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Extramarital relations and perceptions of HIV/AIDS in Nigeria*

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Abstract

Data from a 1991 survey of five Nigerian towns are used to examine currently married men's and women's perceptions of AIDS which, together with other socioeconomic factors, are then related to extramarital sexual behaviour. An overwhelming majority of the respondents have accurate information about AIDS. In particular, most associate HIV/AIDS transmission with multiple sexual partners, though only one-third of them think that the fear of AIDS has limited casual sex in their communities. About 54 per cent of men and 39 per cent of women have had extramarital relations, with 18 per cent of men and 11 per cent of women having done so in the previous week. The incidence of extramarital relations varies considerably by respondents' level of education, type of marriage, religion, and spousal closeness. More importantly, knowledge of multiple sexual partners as a risk factor for HIV/AIDS is inversely related to extramarital affairs. The study underscores the link between knowledge and behaviour, and calls for a well-articulated campaign designed to educate the populace about the threat of AIDS, with the aim of modifying both premarital and extramarital sexual behaviour, thereby reducing the risk factor for HIV through heterosexual relations which is the main mode of transmission in Nigeria.

Introduction

In the past few years, and as a consequence of the AIDS pandemic in Africa, a major research endeavour in Nigeria has focused on sexual networking. This is defined as the number of different sexual partners a sexually active individual maintains within a given period, and most of the published work relating to Nigeria is associated with Orubuloye and the Caldwells (Orubuloye, Caldwell and Caldwell 1990, 1991, 1992; Caldwell, Orubuloye and Caldwell 1991). These studies have been highly localized, and have involved relatively small samples. Nevertheless, many insightful and instructive findings have emerged from their pioneer efforts. For instance, they reveal a very high level of sexual networking among married people in the Ekiti District of Nigeria, comparable to levels in East and Southern Africa, and in Western societies; the level is higher among men than women, and higher in urban than rural areas. Furthermore, polygyny and post-partum sexual abstinence are the underlying social institutions explaining the observed high levels of sexual networking in Ekiti.

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The increasing number of HIV/AIDS cases recently reported in various states of Nigeria, and some reports of AIDS fatalities (WHO 1993; FMH&HS 1992) make these findings timely; there is a need for more and larger studies, employing more rigorous analytical techniques, to gain a deeper understanding of the risk of HIV transmission in Nigeria. In this study, I examine data on HIV/AIDS awareness and perceptions which are, together with selected socioeconomic factors, then related to recent extramarital relations among currently married men and women.

Data and methods

This study uses data collected in a 1991 study of five urban centres in Nigeria: Jos and Zaria in the north, and Ibadan, Irrua-Ekpoma, and Owerri in the south. The selected towns were divided into three fairly distinct residential zones corresponding to the social class of residents. Streets were randomly selected from each zone, and houses and households were systematically selected until the required sample size for a particular zone was attained. In each selected household, one currently married man 60 years or under, and his wife, or one of his wives in polygynous situations, were interviewed. In polygynous homes, wives were assigned numbers corresponding to their rank-order, then one number was drawn randomly and the matching wife was accordingly selected for interview. A pair of male and female fieldworkers interviewed the couples at the same time, but in different locations. Where a partner was not home, the present one was interviewed, but was requested not to discuss the topic and questions of the interview with the absent partner. Revisits were made until the questionnaire was successfully administered to the absent spouse. In all, 3,200 couples were interviewed.

The questionnaire contained a number of questions on respondents' knowledge of HIV/AIDS and their extramarital sexual behaviour. Among the questions on extramarital behaviour are the number of times the respondents engaged in extramarital sexual activity in the previous week, and in the last month; who their last sexual partner was; condom use; knowledge and perceptions of HIV/AIDS, risk factors of AIDS and precautions being taken to avoid contracting the disease. The precise wording of the knowledge questions is:

> Have you heard about the disease that makes one slim or lean, called AIDS (use local names for AIDS where applicable)? Responses: Yes/No.
>
> (For those who answered 'Yes')
>
> When did you hear about it first (year)?
>
> From whom or what source did you first hear about it? (open-ended)
>
> What are the means through which AIDS can be transmitted?
>
> (List all means mentioned by the respondent)
>
> Have you seen anybody suffering from AIDS? (Yes/No)
>
> What do you consider the most important precaution against the spread of AIDS? (open-ended).

Both descriptive and analytical methods were used to examine knowledge of multiplicity of sexual partners as a source of HIV/AIDS infection, and recent extramarital sexual behaviour among men and women. With the aid of logistic regression, I attempted to predict, first, respondents' knowledge that having multiple sexual partners is a risk factor for HIV/AIDS, and secondly, the likelihood of respondents having had an extramarital affair in the previous week. In particular, we want to know whether or not knowledge of the risk factors for AIDS affects high-risk behaviour. The calculation of odds ratios, by means of logistic regression enables us to examine the relative impact of each variable, controlling for

the effects of other variables in the model (Hosmer and Lemeshow 1989). A number of variables were examined in many possible models for both men and women, and the final models were chosen on the basis of parsimony. Thus, the set of variables in the models for men may be different from those for women.

The independent variables considered include current age, religion, ethnicity, level of education, type of marriage, duration of marriage, knowledge and perceptions of AIDS; socio-economic status, derived from 5-item questions on modern household items available to the respondent; and an index of spousal closeness, constructed from three 3-category[1] questions: whether partners always ate together; always slept together; and always discussed family matters. An index with values ranging from 0 to 6 was generated, which was then trichotomized into low (values 0 to 3), moderate (values 4 and 5), and high (value 6). Extramarital sexual behaviour was expected to vary among categories of these variables because of the underlying differences in social and familial norms, different exposure to modern or traditional lifestyles, and variations in emotional attachment among couples; and because accurate knowledge of the risk factors for AIDS may affect the likelihood of risky sexual behaviour.

The HIV/AIDS situation in Nigeria

Although the prevalence of HIV/AIDS appears low in Nigeria, AIDS has become a major public-health issue. According to the Federal Ministry of Health (FMH&HS 1992), the first case of AIDS in Nigeria, involving a sexually active 13-year-old girl, was identified in 1984. Few cases were reported until 1989, when 23 AIDS patients were identified. Since then, reported AIDS cases have more than doubled each year. In 1990, 90 new AIDS cases were reported throughout the country; this increased to 218 in 1991, 367 in 1992 and 212 in the first nine months of 1993 (FMH&HS 1992; WHO 1993). By the end of 1993, close to 1000 AIDS cases had been identified[2], and some 500,000 to 600,000 people are estimated to be HIV-positive (WHO 1993; FMH&HS 1992). This rapid increase notwithstanding, the disease is likely to be underreported partly because of the recency and paucity of HIV surveillance centres, and the inadequacy of testing reagents. Furthermore, the varying latency of HIV among people suggests that some HIV-infected individuals may not manifest the symptoms for months or even years, even though they can transmit the virus to others.

The demography of reported AIDS cases in Nigeria indicates that about two-thirds of sufferers are males, and that the disease is most prevalent between the ages of 20 and 39 years among both sexes, with more than 66 per cent of patients concentrated within this age bracket (WHO 1993). HIV infection and even full-blown AIDS have been reported in virtually all the states of the country. The WHO *AIDS Surveillance Report* reveals that Lagos, Enugu, Plateau, Bornu, Benue and Kaduna states are leading (in that order) in the number of reported AIDS cases. Since these states have few features in common, the low figures reported for many other states may be partly due to underreporting rather than low prevalence. The main mode of AIDS transmission in Nigeria is heterosexual sex, which accounts for more than 71 per cent of reported AIDS cases, followed by blood transfusion and infection by blood products (2.5 per cent), and vertical transmission from mother to infant (1.4 per cent). For the remaining 25 per cent of the AIDS cases the transmission mode was not or could not be specified (WHO 1993), although the likelihood of sexual transmission is high.

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1 (never=0, sometimes=1, always=2)

2 917 by September 1993

Knowledge and perceptions of HIV/AIDS

This study shows that a large majority of urban Nigerians are aware of HIV/AIDS, and have accurate knowledge of its modes of transmission. About 86 per cent of men and 79 per cent of women claimed knowledge of AIDS. The modes of transmission mentioned most frequently were casual sexual intercourse or having multiple sexual partners, and blood transfusion. However, many erroneously also mentioned handshaking, haircuts, sharing clothes, and toilets as other means through which AIDS could be transmitted. Most men and women said they had first heard about AIDS from the media, particularly radio and newspapers. Other sources of information on AIDS included friends and relatives, and medical personnel.

When respondents were asked to identify which precautions against HIV/AIDS they knew from a list of precautions read out by the interviewer, the single most important means they identified was avoiding multiple sexual partners Next came using condoms and avoiding blood transfusions (Table 1).

Table 1
Different means of preventing AIDS/HIV transmission, male and female respondents who know about AIDS (per cent)

	Men		Women	
Preventive means	**% with knowledge**	**number**	**% with knowledge**	**number**
avoid multiple sexual partners	81.8	2291	76.3	2026
use of condom	63.0	1765	54.6	1446
avoid blood transfusion	60.4	1691	55.0	1455
avoid intravenous injections	54.2	1517	46.0	1217

In a related question, the respondents were asked what they considered to be the most important precaution against AIDS transmission: the majority of both men and women considered avoidance of casual sex the most important (Table 2). The two next most important precautions were the use of condoms, and avoiding blood transfusions.

An overwhelming majority of urban Nigerians associate HIV/AIDS transmission with sexual relations, and especially with casual or multiple partners. Because it is now well established that HIV/AIDS transmission occurs through heterosexual intercourse involving an infected partner, the respondents' correct identification of maintaining one sexual partner, or avoiding casual sex, as the most important means to prevent transmission augurs well for the containment of the AIDS epidemic in Nigeria if, indeed, people's knowledge dictates their behaviour. Yet, when we asked the respondents whether they thought the fear of HIV/AIDS infection had limited casual sex in their community, only one-third each of men and women who knew about AIDS agreed. Twenty-six per cent of men and eight per cent of women thought that the fear of AIDS had not limited casual sexual relations, and 30 per cent of men and 38 per cent of women said they did not know. The rest failed to answer.

Information was further sought on the respondents' personal experience with extramarital sex in relation to their perceptions of the risk of AIDS. Nearly 54 per cent of men, and 74 per cent of women, who knew about AIDS, said they had never had extramarital relations. About 29 per cent of men and ten per cent of women had modified their sexual behaviour because of the fear of AIDS, most of them having become more selective of their extramarital sexual partners (14 per cent of men and three per cent of women), or stopped extramarital affairs completely (ten per cent of men and five per cent of women). A smaller proportion said they

now used condoms in extramarital encounters (five per cent of men and two per cent of women). It is perhaps more worrying that more than eight per cent of men and seven per cent of women replied that they did not bother about AIDS when they chose sexual partners outside their marriage. The remaining eleven per cent of men and ten per cent of women did not respond to the question.

Table 2
Most important precaution against AIDS transmission, male and female respondents who know about AIDS (per cent)

Precautions against AIDS transmission	Men		Women	
	%	number	%	number
avoid casual sex	59.6	1670	57.8	1529
abstain from sex completely	8.5	239	10.4	274
always use condom	8.4	235	6.7	178
avoid blood transfusion	5.0	139	4.5	118
avoid intravenous drug injections	1.4	38	0.8	22
combinations of above	6.9	192	10.5	278
only God can prevent AIDS	1.3	37	9.0	23
don't know/No response	0.9	250	8.5	225
Total	100.0	2800	100.0	2647

It is clear from these results that although AIDS awareness is high in urban Nigeria, a substantial number of people still engage in high-risk sexual behaviour by continuing to have casual sex, or by having multiple partners, and doing so without using condoms which have proved to offer some protection against HIV transmission (Liskin, Wharton and Blackburn 1990). The main reason why some people have not modified their sexual behaviour is their belief that AIDS is not yet common in Nigeria; many claimed not to have known or seen an AIDS patient. Others view the dangers of AIDS with resignation, arguing that one will eventually 'die of something', and so are not yet prepared to change their usual sexual behaviour because of the threat of AIDS.

Since casual sex or having multiple sexual partners is identified as the most important risk factor for HIV/AIDS, it is necessary to know if various respondent characteristics predict such knowledge. I therefore performed a logistic regression to predict knowledge that multiple sexual partners are a risk factor for AIDS transmission. The dependent variable was coded 1 if a respondent knew that having multiple sexual partners is a risk factor for AIDS, and 0 otherwise. The results for men and women are presented in Table 3. Many factors were modelled, and the table shows only the best model. It is noteworthy that nearly the same set of variables yield parsimony for both the male and female equations, the only exception being that the female model lacks one variable, religion, that appears in the male equation. The variables were selected by the forward stepwise method, but all categories (dummies) of a selected variable, irrespective of statistical significance, were entered in the final model for the sake of completeness. For instance, among men the indigenous religion category, and Jos and Zaria categories of study location, were 'forced' into the model to show the relative importance of all categories of the particular variable; the same is applicable for the Zaria category of study location among women.

Table 3
Logistic regression of knowledge that multiple sexual partners are a risk factor for AIDS, currently married men and women

	Men		Women	
Variable/category	**Coefficient**	**Odds ratio**	**Coefficient**	**Odds ratio**
Age				
< 30	}0.441	1.554***	0.492	1.636***
30-34	0.406	1.500***	0.545	1.725***
35-39	0.263	1.301**	0.484	1.622***
40-49	0.0	1.0	}0.0	1.0
50 +				
Religion				
Catholic	0.412	1.510***	Excluded from Model	
Protestant	0.227	1.254*		
Indigenous religion	0.182	0.834		
Muslim	0.0	1.0		
Education				
no schooling	0.0	1.0	0.0	1.0
primary	0.879	2.409***	0.737	2.091***
secondary	1.353	3.868***	1.209	3.350***
tertiary	1.771	5.875***	1.594	4.923***
Type of marriage				
monogamy	0.223	1.254**	0.320	1.377***
polygyny	0.0	1.0	0.0	1.0
Socioeconomic status				
low	0.0	1.0	0.0	1.0
middle	0.283	1.327**	0.291	1.337***
high	0.412	1.509***	0.415	1.514***
Study location				
Ibadan	0.633	1.883***	1.267	3.551***
Owerri	0.569	1.767***	1.203	3.328***
Jos	0.105	1.111	0.383	1.466***
Zaria	-0.087	0.917	0.040	1.040
Irrua-Ekpoma	0.0	1.0	0.0	1.0
Constant	-1.202		-1.564	
Initial model				
-2 log likelihood	3786.07		4134.32	
df	3143		3131	
Final model				
-2 log likelihood	3204.90		3369.97	
df	3127		3118	
Model X^2	581.18		764.35	
df	16		13	

Note: ***p<.001 **p<.05 *p<.10.

Catholic and Protestant men are more likely to know about the risk factors for HIV/AIDS than Muslims and members of indigenous African religions. This is probably related to the condemnation of sexual promiscuity by the church, and the increasing pulpit messages

associating HIV/AIDS with divine punishment for adultery and fornication. As would be expected, knowledge of the risk factors for HIV/AIDS increases as the level of education increases. Indeed, the odds ratios show that of all variables in the model, the one most strongly related with such knowledge is education. Men with some primary education are 2.4 times more likely to know the risk factors for AIDS than those with no formal schooling; men with secondary and tertiary education are respectively 3.9 and 5.9 times more likely. Similarly, women with primary, secondary and tertiary education are respectively 2.1, 3.4 and 4.9 times more likely to know about the risk factor for HIV/AIDS than women with no schooling. Education leads to the acquisition of information and increases the extent to which such information is processed, used and passed on to individuals or members of a social network.

Being in a monogamous marital union, instead of a polygynous situation, is associated with greater knowledge of HIV/AIDS risk factors. The odds ratios for monogamous men are 1.25 times greater than for polygymous men, while monogamous women are 1.38 times more likely to know the risk factors of AIDS than those in polygamy. Since monogamous couples are more likely to be over-represented among the modern urban elite, their superior knowledge may be related to their having a broader and more modern world view than those in polygyny, who are more likely to be older and less educated. Socioeconomic status, which is derived as a composite of modern household durables, including radio, television and car, has a strong statistically significant effect on knowledge of HIV/AIDS risk factors among both men and women. The finding is in the expected direction, and suggests the impact both of social class and of different levels of ownership of the modern means through which information is disseminated.

The location dummies compare four large cities with the smaller semi-urban town of Irrua-Ekpoma on the assumption that accurate knowledge of the risks of HIV/AIDS varies by place of residence. Among men, those interviewed in the two southern cities of Ibadan and Owerri are much more likely to know about the risk factors for AIDS than are residents of Irrua-Ekpoma. Residents of the two northern cities of Jos and Zaria are not significantly different from the reference category. The same pattern is evident among women, except that female residents of Jos differ significantly from those in Zaria and Irrua-Ekpoma in having accurate knowledge of the risk factors for HIV/AIDS. These results could be due to variations in media coverage of AIDS, and also accessibility to the media, both of which are more likely in Ibadan, Owerri and, to a lesser extent, Jos. Although the five locations are university towns, Ibadan and Owerri stand out in being predominantly literate populations, and located in highly urbanized and thickly populated parts of the country. They also appear to be more cosmopolitan than the other three locations, which apart from being less industrialized also have very large Muslim populations.

In sum, when current age is controlled, the characteristics that predict knowledge that multiple sexual partners are a risk factor for AIDS among men include education, type of marriage, socioeconomic status, religion and location of study. The same set of variables, except religion, also predict female knowledge. The next task is to predict extramarital sexual behaviour on the basis of knowledge of risk factors for AIDS as well as of these sorts of factors.

Extramarital sexual relations

Research on sexual networking in Nigeria has revealed a considerable level of extramarital sexual relations among men and women (Orubuloye et al. 1990, 1991). We asked our respondents two questions on extramarital affairs: whether or not they had ever had sexual relations with a person other than their spouses since they had first married; and whether they

had had an extramarital sexual episode in the previous week. About 46 per cent of all men and 61 per cent of all women claimed they had never had intercourse with anyone other than their partners since their marriage: in other words, about 54 per cent of men and 39 per cent of women have had extramarital relations. With respect to sexual encounters in the previous week, 18.2 per cent of men and 10.6 per cent of women reported that they had had such an encounter. The relatively high level of extramarital relations in the previous week compared with the overall level of extramarital affairs perhaps suggests the existence of a very sexually gregarious subgroup of men (and, for that matter, women), who repeatedly stray outside marriage, and a solid proportion of people who do not. As for the nature of their recent extramarital partners, 34 per cent of men mentioned girl- or woman-friends, eleven per cent mentioned free girls or prostitutes and the rest failed to identify their partners. Ten per cent of women who had had extramarital encounters in the previous week identified their last partner as a male friend, while 39 per cent said their last partner was an acquaintance; the rest did not identify their last extramarital partner. Male prostitution has not been widely reported in Nigeria, even though there are a few places in big cities where some well-to-do women go to pick up men. However, that more than one in ten men said they had had relations with free women or prostitutes suggests considerable commercialization of sex in Nigerian cities, which certainly has profound implications for STD transmission in general, and HIV/AIDS transmission in particular. The women described as 'free' include 'school-girls' in secondary and tertiary institutions, who in some cities usually linger at favourite spots soliciting sex, essentially for money to maintain their high-profile, Western lifestyles.

Table 4 displays variations in the incidence of extramarital relations since marriage, and in the previous week. For both men and women, marital infidelity tends to increase with age. This is partly because older people have passed through a longer period of exposure to the risk of extramarital sexual relations. The incidence of extramarital relations varies widely with religion, with Roman Catholics, Muslims, and members of indigenous religions being more likely to be unfaithful, and Protestants and Pentecostals being less likely. People with less education are somewhat more prone to having extramarital relations, but the results are not very firm, especially with respect to the most recent extramarital episode. Overall, polygynists are more likely ever to have had extramarital relations than monogamists, but for recent extramarital encounters, male monogamists exceed male polygynists; there is virtually no difference in recent extramarital affairs by type of marriage among women. The extent to which marriage partners are close, or are emotionally bonded, might be considered to be directly related to faithfulness in marriage. As Table 4 indicates, spousal closeness appears to have a considerable negative influence on extramarital relations, especially among women. Extramarital affairs also tend to vary by socioeconomic status. As expected, knowledge of AIDS and its risk factors have a negative impact on extramarital relations. Although Table 4 reveals considerable variations in the incidence of extramarital relations, these differences may be misleading if the variables are interrelated. As a result, the relationships are re-examined using a logistic regression model.

The multivariate analysis of extramarital relations is focused on extramarital affairs in the past week. On the one hand, lifetime extramarital affairs are more likely to be misreported; on the other, recent extramarital relations are more relevant for HIV/AIDS transmission given the recency of the pandemic. As usual, the dependent variable is dichotomous, coded 1 if a respondent reported having an extramarital affair in the previous week, and 0 otherwise. All the covariates described in Table 4 were tested in a forward stepwise logistic model using the dummy-variable format, with the best models for men and women displayed in Table 5.

Table 4
Percentage distributions of currently married men and women by two measures of extramarital relations, by sex

	Ever had affair		Affair in previous week	
Variable/category	**Men**	**Women**	**Men**	**Women**
Age				
< 30	58.9	38.3	16.3	11.8
30-34	53.0	33.6	16.0	7.4
35-39	51.2	36.2	18.9	8.1
40-49	50.7	44.8	17.6	11.9
50-60	58.0	54.0	11.2	15.3
Religion				
Muslim	51.2	41.1	15.4	10.3
Catholic	62.4	41.1	23.7	12.3
Protestant	49.2	32.0	17.7	9.6
Pentecostal	42.4	28.0	12.3	6.3
Indigenous religion	63.7	54.5	22.1	13.5
Educational level				
no schooling	65.0	58.1	16.2	10.9
primary	57.1	39.2	21.8	11.0
secondary	52.2	31.3	16.7	10.4
tertiary	46.9	25.5	17.2	9.6
Type of marriage				
monogamy	53.0	36.2	18.7	10.5
polygyny	57.4	46.4	15.7	10.8
Marital duration				
0-5 years	57.7	32.2	18.0	10.5
6-12 years	50.1	34.6	17.6	8.1
13 years +	52.5	47.7	18.8	12.1
Spousal closeness				
low	62.0	50.6	19.8	13.6
moderate	53.9	38.7	20.2	10.1
high	43.6	25.8	13.1	7.3
Socioeconomic status				
low	58.9	32.2	20.0	11.6
medium	50.3	34.6	15.6	10.0
high	44.1	47.7	16.2	8.4
Knows about AIDS				
yes	47.3	25.2	17.4	9.0
no	94.4	94.8	23.2	16.5
Condom prevents AIDS transmission				
knows	50.4	25.6	17.1	7.6
doesn't know	57.8	50.4	19.4	13.0
Many sexual partners as risk factor				
knows	47.0	23.0	15.6	7.7
doesn't know	70.3	66.7	24.3	15.3
Total	53.7	39.3	18.2	10.6
	(3143)	(3135)	(3143)	(3135)

Only five factors significantly affect recent extramarital affairs among men, namely religion, education, type of marriage, degree of spousal closeness, and knowledge of multiple sexual partners as a risk factor for HIV/AIDS. For women current age, education, spousal closeness, religion, awareness of AIDS, and knowledge of the risk factors for HIV/AIDS yield the most parsimonious model. Among women the odds of having extramarital affairs in the past week are lower in the central age groups, 30-34 and 35-39, than at ages 40 years and over, and under 30.

The higher level of extramarital affairs among older women is probably related to their stage in the life cycle; most of their children have grown up or left home so they have more time to socialize outside the home. Having completed their families, many are actively involved in economic pursuits such as government contracts and large scale commercial enterprises, and are therefore wealthy; the common tag of 'cash-madam' is associated with such women who, apart from being rich, also exhibit independence in their personal behaviour. Many probably maintain relatively weak relationships with their spouses, who may have taken younger wives. The higher rate of extramarital sexual activities among women under 30 may reflect what Orubuloye et al. (1990, 1991) have described as something of a female sexual revolution, which has occurred in the last two decades in Nigeria, whereby women now increasingly view sexual relationships as a form of recreation. Perhaps also, younger wives may maintain sexual links with premarital sexual mates or friends (Isiugo-Abanihe 1993b).

It is perhaps for the same reasons that religion, despite the condemnation by various religious groups of marital infidelity, proves not to be an important predictor of female extramarital affairs. Among men, in contrast, Catholics are about 79 per cent more likely than Muslims to have had an extramarital affair in the previous week, while members of the indigenous religions are about 49 per cent more likely. It is clear from these results that many Christians, especially Catholics, fail to follow the teachings of their religion regarding marital fidelity.

Irrespective of sex, education presents a positive association with extramarital relations, with a higher probability of engaging in extramarital affairs the higher one's level of education. However, a monotonic increase in the rate of extramarital affairs with level of education is demonstrated only by women. Among men, the probability of having had extramarital relations in the previous week is high for those with secondary education, higher for those with some tertiary education, and highest for those with primary education. The female pattern is consistent with female liberation and empowerment, while the male pattern may be related to income. Primary-school-educated men include a large number of merchants, entrepreneurs and skilled and semi-skilled workers, many of whom are considered wealthy by Nigerian standards, and can, therefore, afford the cash which many of their extramarital partners demand. On their part, men with some tertiary education constitute the social and government elite whose work experience is more likely to expose them to high risks of extramarital overtures.

The odds of having extramarital relations do not significantly differ between women in monogamous unions and those who are in polygynous unions. However, male monogamists are significantly more likely to be currently engaged in extramarital relations than their polygynous counterparts, who have the luxury of changing sexual partners within marriage. Conversely, if the only wife in a monogamous marriage is away from home, or unavailable through sickness or during a period of post-partum sexual abstinence, a husband who cannot exercise continence must look for a sexual partner outside the home.

Table 5
Logistic regression of extramarital affair in the previous week, currently married males and females

	Men		Women	
Variable/category	**Coefficient**	**Odds ratio**	**Coefficient**	**Odds ratio**
Age				
< 30	Excluded from model		0.023	1.023
30-34			-0.461	0.631**
35-39			-0.390	0.677*
40+			0.0	1.0
Religion				
Catholic	0.583	1.791***	Excluded from model	
Protestant	0.071	1.074		
Indigenous religion	0.396	1.485***		
Muslim	0.0	1.0		
Education				
No schooling	0.0	1.0	0.0	1.0
primary	0.535	1.708***	0.405	1.499**
secondary	0.341	1.406*	0.525	1.691**
tertiary	0.407	1.502**	0.625	1.860***
Marriage				
monogamy	0.285	1.330*	Excluded from model	
polygyny	0.0	1.0		
Spousal closeness				
low	0.0	1.0	0.0	1.0
moderate	-0.249	0.838	-0.448	0.639**
high	-0.541	0.582***	-0.798	0.450***
Knows about AIDS				
yes	Excluded from model		-0.332	0.717*
no			0.0	1.0
Knows many sex partners are AIDS risk factor				
yes	-0.651	0.522***	-0.616	0.540***
no	0.0	1.0	0.0	1.0
Constant	-1.766		-1.563	
Initial model				
- 2 log likelihood	2979.07		2087.47	
df	3143		3131	
Final model				
- 2 log likelihood	2885.10		2009.94	
df	3133		3121	
Model X^2	93.97		77.53	
df	10		10	

Note:***p<.001; **p<.05; *p<.10.

Emotional bonding between spouses, or spousal closeness, clearly shows a negative relationship with the incidence of extramarital relations. For instance, men who share a strong emotional bond with their partners are about 58 per cent as likely to have had extramarital relations in the previous week as those with a weak bond. Similarly, women who are strongly bonded with their husbands are 45 per cent as likely to have had extramarital relations in the previous week as women who are weakly bonded, while those who are moderately bonded are about 64 per cent as likely. Partners who are emotionally distant may be more likely to reject each other's sexual advances, and less likely to derive satisfaction from such encounters when they do take place: consequently, sexual satisfaction may be sought outside the marital home.

The relation between knowledge and behaviour has long been a popular topic for family-planning research. The present data set offers a rare opportunity to relate knowledge of AIDS and of the multiple-sexual-partnership route of HIV/AIDS transmission to extramarital sexual behaviour. As Table 5 shows, women who know about AIDS are less likely to engage in extramarital relations[3]. Moreover, knowledge of multiple sexual partners as a risk factor for AIDS is inversely and very strongly related to current incidence of extramarital affairs among both men and women. Indeed, using the forward stepwise regression procedure in exploratory models, the variable was the single most powerful predictor of recent extramarital sexual activity for both men and women[4].

The multivariate analysis shows that both men and women who know that having multiple sexual partners constitutes a risk factor for HIV/AIDS are about half as likely to have engaged in extramarital sex in the previous week as people who have no knowledge of this route of AIDS transmission. Elsewhere I have shown that knowledge that the condom offers protection against HIV/AIDS transmission affects current use of the device (Isiugo-Abanihe 1992). The odds ratio of condom use for men who know about its protective ability is 2.35 times greater than for men without such knowledge. Given recent increases in the numbers of HIV patients and AIDS-related deaths in Nigeria (FMH&HS 1992; WHO 1993), and the finding that knowledge does appear to affect behaviour, the need to educate the populace on the risk factors of the disease deserves priority attention.

An observation in respect of the relation between education and extramarital sexual behaviour is in order. The analysis indicates that net of knowledge of sexual risk factors and the confounding effects of other variables in the model, education exerts a positive effect on extramarital sexual relations. Ordinarily, one would have expected an inverse association between the two variables given that education is an important predictor of knowledge of risk factors of such behaviour. Furthermore, that education does not give the expected inverse relation with behaviour is probably a function of the fact that many educated people are likely to adopt precautionary measures to avoid contacting sexually transmitted diseases generally, such as using a condom. Indeed, this study indicates that about 54 per cent and 37 per cent of men who had tertiary and secondary education respectively had ever used a condom, in comparison with about one-quarter of men who had only primary education and just four per cent of those with no formal education. Current use figures are 40 per cent for tertiary, 19 per cent for secondary, 15 per cent for primary and three per cent for those with no schooling.

It could also be that people fail to act according to their knowledge. People may be willing to take a chance in order to derive momentary satisfaction, a situation which is

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3 The relation is also inverse for men, though not significant.

4 In the male model, for example, it has a likelihood (minus twice the log-likelihood) of 2947, and goodness of fit of 3142, both indicating that the model classifies or fits the observed data well, or that the sample results are highly likely given the parameter estimates (Hosmer and Lemeshow 1989).

perhaps underscored by the belief that 'AIDS is not in Nigeria yet'. Many Nigerians believe that 'AIDS is a white man's disease' that was introduced to east Africa in the course of their popular 'safaris'. That many people are yet to know or see an AIDS patient suggests that the seriousness of the disease may not have struck home among most Nigerians. Thus, the discriminatory impact of educational attainment with respect to extramarital relations is still somewhat obscured.

Conclusion

Studies of sexual behaviour in Nigeria have long focused primarily on single women[5], probably because unintended pregnancy and its consequences were considered the main, if not the only, negative consequences of such behaviour (Isiugo-Abanihe 1993a). People often gossiped about married people who engaged in extramarital sexual relations; but probably because such practices were usually discreet and could be a prelude to a polygynous relationship, extramarital affairs were generally disregarded and received little research interest (Isiugo-Abanihe 1993b). However, the advent of AIDS has kindled interest in sexual behaviour both before and outside marriage in an attempt to identify the numbers and characteristics of men and women at risk of contracting AIDS, especially through heterosexual activity, and to understand differences between the sexual behaviour of different groups (Isiugo-Abanihe 1993b; Orubuloye et al**.** 1992, 1993). This is perhaps all the more important given novel social realities and the widening gap between what the old and the young consider to be acceptable sexual practice (Isiugo-Abanihe 1993b).

An overwhelming majority of respondents had accurate information about HIV/AIDS. In particular, they associated AIDS transmission largely with casual sex or having multiple sexual partners, though only one-third thought that the fear of contracting the disease had limited casual sex in their community. Although some people claimed to have personally modified their sexual behaviour outside marriage, many were not bothered by the AIDS epidemic, and continued to have extramarital relations, and without the benefit of the condom even though a majority identified condoms as offering protection against the transmission of HIV/AIDS. Through the use of logit regression, age, education, type of marriage, socioeconomic status, and city of residence were identified as the main predictors of knowledge of the risk factors for HIV/AIDS.

Extramarital relations involving multiple or casual partners, either in the past or currently, are not limited to a few married men and women. More than one-half of currently married men and two out of five women had had extramarital relations. The prevalence of recent extramarital affairs is also high, with almost one in five men and more than one in ten women having had extramarital relations in the past week.

Multivariate analysis reveals important variations in the incidence of extramarital sexual activity in various subgroups. Catholic men and members of the indigenous religions were more likely to engage in extramarital affairs than Protestants and Muslims. People who had been to school were more likely to engage in extramarital affairs than people who had not. Male monogamists were more likely than polygymists to be currently having extramarital affairs. Emotional bonding between spouses, or spousal closeness, had an inverse relationship with extramarital affairs, spouses who were not close being more likely to seek sexual satisfaction away from home. Finally, the logit model reveals that men and women who knew that multiple sexual partners were a risk factor for HIV/AIDS were less likely to have had extramarital relations in the past week; this suggests an important link between

5 See, for example Omu et al.1981; Oronsaye, Ogbeide and Unuigde 1982; Oronsaye and Odiase 1983; Gyepi-Garbrah 1985; Nichols et al. 1986; Feyisetan and Pebley 1989; Makinwa-Adebusoye 1992.

knowledge and behaviour. There is, therefore, an urgent need for a national program designed to collect current and comprehensive data on HIV/AIDS incidence throughout the country, and to inform, educate and communicate the HIV/AIDS message.

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The impact of rural-urban migration on child survival

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Abstract

Large rural-urban child mortality differentials in many developing countries suggest that rural families can improve their children's survival chances by leaving the countryside and settling in towns and cities. This study uses data from Demographic and Health Surveys in 17 countries to assess the impact of maternal rural-urban migration on the survival chances of children under age two in the late 1970s and 1980s. Results show that, before migration, children of migrant women had similar or slightly higher mortality risks than children of women who remained in the village. In the two-year period surrounding their mother's migration, their chances of dying increased sharply as a result of accompanying their mothers or being left behind, to levels well above those of rural and urban non-migrant children. Children born after migrants had settled in the urban area, however, gradually experienced much better survival chances than children of rural non-migrants, as well as lower mortality risks than migrants' children born in rural areas before migration. The study concludes that many disadvantaged urban children would probably have been much worse off had their mothers remained in the village, and that millions of children's lives may have been saved in the 1980s as a result of mothers moving to urban areas.

Recent demographic surveys in several developing countries, including Ghana, Guatemala, Morocco, Niger, Nigeria, Pakistan, Uganda, and Zambia, indicate that child mortality decline in rural areas has slowed or halted since the 1970s, and that rural-urban child mortality differentials remained large or increased between the 1970s and 1980s (Cleland, Bicego and Fegan 1992). The most important reasons for persistent high child mortality in rural areas of many countries remain the subject of debate among researchers[1], but probably include a variety of causes in each country. Among the most common and plausible explanations are the continued concentration of public health-related resources in large cities (UNICEF 1994), the failure of immunization and family planning programs to achieve high levels of coverage in remote regions (USAID 1991), the resurgence of malaria and other infectious diseases in some tropical environments (WHO 1990; Bradley 1991), and the localization of prolonged civil wars in mountainous or jungle areas, for example in Afghanistan, Angola, Cambodia and Mozambique.

The limited progress of international health programs and rural development policies in improving child health and survival in many rural areas raises the question whether rural mothers or parents can improve their children's survival chances by leaving their villages and settling in towns and cities, where modern health and social services, income-earning

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[1] See the World Bank's *World Development Report* (1993) and Desai (1993), for example, for conflicting interpretations.

opportunities, superior housing, stable food supplies, and modern information on child health care are generally more available. In other words, does cityward migration represent a means for rural families to experience quicker and more pronounced improvements in their children's health and life opportunities than waiting for the benefits of national economic growth or redistributive sectoral policies to 'trickle down' to the village level? If so, and in the absence of genuine attempts by governments to improve living conditions in rural areas, a case could be made that policies and measures implemented to restrict rural-urban migration discriminate against disadvantaged children and contradict the goals of child survival expressed at the 1990 World Summit for Children. Evidence that rural-urban migration enhances child survival would also bolster the arguments of those who maintain that seasonal and long-term mobility to urban areas should be allowed and in some cases facilitated as a family survival strategy or as a means to promote national economic growth (Richardson 1989; Findley 1992).

On the other hand, the conventional belief is that rapid in-migration to towns and cities of developing countries leads not only to such well-known problems as shortages of housing, jobs and social services, and to environmental degradation (UN 1993), but also to increased threats to the health of children of migrants as well as to those of the existing, resident urban population (Bogin, 1988). Throughout the developing world, migrant women in big cities are more likely than non-migrants to settle and remain in slums and shantytowns where basic household facilities essential for good health and survival are unavailable (Brockerhoff 1993). Furthermore, the physical process of moving and resettling in low-income areas typically exposes young children to numerous hardships — new diseases, temporary residence in crowded dwellings, separation from additional care-givers, termination or decrease in the frequency or intensity of breastfeeding — that undermine their well-being. For native children, the influx of new urbanites often brings them into contact with disease agents not typically found in modern urban environments (Prothero 1977; WHO 1991), and further strains the capacity of municipal services and infrastructure to meet their basic needs. Such pressures are recognized to be most common in 'mega-cities' originally designed to accommodate fewer than five million residents, but which now encompass more than ten million inhabitants (Brown 1987; Axelbank 1988). Evidence that rural-urban migration, on balance, exacerbates child health and survival chances would provide additional justification for current policies and measures implemented by virtually all developing country governments to curb rural-urban migration in order to reduce rates of urban growth (UN 1990).

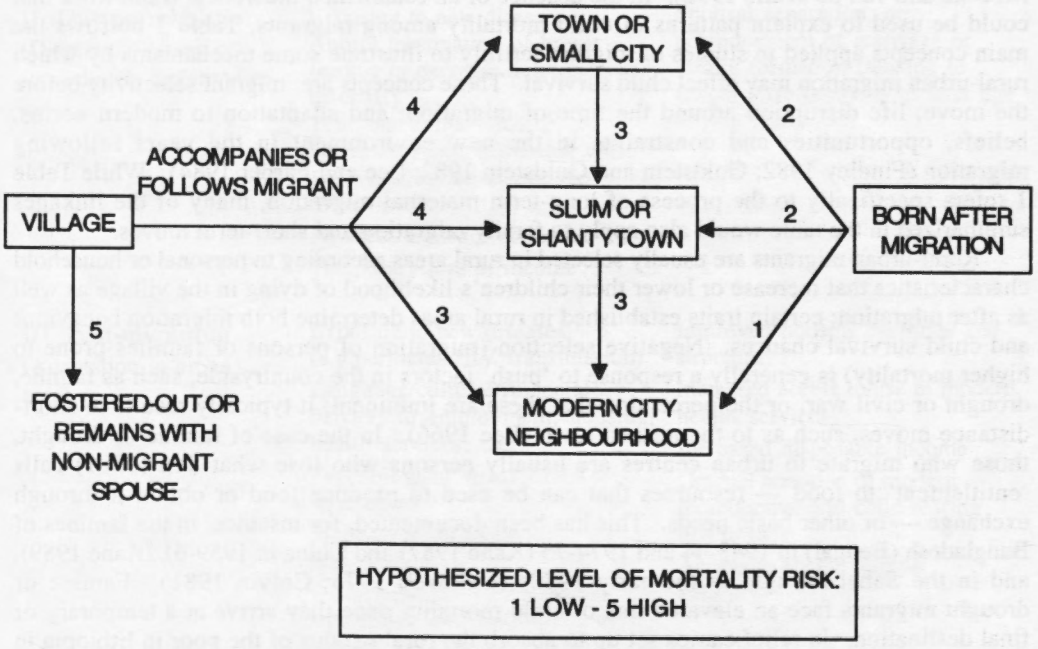
The central question in this study is whether mothers improve or harm the survival chances of their children under age two by moving from rural to urban areas of developing countries, and if so, at what stage, by what magnitude, and through what mechanisms this occurs. Where possible, reference is made to the impact of in-migration on the survival chances of children already residing in urban areas, although direct evidence of such impact is unavailable. The study uses data collected by the Demographic and Health Surveys (DHS) project in 17 countries between 1986 and 1990 to analyse and compare the maternal migration-child survival relationship in four developing regions: sub-Saharan Africa, North Africa, Latin America and Southeast Asia. Pooled regional samples are used in multivariate analyses since most country surveys recorded insufficient vital events to reliably estimate child mortality risks at various stages of the migration process. The regional perspective is intended to identify where policies to curb urban in-migration on the basis of child health concerns are most appropriate.

Conceptual issues: how does maternal migration affect young children?

In assessing the impact of rural-urban migration on child survival, one can differentiate three types of young children who may be affected by their mothers' migration: those left behind in the village by migrant mothers, as foster-children in the care of relatives or with their fathers;

those who accompany their mothers to towns or cities, or soon follow them; and children born after the migrants settle in the urban area, a large majority of whom remain with the mothers through the first few years of life. As shown in Figure 1, children who migrate or are born after migration can be further distinguished according to the type of urban environment in which they reside: a town or small city, a low-income periurban or inner city settlement, or a modern city neighbourhood. Each group of children is hypothesized as subject to a distinct set of mortality risks as a result of their mothers' change of residence.

Figure 1
Hypothesized risks of child mortality associated with maternal migration to urban areas



Cross-national studies of child fosterage and living arrangements suggest that in most developing countries over 95 per cent of children under age five live with their mothers (Page 1989; Lloyd and Desai 1992). Given the lengthy breastfeeding practised in most countries, one may presume that almost all children live with their mothers until their second birthday, the period of interest in this study. Fostering of very young children may be more common among female migrants and mothers in urban areas (Lloyd and Desai 1992), however, and hence warrants some consideration of fosterage-child mortality links. Bledsoe and Brandon (1992) note the difficulty of ascertaining the effects of mother-child separation on child mortality, since fostered children may bring poor health or high mortality risks with them to their new homes. Their review of evidence from West Africa suggests that, while fostered children may be disadvantaged compared to other children in the household where they are staying in terms of access to food or health care, they may nevertheless be better off than if they had remained with their migrant mothers. This may be particularly true if children thus avoid exposure to new infectious pathogens by not migrating at this vulnerable time of life, if they have continued access to the economic resources of a non-migrant father, or if they indirectly benefit from remittances received from the migrant mother or parents. On the other

hand, the mother's departure soon after a child's birth may result in premature exclusive reliance on weaning foods, or placement in a dwelling with other young, unfamiliar children that increases the child's likelihood of contracting a disease. Most important, children who do not migrate with their mothers or parents may not experience any of the health-related benefits more closely associated with urban than rural residence, such as proximity to modern health services and facilities, potable water in the dwelling and greater educational opportunities for the mother.

Few studies have focused on the health and survival of children who migrate from rural areas or are born to migrants in urban areas of developing countries, although several studies have incorporated maternal migrant status as an explanatory variable in child mortality analyses (Farah and Preston 1982; Mensch, Lentzner and Preston 1985; Brockerhoff 1990; Mbacké and van de Walle 1992). In the absence of an established theoretical framework that could be used to explain patterns of child mortality among migrants, Table 1 borrows the main concepts applied in studies of migrant fertility to illustrate some mechanisms by which rural-urban migration may affect child survival. These concepts are: migrant selectivity before the move; life disruption around the time of migration; and adaptation to modern norms, beliefs, opportunities and constraints in the new environment in the years following migration (Findley 1982; Goldstein and Goldstein 1982; Lee and Farber 1984). While Table 1 refers specifically to the process of long-term maternal migration, many of the linkages summarized in the table would also apply to family migration and short-term moves.

Rural-urban migrants are usually selected in rural areas according to personal or household characteristics that increase or lower their children's likelihood of dying in the village as well as after migration; certain traits established in rural areas determine both migration behaviour and child survival chances. Negative selection (migration of persons or families prone to higher mortality) is generally a response to 'push' factors in the countryside, such as famine, drought or civil war, or the perception that these are imminent; it typically results in short-distance moves, such as to the nearest town (Lee 1966). In the case of famine or drought, those who migrate to urban centres are usually persons who lose what Sen (1981) calls 'entitlement' to food — resources that can be used to produce food or obtain it through exchange — or other basic needs. This has been documented, for instance, in the famines of Bangladesh (Bengal) in 1943-44 and 1974-75 (Kane 1987) and China in 1959-61 (Kane 1989), and in the Sahel drought in the early 1970s (Caldwell 1975; Colvin 1981). Famine or drought migrants face an elevated risk of child mortality once they arrive at a temporary or final destination. In relief camps set up to absorb the rural exodus of the poor in Ethiopia in the mid-1980s, contagious childhood diseases, particularly measles, were rampant (Shears and Lusty 1987). At roughly the same time, young children who migrated to towns in the Darfur region of Sudan experienced extremely high excess mortality due to contamination of well water (de Waal 1989). When women who migrate are the most malnourished of the rural population, they probably subsequently experience higher neonatal mortality, due to poor foetal development, prematurity, or complications at delivery (Hugo 1984).

A more common cause of rural out-migration by the less healthy or less well-endowed, particularly in sub-Saharan Africa, is civil war. Refugees who leave their home countries at an early stage of a crisis, that is, anticipatory refugees, are probably wealthier and better educated than persons who choose to remain; as the crisis unfolds, however, migration becomes less selective, as more persons are forced by events to relocate. These later-stage refugees may experience psychological problems of adaptation — anomie, neurosis, alcoholism — in their new area of residence due to their overwhelming identification as members of the population at home, with consequent negative effects for the health of their children (Kunz 1981).

Negative selection of migrants can also occur during non-crisis conditions in rural areas. Divorce or widowhood, for example, often precipitates a mother's departure from the village,

Table 1
Main determinants of child survival during rural-urban migration process

Stage of migration	Impact on child survival	
	Negative	**Positive**
I. Pre-migration (Selection factors of migrants in rural areas)	Loss of entitlement to basic needs (e.g.food, income,shelter, safety) Malnourishment or history of illness of mother or child Divorce or widowhood of mother	Maternal schooling Occupational skills Wealth or income Modern world view (including high aspirations for children)
II. During migration (Disruption during or immediately before/after move)	Exposure to new diseases Abrupt termination of breast feeding or decrease in frequency/ intensity Temporary unavailability of health services, additional child-rearers, adequate shelter and nutrition Physical hardship of move Temporary loss of income	Spousal separation, or postponement of marriage or family formation (leading to longer birth intervals or later age at first birth)
III. Post-migration (Adaptation in urban area)	Exposure to new diseases (e.g.perinatal HIV transmission) Language/cultural/financial barriers to employment, housing, health services, etc. Psychological stress of adjustment More crowded living arrangements Discrimination by municipal authorities and institutions in service provision Depletion of savings (e.g.from need to send remittances).	Improved housing facilities and structure Increased access to/use of modern health services Increased disposable income Gradual adoption of modern reproductive and child-rearing practices Access to social support networks

and can deprive migrant mothers of the economic and social support required to rear healthy children (Morokvasic 1984). When there is no crisis, the departure of migrants who represented the high-mortality or more disadvantaged segment of the rural population should reduce overall rural child mortality levels. Such migrants are likely to experience much higher child mortality than the existing urban population after migration, as was the case in towns in Mali in the 1980s (Hill 1990). Their opportunities to enhance their children's welfare can improve dramatically, however, if they initially or eventually settle in urban neighbourhoods where modern services and housing are more available.

Studies of rural-urban migration in developing countries show, however, that most migrants are selected for characteristics associated with relatively low child mortality, such as having schooling, occupational skills, wealth, and modern attitudes such as a desire for personal advancement and to raise 'high-quality' children (Shaw 1975; Findley 1977). Female rural-urban migrants in sub-Saharan Africa in the 1980s, for instance, were more likely to be

highly educated, in their prime income-earning years, and to have lower fertility than women who remained in the countryside (Brockerhoff and Eu 1993). Since most of these positive traits are established over a period of several years before migration, they should distinguish child mortality levels among migrants and rural stayers for a substantial period of time before migration. They are also likely to facilitate the migrant's adjustment in the new location, and help her, or the family, achieve child mortality levels similar to those of the resident urban population. Migrants who are positively selected are more likely to travel the greater distance and longer duration usually required to reach a major city (Lee 1966), and their departure should increase child mortality, or reduce the rate of decline, in rural areas.

After the decision to migrate has been made, there may occur a delay in marriage or family formation until after the move, which could have a positive effect on child survival through avoidance of high-risk births, such as first births and teenage births. Child survival around the time of migration may also be enhanced by the long birth intervals resulting from spousal separation, which have been observed in the years just before and after migration in sub-Saharan Africa (Brockerhoff and Yang, forthcoming) and Asia (Goldstein and Goldstein 1981). In most cases, however, one would expect a child's risk of contracting disease and dying to increase around the time of the move, because of disruptive changes in migrant behaviour or living conditions associated with moving and resettling. Immediately before migration, such changes may include a migrant's termination of employment and resulting loss of income, or insufficient preparation in the case of forced or hasty moves. During migration the child's diet may change because of termination of breastfeeding or food shortage, for example in situations of famine or negative migrant selection;,other changes might include heightened physiological stress during pregnancy; a temporary relaxation of child care, from the absence of spouse or family; depletion of savings; or temporary unavailability of curative health services. In the first months after settling in the urban area, migrants without family or social support networks are particularly vulnerable to such threats to child survival as unawareness of or lack of access to health resources, and the inability to secure a source of income.

The magnitude of disruptive effects on child survival is likely to depend on the type of migration involved. In general, short-term increases in child mortality are more probable when single moves occur over great distances or long durations, are involuntary, expose children to new epidemiological environments, and are innovative, that is, do not follow a traditional process. Where long-distance and more permanent migration between urban and rural areas has traditionally occurred in stages, in 'step-migration' from village to town to city as in much of sub-Saharan Africa, one would expect less effect on child mortality, since migrants experience cultural change and physical hardships of movement only gradually (Adepoju 1984). As suggested by Figure 1, children born after migration are less subject to disruptive influences of migration on mortality than children who migrate, since these short-term effects are presumed to diminish or disappear over time as the migrant mother or family adjusts to the new environment.

Improved child survival following migration to urban areas, that is, successful adaptation, depends not only on the behaviour and socio-economic mobility of the migrant mother or family, but also on the receptivity of the existing urban population and municipal authorities and institutions, and the conditions underlying migration:the reasons for the move and intended duration of stay (Goldlust and Richmond 1974). Hence, a migrant woman may radically alter her behaviour in ways favourable to child survival but still not experience improvements if, for instance, she faces discrimination in access to social services or severe competition for limited income-earning opportunities, or if she has settled under conditions of extreme duress. To enhance child health and survival, migrants and their children must often overcome numerous personal and situational obstacles which can be categorized as environmental: exposure to new disease agents, residence in more crowded or unsafe housing;

psychological: the stress of leaving home and coping with the conflicting norms of a more heterogeneous population; socio-cultural: normative or linguistic barriers to use of health services; political: discrimination or neglect by government because of non-citizenship or illegality of tenure; and economic: the need to get a source of income or economic support (WHO 1991; UN 1993). Surmounting these barriers usually requires what Skinner (1974, 1986) refers to as the 'ability to manipulate', that is, to use both 'traditional' and 'modern' skills and institutions in daily life. This implies some degree of behavioural change that makes migrants more closely resemble the resident urban population in terms of reproduction and childrearing. It also requires that migrants achieve sufficient economic success to attain the modern housing facilities and access to effective health services that strongly influence a child's survival chances. Since behavioural change and economic progress tend to occur slowly, and are more likely to occur with exposure to modern environments, Figure 1 posits that migrant children will experience superior survival chances when they are born well after migration and in modern city neighbourhoods.

Data

The 17 Demographic and Health Surveys analysed here, conducted between 1986 and 1990, are those in which basic information on residential history and mobility was collected from women aged 15 to 49. Most of the surveys were nationally representative[2]. Each survey defined 'urban area' according to the definition used in the most recent census. The content and quality of the DHS migration data are described elsewhere (Goldman, Moreno and Westoff 1989; Brockerhoff and Eu 1993; Brockerhoff and Yang, forthcoming), and not discussed here. Their most critical shortcoming, for this study, is that urban migrants identified at the time of the survey may not be representative of all women who in-migrated in the recent past in terms of characteristics that impact on child survival, if there has been selective onward or return migration. Other assessments of DHS data (Brockerhoff 1991), however, suggest that the importance of selective return migration can be discounted as a threat to the analyses in this study.

With respect to the fertility and mortality data used here, information collected by the DHS in retrospective birth histories generally compares favourably with data gathered by the World Fertility Survey (Institute for Resource Development 1990). Migrant and non-migrant respondents in the DHS do not appear to differ significantly in terms of accuracy or completeness of reporting of vital events (Brockerhoff 1991). This study focuses exclusively on children under age two in order to make periods of exposure to mortality roughly coincide with the pre-migration and post-migration periods used in the multivariate analyses. Analysis of infants and toddlers is also appropriate in light of the increasingly small number of deaths at older ages.

Table 2 presents the number of births of rural-urban migrant and rural and urban non-migrant women in the ten years preceding each survey. These constitute the samples used for most of the calculations and analyses in this study. Rural-urban migrants are considered as those women who moved from villages to towns or cities in the ten years preceding the survey, had lived in the urban area for at least six months at the time of the survey, and intended to remain there. Rural-rural and urban-urban migrants, who are of less interest to this study, and urban-rural migrants, who are too few to analyse, are excluded from the study.

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2 Areas were omitted in the following surveys: five of 26 governorates in Egypt; one of 22 *departamentos* in Guatemala; seven of 27 provinces in Indonesia (representing seven per cent of the national population); the three southern regions in Sudan; and nine of 34 districts in Uganda (representing 20 per cent of national population). In addition, nomads were totally excluded in Sudan and partly excluded in Mali.

Table 2 shows that within each region migrant births are relatively evenly distributed across countries, although they are under-represented in Ghana, Peru and Guatemala. Results of the regional multivariate analyses shown in Table 6 are therefore less indicative of migration-child survival relationships in these countries than in other countries in the regions.

Table 2
Number of births to recent rural-urban migrants and rural and urban non-migrants recorded by the DHS

	Rural-urban migrants		Non-migrants		
		% of regional total	Rural	Urban	Total
Sub-Saharan Africa	3,077	100.0	24,180	6,930	34,187
Ghana, 1979-1988	190	6.2	3,455	1,305	4,950
Kenya, 1980-1989	769	25.0	8,098	1,249	10,116
Mali, 1978-1987	590	19.2	2,552	1,449	4,591
Senegal, 1977-1986	562	18.3	3,210	1,617	5,389
Togo, 1979-1988	490	15.9	2,237	719	3,446
Uganda, 1981-1990	476	15.4	4,628	591	5,695
North Africa	2,399	100.0	25,053	13,712	41,164
Egypt, 1980-1989	510	21.3	8,246	5,506	14,262
Morocco, 1978-1987	763	31.8	6,426	2,604	9,793
North Sudan, 1980-1989	487	20.3	7,182	3,288	10,957
Tunisia, 1979-1988	639	26.6	3,199	2,314	6,152
Latin America	2,604	100.0	15,937	15,838	34,379
Bolivia, 1980-1989	611	23.5	3,810	4,400	8,821
Ecuador, 1978-1987	870	33.4	2,340	2,053	5,263
Guatemala, 1978-1987	329	12.6	4,623	1,629	6,581
Mexico, 1978-1987	575	22.1	2,815	5,323	8,713
Peru, 1977-1986	219	8.4	2,349	2,433	5,001
Southeast Asia	1,508	100.0	11,708	4,933	18,149
Indonesia, 1978-1987	832	55.2	8,547	3,667	13,046
Thailand, 1977-1986	676	44.8	3,161	1,266	5,103

Descriptive analyses

The early child mortality rates ($_2q_0$) presented in Table 3 are crude indicators of whether women who moved from villages to towns and cities in the late 1970s and 1980s improved their children's survival chances as a result of migration. Pre-migration rates are based on births that occurred during the month of migration or earlier, so these include children exposed to mortality in the village for the entire 24-month period (those born more than two years before the mother's migration), as well as the smaller number of children who were born during the two years before migration and who accompanied their mothers or remained in the village. Post-migration rates are based on children born at least one month after the mothers'' migration. These children are assumed to have been exposed to mortality only in the new urban setting: not to have been born during a return visit by the migrant mother, and not to have been immediately sent back to the village after birth. Some rates are estimated on small numbers of births, as reflected by the high standard errors, so apparent changes in mortality in these countries should be interpreted cautiously. The summary pre- and post-migration rates

are calculated using as weights each country's share of pre- and post-migration births in the total pooled sample of 17 surveys[3] . Since migrants moved at various times in the ten years

Table 3
Estimated early child mortality rates ($_2q_0$) of rural-urban migrants before and after migration per thousand

	Pre-migration (rural)		Post-migration (urban)	
Sub-Saharan Africa				
Ghana,1979-88	68.5	(24.6)	52.6	(21.3)
Kenya, 1980-89	61.9	(12.7)	40.7	(11.6)
Mali, 1978-87	203.5	(25.4)	148.0	(23.3)
Senegal, 1977-86	180.7	(21.0)	127.7	(20.8)
Togo, 1979-88	115.2	(22.8)	67.7	(18.4)
Uganda, 1980-89	122.2	(20.5)	114.5	(24.3)
North Africa				
Egypt, 1980-89	153.8	(32.6)	99.0	(16.1)
Morocco, 1978-87	88.1	(15.9)	86.8	(15.0)
North Sudan, 1980-89	145.5	(23.8)	81.8	(16.7)
Tunisia, 1979-88	104.7	(19.9)	58.3	(12.8)
Latin America				
Bolivia, 1980-89	171.8	(22.0)	132.4	(20.7)
Ecuador, 1978-87	66.2	(13.2)	76.3	(13.1)
Guatemala, 1978-87	93.7	(23.4)	74.1	(18.8)
Mexico, 1978-87	50.7	(13.6)	46.3	(13.5)
Peru, 1977-86	106.1	(31.4)	122.8	(27.9)
Southeast Asia,				
Indonesia, 1978-87	102.6	(16.1)	68.7	(12.6)
Thailand, 1977-86	56.5	(13.7)	41.8	(12.0)
Total	110.1	(19.5)	82.1	(15.6)
Rural sedentary	107.9	(4.3)		
Urban sedentary			74.5	(6.5)

Notes: Estimates for migrants are based on births that occurred before and after the calendar month of the most recent migration. Standard error of estimate in brackets.

preceding the surveys, post-migration rates do not necessarily represent a much later calendar period than pre-migration rates, and migrants' rates are comparable to the rates of rural and urban non-migrants over the ten-year periods.

Overall, women appear to experience a 25 per cent reduction in their children's mortality under age two with the change from rural to urban residence, from a level of 110 deaths per

3 Summary figures are country rates weighted by each country's share of migrant and non-migrant children exposed to mortality in the total pooled sample of countries. These sample shares are not equal to each country's share of migrant and non-migrant children in the actual aggregate population of these countries (which is unknown). Therefore, the summary figures do not represent the actual rates experienced in this group of countries, although they may be reasonable approximations.

thousand births before migration, to 82 after migration. The extent of improvement is roughly equivalent to the mortality differential among rural and urban non-migrant women; migrant child mortality approximates the level of rural stayers before migration, and is slightly higher than that of urban non-migrants after migration. In all countries outside Latin America, except Uganda and Morocco, there appears to be a substantial decline in mortality after migration. This decline is large in both absolute and relative terms, and seems unrelated to the level of mortality experienced by migrants in rural areas before they moved. The implication is that rural-urban migration can improve children's early survival chances regardless of mortality levels in rural areas, if conditions are better in urban areas. Of the five Latin American countries studied here, three, Ecuador, Mexico and Peru, show no improvement, and possibly deterioration, in child survival following migration to towns and cities. Many recent female migrants to the main cities of these countries — Guayaquil, Mexico City and Lima — are known to be residing in slum or shanty dwellings that lack basic child health-related amenities such as potable drinking water, flush toilets and electricity (Brockerhoff 1993), which may account in part for the mortality patterns observed here.

An obvious explanation for improved child survival after migration is that urban residence immediately provides migrants with greater access to the modern health resources, such as hospitals and clinics, health professionals, drugs and vaccines, that are typically concentrated in cities. To assess this, Table 4 shows the percentage of pre- and post-migration births, in the five years before the survey, for which mothers received at least one tetanus injection and prenatal care and birth assistance from a trained physician, nurse or midwife. Because of the shorter time frame represented here than in Table 3, pre-migration and post-migration differentials in use of health services may be somewhat smaller than in mortality rates, and differences in use of these services between the two periods may mainly reflect changes in access to health care, rather than sudden behavioural changes that would motivate mothers to make greater use of urban than rural services. In sum, the three measures may also reflect other changes in use of health services that result from migration but cannot be assessed reliably with these data, including immunization against major childhood diseases and use of oral rehydration therapy to treat episodes of diarrhoea. In interpreting the figures in Table 4, it should be recognized that professional health services probably vary in quality from country to country, and are not in all cases superior to traditional services.

In a few countries — Mali, Senegal, Bolivia, Ecuador, and possibly Peru and Egypt — use of modern health services clearly increased after migration. These are all countries where large disparities exist between urban and rural areas in the prevalence of childhood morbidity and treatment patterns (Boerma, Sommerfelt and Rutstein 1991), immunization coverage (Boerma and Rojas 1990), access to safe water and adequate sanitation (UNICEF 1994), and probably level of income per capita , and hence where there seem to be great opportunities for improved child survival through migration to urban areas. Overall, however, changes in use of health services after migration were modest. In eight of the 14 countries for which all three indicators are available, migrant women were more likely to have received each of the services after they migrated, but the degree of change is unimpressive. In almost all countries, migrants were much more likely to have received professional assistance at delivery for post-migration births, but the positive effects of modern birth assistance on early child survival are probably weaker than those of prenatal care and immunization (Bicego and Boerma 1991). Moreover, in some countries changes in use of health care by migrants are inconsistent with changes in early mortality levels observed in Table 3; although different cohorts of children are represented in the two tables. In Togo and Tunisia, for example, child survival appears to have improved substantially after migration without increased use of health services. Thus, greater use of modern health resources seems, at best, a partial explanation for the child mortality decline experienced by recent rural-urban migrants in most of these countries.

Table 4
Percentage of rural-urban migrants' children whose mothers received modern health care pre and post migration

	Tetanus toxoid		Professional prenatal care		Professional birth assistance	
	pre	post	pre	post	pre	post
Sub-Saharan Africa						
Ghana, 1983-88	(87.5)	(70.4)	(95.8)	(92.6)	(66.7)	(59.3)
Kenya, 1984-89	94.7	96.2	74.5	83.0	69.1	80.7
Mali, 1982-87	45.1	49.2	35.3	50.0	35.3	49.2
Senegal, 1981-86	38.7	52.6	44.1	51.3	26.9	46.1
Togo, 1983-88	82.5	85.5	75.5	73.6	68.5	68.4
Uganda, 1984-89	58.8	78.2	92.5	93.2	65.1	79.9
North Africa						
Egypt, 1984-89	(12.5)	17.4	(41.7)	65.8	(37.5)	53.7
Morocco, 1982-87	NA	NA	21.4	24.4	27.1	39.4
North Sudan, 1985-90	31.0	64.3	83.3	78.6	76.2	76.2
Tunisia, 1983-88	41.9	34.5	69.7	59.7	69.8	86.3
Latin America						
Bolivia, 1984-89	14.1	26.3	29.4	40.4	21.2	36.3
Ecuador, 1982-87	39.3	45.3	69.1	79.3	75.2	84.7
Guatemala, 1982-87	(9.7)	17.2	(54.9)	41.4	(29.1)	41.4
Mexico, 1982-87	NA	NA	80.2	84.4	75.6	83.3
Peru, 1981-86	(18.8)	(25.0)	(25.0)	(62.5)	(31.3)	(54.1)
Southeast Asia						
Indonesia, 1982-87	NA	NA	NA	NA	57.2	66.3
Thailand, 1982-87	77.4	74.8	86.0	93.4	85.0	95.4

Notes: Professional prenatal care and birth assistance refer to attendance by a trained physician, nurse or midwife. ( ) = Based on < 50 births. NA = not available.

The Demographic and Health Surveys also make it possible to test the long-held belief that migration from traditional rural societies to modern urban areas leads to a decline in length of breastfeeding, as migrant women increasingly adopt modern methods of contraception to avoid pregnancy, wean their children earlier onto infant formula and other foods that are more plentiful in urban areas, fail to start breastfeeding in order to take advantage of greater income-earning opportunities, and free themselves from the social constraints, like residence with parents or in-laws, that dictate prolonged breastfeeding in rural areas (Huffman and Lamphere 1984; Latham,Agunda and Eliot 1988). This perspective implies that changes in breastfeeding are one aspect of the modernization of migrant behaviour in urban areas that confers a wide range of health benefits on children of migrants. On the other hand, relatively low durations of breastfeeding of migrant children may be associated with increased risks of early mortality, insofar as they reflect abrupt termination or non-initiation of breastfeeding due to separation of mother and child, and earlier intake of contaminated water and foods in low-income urban areas; or they result in short birth intervals.

Table 5
Median number of months of breastfeeding of rural-urban migrants and non-migrants

	Rural-urban migrants	Non-migrants urban	Non-migrants rural
Sub-Saharan Africa			
Ghana, 1983-88	(20.6)	18.8	23.1
Kenya, 1984-89	16.8	19.6	21.0
Mali, 1982-87	21.1	19.5	22.7
Senegal, 1981-86	17.7	17.0	21.3
Togo, 1983-88	21.3	21.2	23.7
Uganda, 1984-89	18.1	15.2	20.7
North Africa			
Egypt, 1984-89	17.8	15.6	20.5
Morocco, 1982-87	13.7	12.1	17.8
North Sudan, 1985-90	18.7	18.3	22.3
Tunisia, 1983-88	18.0	12.4	18.7
Latin America			
Bolivia, 1984-89	17.2	15.1	17.6
Ecuador, 1982-87	12.6	11.6	16.1
Guatemala, 1982-87	19.1	20.1	20.6
Mexico, 1982-87	7.4	4.5	15.0
Peru, 1981-86	(18.7)	10.2	21.0
Southeast Asia			
Indonesia, 1982-87	19.8	20.3	23.4
Thailand, 1981-86	7.9	7.6	14.5
Total	15.7	14.6	21.4

Figures refer to median duration of any (full or partial) breastfeeding.
Notes: ( ) = Based on fewer than 100 births.

Table 5 presents the median duration of full or partial breastfeeding of children born to women who migrated from rural to urban areas in the five years preceding the surveys, and among rural and urban non-migrant children. Migrant children include those born before migration, whose breastfeeding may have terminated at the time of migration because of separation from the mother or the stress and necessary adjustments imposed on the mother by moving; and children born soon after migration, who may be more subject to the constraints and opportunities associated with lower breastfeeding durations in urban than rural areas. Pre- and post-migration births are not distinguished, so that reliable estimates for the five-year period can be derived. Since the measure in Table 5 does not indicate age at weaning, or weaning practices, its relationship to child survival is difficult to discern. Presumably, however, much lower breastfeeding durations among migrants than rural non-migrants would partly reflect very early ages at full weaning for some migrant children — with negative effects for health and survival — due to the disruptive factors noted above.

Results in Table 5 are remarkably consistent across countries: in 14 of the 17 countries, children of migrants were breastfed for fewer months than were rural non-migrant children, but for longer than urban non-migrant children. In the other three countries, Kenya, Guatemala and Indonesia, migrant children were breastfed for shorter periods than both non-migrant

groups. The summary measure[4] suggests that migrant children were breastfed almost six months less than children of rural non-migrants, but only one month longer than urban non-migrant children. Since all of the migrant women represented in Table 5 had lived in the town or city for less than five years, and most for less than three years, it is unlikely that similar breastfeeding durations of urban migrant and non-migrant children result from migrant mothers' sudden adoption of the breastfeeding norms and practices of long-time urban residents. A more plausible explanation is that for some children breastfeeding is disrupted by migration, in which case an increased risk of child mortality might be expected in the months following their mothers' departure to the urban area. This temporal pattern of mortality is considered in the following multivariate analyses.

Multivariate analysis

Model and variables

For the purpose of multivariate analysis, the 17 countries included in this study have been aggregated into four pooled samples, representing sub-Saharan Africa, North Africa, Latin America and Southeast Asia. This allows for more robust estimates of the effects of migration on child survival, and hence for more meaningful comparisons of results among the regions. The countries in each region are noted at the bottom of Table 6.

The Cox proportional hazards model is used to analyse the chance of dying between ages one month and 24 months in the ten years preceding the survey in each country. Neonates are excluded from the analysis because their survival chances are known to be largely biologically determined. Our model estimates rural-urban migrants' hazards of child mortality at various time periods before and after migration in relation to the hazards among rural non-migrants throughout the ten years. Since migrant women may have moved at any time in the ten years, their calendar period for exposure to the risk of child mortality is roughly similar to that of non-migrants. We cannot distinguish the types of urban locations in which migrant children reside (as in Figure 1) because of the paucity of vital events recorded after migration, and lack of information on whether migrants moved between types of urban locations after leaving the countryside.

The model takes the following form:

$$\ln(h_t) = p_1F+q_1S+r_1U+s_1M1+s_2M2_t+s_3M3+s_4M4$$

where

h = hazard of dying at time t;
F = a set of fertility-related predictors of child mortality (length of preceding birth interval, birth order, mother's age at birth);
S = mother's level of education;
U = a dummy variable for non-migrants (1=urban residence, 0=rural residence);
M = a set of dummy variables for duration of residence of rural-urban migrants

such that

M1 = 1 if 24 or more months before move, 0 otherwise;
$M2_t$ = 1 if 23-0 months before move, 0 otherwise;
M3 = 1 if 1-24 months after move, 0 otherwise;
M4 = 1 if more than 24 months after move, 0 otherwise;

and

p1, q1, r1, s1...s4 = parameters to be estimated.

4 Computed as in Table 3.

The dummy variables represented by M indicate whether migrants' children were exposed to mortality in rural or urban environments between ages one month and 24 months. Respectively, they are proxies for exposure to pre-migration rural conditions (M1), to rural conditions before migration then, if the child has survived, urban conditions after migration ($M2_t$), to urban conditions immediately after migration (M3), or to urban conditions longer after migration (M4). If we interpret these variables in terms of type of residence, where 0=rural and 1=urban, then M1=0, $M2_t$=0 then changes to 1 after migration, M3=1, and M4=1. M1, M3 and M4 are thus static variables, in that children born during these stages of migration are presumed to have been exposed to only one type of environment, whereas $M2_t$ is a time-dependent covariate representing maternal migration during the child's period of exposure to mortality: at least one month after birth and before the child could have reached age 25 months. Since the specification of M1 allows a future event (a move 24 or more months later) to shape the mortality risk faced in the present, at time t, this estimated coefficient should be interpreted in terms of the selectivity of rural-urban migration according to child mortality experience, rather than in terms of causal effects of migration on child mortality.

The independent variables included in the model, other than stage of migration, are chosen on the basis of their well-documented relationship with early child mortality in low-income settings (Hobcraft, McDonald and Rutstein 1984, 1985). The analysis is also constrained to use explanatory variables that are known to have applied to children or their mothers at specific stages of migration. This is obviously the case with the birth-related variables; it is true of maternal education if we assume, as virtually all mortality and fertility analyses of WFS and DHS data have done, that mother's level of educational attainment had not changed in the ten years preceding the survey. Insofar as migrant status, as represented by M1...M4, is a consequence of knowledge, attitudes, etc. for which mother's level of education is a proxy, its effects on child mortality will be conditioned by education. While the inclusion of maternal education level in the model probably has different effects at different stages of the migration process, it is expected to cause an underestimate of the effects of migration on early child mortality. The dummy variable for urban non-migrant status is of particular interest insofar as it provides a purer measure of the early child survival advantage of urban children by excluding urban migrants, so that it is not biased by their possible exposure to mortality in rural environments.

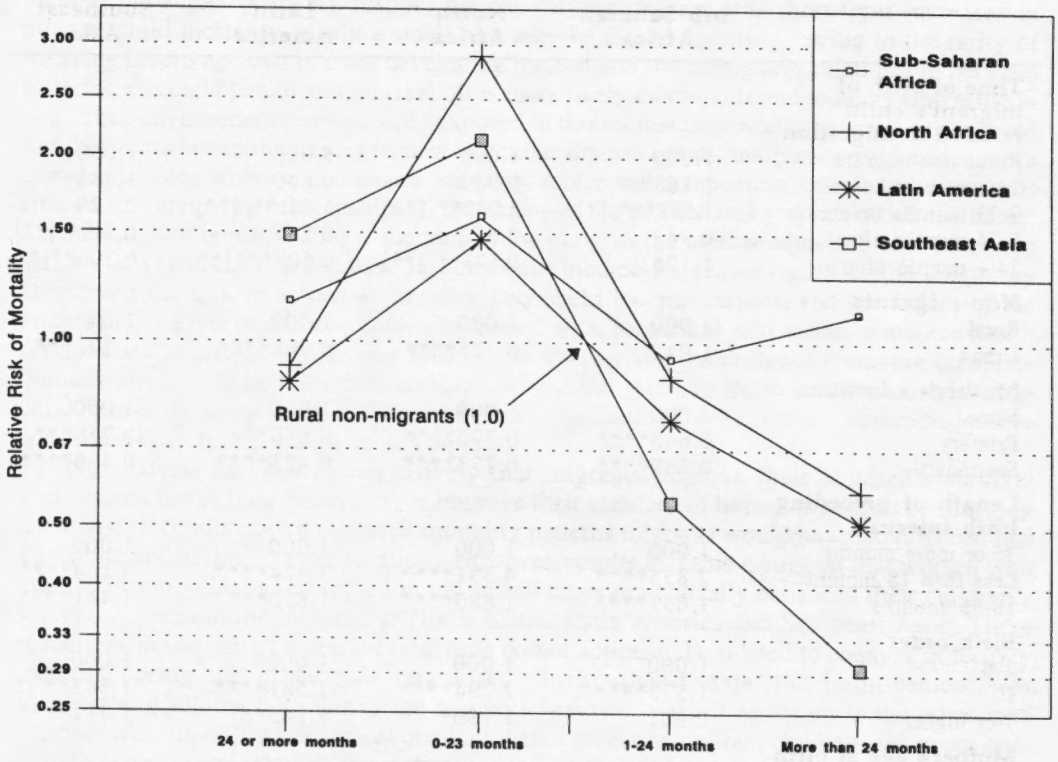
Results

Table 6 presents exponentiated parameter estimates (relative risks) of mortality between ages one month and 24 months at different stages of the rural-urban migration process, and other results of the multivariate models. The bracketed asterisks indicate that migrants' risks of mortality around the time of migration and after settling in the urban area were significantly different from their risks more than two years before migration; they thus provide evidence more direct than comparisons with rural non-migrants, of whether migrant women affected their children's survival chances by leaving the countryside. The estimated risks at each stage of migration are also illustrated in Figure 2.

Children born more than two years before their mothers left their villages experienced a 16 per cent higher risk of death than children of rural stayers in sub-Saharan Africa, and a 48 per cent higher risk in Southeast Asia. Migrants in these two regions can therefore be said to have been selected disproportionately from the high-mortality segment of the rural population.

In this case, one might expect migrant mothers' change of location to have contributed to any recent decline in rural child mortality in these regions. Such negative migrant selection is not surprising in light of the famines, droughts and civil wars that occurred throughout much

Figure 2
Relative risks of early child mortality (ages 1 - 24 months) during rural-urban migration process



Note: Relative risks taken from model that is controlled for mother's level of education, parity, length of preceding birth interval and mother's age at birth (see table 6).

of rural Africa and parts of rural Thailand and Indonesia in the 1970s and 1980s, that may have forced many villagers, including those considered as refugees, from their homes to urban centres. Alternatively, African and Asian women who experience one or several child deaths in rural areas may be more motivated to obtain the superior child-health-related amenities located in urban areas than their counterparts in other developing regions, who are generally better served by rural health services (UNICEF 1993), and whose children may therefore have less to gain from the change of location.

Rural-urban migration in developing countries clearly results in a dramatic short-term increase in children's likelihood of dying. In sub-Saharan and North Africa, Latin America, and possibly Southeast Asia, children born in the two years preceding migration — who were either fostered out, accompanied or followed their mother, or died just before the mother's move — experienced an increased risk of mortality in the time immediately preceding or following migration. This increase is most apparent in North Africa, where migrants' children temporarily experienced three times the risk of death of rural non-migrants' children, and significantly higher risks than during migrants' earlier pre-migration stage. In sub-Saharan Africa and Latin America the increase was more modest but still substantial.

Table 6
Cox proportional hazards models of the relative risks of early child mortality (1-24 months) in developing regions period ten years preceding surveys

	Sub-Saharan Africa	North Africa	Latin America	Southeast Asia
Time of birth of migrant's child relative to migration				
Rural non-migrant	1.000	1.000	1.000	1.000
24 + months before	1.163*	0.912	0.860	1.482**
0-23 months before	1.597*** [*]	2.932** [**]	1.461** [**]	2.129
1-24 months after	0.941	0.875	0.748	0.549* [**]
24 + months after	1.126	0.573** [**]	0.508***[**]	0.296**[**]
Non-migrants				
Rural	1.000	1.000	1.000	1.000
Urban	1.012	0.725****	0.768****	0.772***
Mother's education				
None	1.000	1.000	1.000	1.000
Primary	0.668****	0.792****	0.850***	0.758***
Secondary+	0.369****	0.373****	0.423****	0.496****
Length of preceding birth interval				
36 or more months	1.000	1.000	1.000	1.000
Less than 18 months	2.855****	4.331****	3.424****	3.104****
18-35 months	1.637****	1.880****	1.850****	1.441****
Birth order				
2-6	1.000	1.000	1.000	1.000
1	1.573****	2.294****	1.581****	1.343**
7 or higher	0.902	1.100*	1.143**	1.711****
Mother's age at birth				
18-39	1.000	1.000	1.000	1.000
Under 18	1.263***	1.211**	1.425****	1.299*
40 or older	0.860	0.958	1.645****	0.730
Initial model				
- 2 log-likelihood	46738.573	42099.415	33438.769	12598.679
df	31,605	33,326	27,762	15,479
Final model				
- 2 log-likelihood	46344.950	41389.903	32893.299	12378.639
df	31,592	33,313	27,749	15,466
Model X^2 (df=13)	393.623****	709.512****	545.470****	222.040****

Notes: *Significant at p<.10, ** p<.05, *** p <.01, **** p<.001, two-tailed test.
Countries included in analyses: Sub-Saharan Africa: Ghana, Kenya, Mali, Senegal, Togo, Uganda; North Africa: Egypt, Morocco, North Sudan, Tunisia; Latin America: Bolivia, Ecuador, Guatemala, Mexico, Peru; Asia: Indonesia, Thailand.
[ ] indicates that estimates are significantly different from those during period 24 or more months before migation.

The Demographic and Health Surveys do not provide sufficient information on migrants' living conditions or behaviour just before or after migration to explain this pattern, and the scarce literature on migration-child survival interrelationships also provides little empirical evidence to support these findings. Nevertheless, the preceding discussion has suggested a number of factors probably responsible, to varying degrees, for short-term increases in migrant child mortality. Only a small part may be due to fostering, owing to the rarity of fostering before age two in most developing regions and the ambiguous relationship between fostering and child health and survival. It is more likely that infants and toddlers who settle in new urban environments are suddenly exposed to threats that they would not have experienced had they remained in their villages: new infectious disease agents; temporary residence in more crowded housing where contaminants are easily spread and competition for resources is strong; changes in caregiving relationships if, for example, the mother seeks work outside the home; a termination of breastfeeding at the time of the move as the mother adjusts to new economic and social constraints; a decrease in household income for reasons such as the temporary absence of the spouse or partner or other household income-earners; and the failure of the mother or caregiver to quickly familiarize herself with, locate and gain access to modern health services and facilities, which may result in accompanying children not receiving complete immunization. These and other explanations for the startling short-term increase in early child mortality associated with rural-urban migration in developing countries deserve consideration in future studies of this topic.

No analysis can prove conclusively that migrants improve their children's survival chances, or change their behaviour, or improve their standard of living, as a result of changing locations, since it is not known what mortality patterns migrants would have experienced had they remained at their former location. However, results in Table 6 suggest that women who migrated from villages and settled in towns and cities dramatically enhanced their children's survival chances in the long run in North Africa, Latin America and Southeast Asia. These reductions in the risk of mortality over time do not appear to be related to changes in fertility patterns during the process of migration. In Southeast Asia, the improvement was immediate. Children born during the mother's first two years of residence in the urban area experienced a mortality risk almost one-half that of rural non-migrant children, and about one-third the level experienced by migrants several years before they left the countryside. Children born more than two years after migration experienced further reductions in risk of mortality, to levels far below those of both urban and rural non-migrant children. In North Africa and Latin America, the improvement resulting from migration was more gradual. Children born soon after migration had mortality risks similar to those born well before migration. Children born after their migrant mothers had lived in the urban area more than two years, however, had significantly better survival chances than early pre-migration births, as well as mortality risks almost 50 per cent lower than rural non-migrant children. The general finding that migrants experience substantial improvements in early child survival with increased duration of residence in urban areas supports the long-held notion of migrant adaptation, or adjustment, to the modern norms and behaviours that are said to characterize most urban residents in developing countries, and is consistent with gross disparities in economic opportunities and housing quality between urban and rural areas of most countries.

It is apparent from the mortality rates presented in Table 3 that rural-urban migration probably improves child survival in most sub-Saharan African countries. Results in Table 6 suggest that this may be due to the rapid and pronounced decline in fertility that accompanies rural-urban migration in Africa (Brockerhoff and Yang, forthcoming). It may also result from increased educational attainment following migration to towns and cities, although this is unlikely since the mean age at migration of women in this regional sample was over 25.

Available data suggest that rural-urban migration in sub-Saharan Africa is less likely to represent change from a less to a more economically advanced living environment than

migration in other regions. Rural-urban differentials in access to safe drinking water and adequate sanitation in the late 1980s, for instance, were smaller in sub-Saharan Africa than in most other regions (UNICEF 1993). On the other hand, the relatively constant pattern of migrant child mortality in this region is surprising in view of findings that rural-urban differentials in immunization coverage, use of oral rehydration therapy to treat diarrhoea, and use of professional services for prenatal care and birth assistance are probably greater in sub-Saharan Africa than in other developing regions (Boerma and Rojas 1990; Boerma et al. 1991; Govindasamy et al. 1993). As the figures in Table 4 suggest, however, the greater availability of modern health services in urban areas does not necessarily mean that new arrivals to towns and cities will make use of these services, at least in the first few years of residence.

Furthermore, migration research in sub-Saharan Africa has consistently recorded that adult migrants typically retain many norms and behaviours, occupations and living arrangements associated with rural ways of life even after many years of urban residence (Hanna and Hanna 1981; O'Connor 1983; Illiffe 1987). Since most migrants historically returned to settle in their home villages later in life, commitment to the village necessarily remained strong: upholding its shared values and practices, accommodating new arrivals into housing, social and occupational networks, making return visits and sending remittances. Traditional links between rural and urban areas of Africa have no doubt been reinforced by more modern developments: centralization of political authority and the process of nation-building; the increased volume of population mobility; improvements in transportation and information systems; greater economic interdependence between areas. In this context, rural-urban migration in sub-Saharan Africa can be regarded as movement along an economic and socio-cultural continuum, involving fewer structural and behavioural changes that impact on child health and survival than in other developing regions.

With respect to the other variables presented in Table 6, findings are remarkably consistent across regions and are not surprising. In each region, the risk of early child mortality is moderately reduced when the mother has attended primary school and greatly reduced by a secondary school education. Effects of fertility on mortality are consistent with World Fertility Survey findings for the 1970s (Hobcraft et al. 1985), but it is noteworthy that children born to women in their forties face an elevated risk of early death only in Latin America. In North Africa, Latin America and Southeast Asia children of lifelong urban residents experience significantly lower chances of dying than their rural counterparts, even after controlling for the variation in maternal level of education that presumably results in differences in income and childraising behaviour between urban and rural residents. Of the numerous characteristics of urban and rural places and their inhabitants that could account for this urban advantage, the quality of housing facilities and availability of modern health services probably deserve priority consideration in future research.

Discussion

This study has analysed patterns of early child mortality during the process of rural-urban migration in developing regions in the late 1970s and 1980s. Results of the study generally confirm the hypotheses of migrant selectivity, life disruption and adaptation used to explain the reproductive behaviour of migrants in low-income settings. Before migration, the mortality risks to children of migrant women were similar to those to children of rural non-migrants, or slightly higher. In the two-year period surrounding the mother's migration, their chances of dying increased sharply, to levels well above those of rural and urban non-migrant children. Children born after the migrant had settled in the urban area, however, gradually experienced much better survival chances than children of women who remained in rural areas, as well as lower mortality risks than migrants' children born in rural areas before migration.

A possible exception to the trend of declining migrant mortality in urban areas is sub-Saharan Africa, where no decline is observed in the analysis after controlling for other characteristics of the mother and child. This study leads to the conclusion that mothers in most developing regions improved their children's survival chances in the first two years of life by leaving the countryside and settling in towns and cities.

Unfortunately, the Demographic and Health Surveys provide limited time-specific information that could be used to understand the mechanisms affecting migrant child survival over time. There is very little evidence, for instance, that reductions in early child mortality following maternal migration to towns and cities are related to greater use of modern health services. However, changes in child survival in North Africa, Latin America and Southeast Asia are not solely the result of changes in migrant fertility, and migrant-non-migrant differentials are large even after accounting for possible differences in level of maternal education.

Is the eventual improvement in child survival resulting from maternal migration from villages to urban areas in most regions sufficient cause to modify current policies deterring migration to cities in these areas, in favour of less forceful, unrestrictive, or promoting measures? Obviously, young children are only one age group affected by urban in-migration, and the long-term impact on other groups, as well as on social and political institutions, economic growth and the quality of the urban environment must be considered in developing and implementing appropriate migration and spatial policies. One limitation of this study is that we have not considered the effects of in-migration on the health and survival chances of children already residing in the town or city, which may be unfavourable. Moreover, the apparent benefits experienced in the 1980s may not occur in the future, as cities continue to grow in size and municipal governments confront overwhelming needs for housing, jobs and services. We already know, for instance, that children experience much higher mortality risks between ages one and five in big cities than in smaller cities of developing countries, and that children of migrants are particularly disadvantaged in big cities (Brockerhoff 1993). This suggests that the advantages of rural-urban migration for child survival may diminish during the process of urban growth.

These cautionary remarks aside, it is possible, in view of the large volume of rural-urban migration in recent years and the finding of rapid and dramatic declines in migrant child mortality presented here, that millions of children's lives were saved in the late 1970s and 1980s as a result of mothers leaving the countryside and settling in towns and cities of developing countries. The conclusion that rural-urban migration may have hastened the decline of infant and toddler mortality in many developing countries, however, awaits evidence that the continuing rapid influx of migrants to towns and cities has no consequent negative impact on the survival chances of urban non-migrant children. The current preoccupation of international health organizations, health researchers and the popular media with the plight of recent settlers in urban slums and shantytowns is certainly justified, given the deplorable living conditions and survival chances of children and other vulnerable groups in many of these areas (Harpham and Stephens 1991; WHO 1991). Nevertheless, future discussions of urban health conditions should acknowledge that many disadvantaged or under-served urban children would probably have been much worse off had their mothers remained in the village. Moreover, the overwhelming evidence of sharp and persistent migrant fertility decline in various urban settings (Zarate and Zarate 1975; Findley 1982), in combination with these findings of migrant child mortality decline, suggest that interventions to control migration to towns and cities in developing countries should be based on a recognition that long-term female rural-urban migration may be helping to promote the demographic transition in many of these countries.

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Use of health services in Hill villages in Central Nepal*

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Abstract

This paper reports the use and non-use of health care facilities in the Hill villages in central Nepal. The health behaviour model (HBM) is applied to test the significance of socio-economic variables on the use of the modern health care system. The study finds that all three characteristics of the HBM model, predisposing, enabling and need, are significantly related to use and non-use of the modern health care system. The analysis shows that number of living children, respondent's education, nearness to the road and service centre, value of land, knowledge about health workers and experience of child loss are some of the variables that are positively and significantly related to the use of modern health care. Age of the respondents and household size were found to be negatively associated with health-care use. Contrary to expectation, caste is unimportant. Making use of the qualitative data, this paper argues that the health care system is unnecessarily bureaucratic and patriarchal, which favours the socio-economically well-off.

Developments in modern medicine and expansion of modern health care facilities have played a very important role in reducing morbidity and mortality in the developing world. Despite a steady penetration of modern health care services, economic underdevelopment has also led to a relatively weak health infrastructure in Nepal. This paper documents the use of health services in some neighbourhoods in the central Nepali Hills. Findings of the study are supplemented by observations and case studies and provide a glimpse of the quality of services available to the majority of the population in rural Nepal.

Nepal is one of the poorest countries in the world. Its per capita income is estimated at $180 in 1993. The recent census shows an increase in the overall literacy rate from 25 per cent in 1981 to 40 per cent in 1991; but female literacy is only 25 per cent. More than 90 per cent of Nepal's population lives in rural areas and is dependent on subsistence agriculture (Central Bureau of Statistics 1987, 1993). More than 83 per cent of the geographical area is rugged terrain and mountains where more than half of the 19 million population live. Health status is uniformly poor in Nepal (UNICEF 1987; World Bank 1989). Health care facilities in the past were provided by the traditional faith healers (*dhami, jhakris)*, and traditional birth attendants. Faith healing is one of the most significant health care systems in Nepal (Achard 1983; Streefland 1985); however,

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there has been a steady penetration of modern health care even though services are few and scattered. There is one hospital for 168,000, one doctor for 92,000 and only one hospital bed available for nearly 4,000 population. The health post, which is the main instrument of the health care system in Nepal, is available to an estimated population of 24,000. Infant mortality is estimated at around 107 per thousand births while under-five mortality is estimated at around 197 per thousand. Maternal mortality accounts for 8.5 deaths per thousand population. Nepal is also one of the countries where life expectancy for women, estimated at 52 years, is lower than for males.

Government policy emphasizes delivery of preventive health care in an integrated manner. The integrated services include family planning and maternal and child health, expanded immunization, safe motherhood, treatment of diarrhoea and acute respiratory infection, and control and prevention of communicable disease. Health posts and sub-health posts are the main providers of these services in rural areas. The government has adopted a policy of reducing infant mortality to 50 per thousand while the target for child mortality is to reduce it to 70 per thousand by the year 2000. During the same period, maternal mortality will be brought down to 4 per thousand. The target for life expectancy is 65 years by the year 2000 (National Planning Commission, 1991).

The Ministry of Health is responsible for providing integrated health services in Nepal. Although the organization of the health care system is constantly changing, it is made up of a hierarchy of institutions which have been developed regionally and locally to suit the concept of decentralized planning. Each regional headquarters has a regional hospital, and this, in principle, is the case with the district headquarters. The district hospitals serve as referral centres for problems that cannot be handled at the lowest level, the health posts. Problems that the district hospitals cannot handle are referred to the regional and the central hospital. Health posts are the lowest level of government service delivery for primary health care; they combine both the health and family planning services. However, because of poor transport and inadequate services at the local health posts, hospitals also serve as the source of primary contact for many people. With this background of the national figures, the concern of this paper is how the health services are organized, and who benefits from the services in rural areas in Nepal.

Data and methodology

Data for this paper are taken from the Benighat Survey, 1988 (Niraula 1990, 1992). The study area is located in a Hill district of central Nepal about 75 kilometres southwest of Kathmandu. Data were collected in eight main settlement clusters. However, within these main settlement clusters, there are many more sub-settlement areas often delineated by caste and ethnicity, by stream and slope of the hill or by a trail. The survey was conducted over a period of five months (August 1988 to January 1989) using micro-demographic research methodology which has components of both survey research and anthropological research (Caldwell and Hill, 1988; Axinn, Fricke and Thornton 1991). Factual and attitudinal data on marriage, fertility, health and family planning, and the value of children were collected using a structured questionnaire. Other instruments included in-depth case studies, observation, group discussion and discourse with key informants. Socio-economic background information collected included education of the women and her husband, household head, landownership, settlement area and caste-ethnicity. A total of 625 households were covered which yielded 719 women aged 15-54 years.

This study can be compared and contrasted with that of Fricke, Thornton and Dahal (1991). Unlike that study, which was of a single ethnic group in an area much closer to Kathmandu city, my study was of a multi-ethnic area far from the capital city. However, both the areas have identical exposure to monetization and modernization. While Fricke et al.'s study is illuminating on the changes encompassing a single ethnic group, this study highlights the forces of change in a much wider social context.

Development and expansion of health care facilities has been an integral part of government policy to improve the health status of the Nepali population. However, experience shows that not all people are equally attracted to the modern health care system or have the incentive and knowledge to use it. Models on use of health services vary (Rosenstock 1966; Andersen 1968; Rogers and Shoemaker 1971): the health behaviour models emphasize the perception of vulnerability to an illness and the efficacy of the treatment which will influence health-seeking behaviour. The health behavioural model proposed by Andersen (1968), and subsequent modifications and applications of the model[1], are used here as a conceptual guide. The model is based on three sets of characteristics: predisposing, enabling and need. The predisposing characteristics include the demographic (age, sex, number of children), and the social (education, caste-ethnicity): younger adults, males and the educated are more likely to use a modern health care facility while the presence of a large family is likely to reduce use of the services because of the increased cost. The enabling factors are those which may promote the use of the health-care facility: they include economic status of the household, and knowledge of and access to modern health care. The third set of characteristics include perception of the severity of an illness, and are therefore a stimulus to use of health care: child loss experienced by women represents the 'need' characteristics in this paper.

The paper contains both descriptive and analytical findings: the descriptive findings are based on bivariate analysis, the analytical findings on multivariate analysis. On the basis of the descriptive findings, logistic regression is carried out and results are interpreted in light of the odds ratios.

The context

As in most of Nepal, traditional life in the Benighat area is being affected by a series of development programs. In the early 1970s, a major road construction project supported by the Chinese government was begun, linking the settlement area with Kathmandu, the capital city, and Pokhara, a tourist spot and urban centre; the highway also linked the study area with southern Nepal and India. The construction of the highway was a major event in the development of the study area and it affected the village community in numerous ways. Many people got jobs as rural construction workers and were paid in cash. Development efforts by the government encouraged irrigation facilities and provided incentives for cash crops, mainly vegetables and other horticultural crops; livestock raising was also encouraged. Surplus horticultural and livestock products gained an easy access to the major urban areas. Marketing of the surplus products, and cash wage-earning, monetized the village economy and integrated it with the national economy. Almost half of the population has access to some form of piped water, but this is inadequate and is mostly concentrated in settlement clusters along the highway: water-borne

[1] See Aday and Andersen 1974; Wilinsky 1978; Soldo 1985, Subedi 1989; Fosu 1989

diseases are rampant in the population. Schooling of children is increasingly looked upon as a means of enhancing status and increasing opportunities for employment outside agriculture. School enrolment for both boys and girls is increasing, at a somewhat lower rate for girls.

In the early 1970s, the Benighat area also benefited from the establishment of a modern health post in Benighat. This health post is now an 'area health post' catering to the needs of about eleven village development committees (VDC, the lowest political unit) including Benighat. With the establishment of the health post in the VDC, a couple of retail medicine shops have sprung up in the area. The retailers not only supply medicines but also give advice on their use for primary illness. In addition, there are shopkeepers who sell medicines with their general provisions; even antibiotics are widely available in those stores and can be obtained without prescription. The health post, which is at the VDC headquarters in Benighat, is about three hours' walk from the farthest settlement covered in this study. Settlement areas which are along the highway and are within half-an-hour of the health post are categorized as settlement cluster-I, and settlements that are far off the highway are categorized as settlement cluster-II. With the opening of the highway, people also have access to major hospital care in urban areas like Kathmandu, Pokhara, and Narayanghat.

Like most of rural Nepal, the surveyed area is predominantly agricultural. As in other agricultural societies, land is the only source of employment and income for most of the households. The ever-increasing population in the area has put great strain on the land available for cultivation. Agriculture is integrated with the rearing of livestock, which provide labour for cultivation, and are important for replenishing soil fertility and supplementing family income. A significant number of households further supplement their income through wage earning and retail trade.

Descriptive findings

Characteristics of the respondents

Patterns of settlement, historical developments and caste-ethnic mix are important characteristics of the socio-economic structure of Nepali society. The study area is a microcosm of Hill settlement in Nepal: major caste-ethnic groups are represented in the study population. Topography is an important source of variation in socio-economic life. Settlement patterns, caste-ethnic mix and access to land and other services vary according to altitude. Diversity in ecology and elevation has always been a factor for caste-ethnic diversity and associated modes of life throughout the history of modern Nepal. About 80 per cent of the Benighat population belong to the Hindu caste system while the remainder belong to various hill tribes and ethnic groups. Among caste Hindus, the higher castes, Brahman and Chhetri, predominate with 63 per cent of the population followed by untouchables, 21 per cent, and residual caste groups, 14 per cent. Among the hill tribes and ethnic groups, the Ghale Gurung are the largest group followed by the Magars[2].

[2] Details of caste-ethnic diversity are beyond the scope of this paper. Despite the pursuit of Hinduization by the state, many of the tribal and ethnic populations maintain their unique social and cultural characteristics; for details see Bista (1972, 1982, 1992); Gaige (1975); Macfarlane (1976); Gurung (1989); Bishop (1990). There are several minority groups within the tribal and ethnic population. For the purpose of this study,

Table 1 shows the major socio-economic and demographic characteristics of respondents according to caste-ethnic background. It is clear from the table that the high castes, Brahman and Chhetri, are socially and economically better-off than the lower castes and ethnic groups. For example, the mean years of husbands' schooling for the Brahmans is more than double the mean years of husbands' schooling for the lower-caste Hindus and ethnic groups. Distribution of landholding is skewed. Large plots are owned and operated by high-caste people. The average size of landholding owned was 1 hectare but the size of holdings owned by the Brahman households was 1.4 hectares, which is more than twice the amount of land owned and operated by the ethnic and other lower-caste groups[3]. Not only do the high castes own more land, they also own the high-quality land which produces better and is thus valued more. The socio-economic superiority of the higher castes in day-to-day life is quite marked in rural areas like Benighat. Therefore, caste in the studied community also represents economic class, though not invariably. In general, the higher castes are better off economically, but even in Benighat, there are Brahmans and Chhetris who are landless or marginal landholders like the ethnic groups and lower castes.

Table 1
Socio-economic characteristics and caste

Caste-ethnicity	Years of schooling		Land(ha.)	Household size	Number
	Respondent	Husband			
Hindu Castes					
Brahman	0.6	3.8	1.6	7.5	232
Chhetri	0.3	2.7	1.1	6.4	117
Untouchables	0.3	1.7	0.9	6.8	125
Other castes	0.1	0.9	0.6	6.4	79
Tribal and ethnic groups	0.2	1.4	0.6	6.5	146

Health beliefs and use of health care facilities

Treatment-seeking behaviour is largely determined by types of illness and popular beliefs regarding them. The cultural diversity brought about by caste and ethnic mix and topographical variations extends to health-seeking behaviour. Some of the health beliefs may be common to all caste-ethnic groups but some are more specific to a particular caste and ethnicity. However, because of the long acculturation of ethnic and tribal groups with the dominant caste groups in Benighat area, we did not find significant differences in health care beliefs. In most cases, illness is thought to be both physical and spiritual. For illness deriving from relations with the

ethnic and tribal groups are treated as separate categories from caste Hindus because of their distinct cultural background.

[3] However, the economic inequality evident in ownership of land per household is somewhat reduced if we consider household size. Higher-caste Brahmans tend to have a larger family size which reduces the per capita availability of land. This is in conformity with results reported elsewhere for Nepal as a whole. The World Bank (1991) found that households with larger landholdings also have larger family sizes.

supernatural, modern medicine is considered ineffective (Stone 1976; Molnar 1981)[4]. For villagers in the Benighat area, the concept of illness is associated with a wide range of causation from food to witchcraft, spirits and supernatural events. For example, it is fairly common in all caste-ethnic groups to put a black mark (*tika*) on a baby's forehead to safeguard it from the 'evil eye'. Similarly, mothers tie black threads on children's ankles and wrists to protect them from malignant spirits. Coughing is often associated with intake of 'cold' food and lack of proper clothing (*chiso lagnu*): the patient will be barred from taking 'cold' food such as yoghurt, green vegetables, cold water and fish. Local wisdom is that a sick person suffering from cold should be given hot soup made with spices (ginger, turmeric, basil), and should avoid sour, hot and oily food. Lack of appetite in children is usually associated with witchcraft and 'evil eye' (*chokha lagnu*). Pregnant women are treated as sick (*bhari jiwaki*). In higher-caste Brahman households, a woman may be barred from worship and cooking responsibilities after six months of pregnancy. Among the higher castes, a menstruating woman is 'untouchable' (*chhuna nahune*) for four days; among the lower castes and other ethnic groups, the restrictions are less severe. While there are few food restrictions during the pregnancy, there are many more food taboos after the birth of the baby. Women are given 'hot' food (*garam*) after the birth of the baby: *garam* food consists of meat, ghee, rice and soup made from different herbs and spices. A woman after childbirth is considered vulnerable to various sicknesses: she is kept in a dark closet to protect her from cold. As a result of several food taboos and poverty, the majority of rural women suffer from anaemia. There are food taboos associated with all types of illness: a child suffering from diarrhoea may be barred from taking water and liquid food. The villagers argued that intake of liquid would make the diarrhoea worse.

In rural Nepal, and in Benighat, women are the primary care-givers; siblings are also important carers for their younger siblings. In a joint household, the grandmother is the one who looks after the young children; usually, it is she who first identifies the illness of a child. Most often, treatment for illness is sought only after home remedies have failed. Experienced women administer their own home medication to the sick; others may take the sick child to a nearby traditional healer for treatment. Mothers are informed of the sickness of the child when they return home, after the evening meal, a time to chat about the day's events. The village source of drinking water is an important place where women seek advice on treatment for their sick children: usually the mother describes the characteristics of the sick child and seeks advice from experienced mothers.

Going to a faith healer is a ritual for seeking treatment, but if the illness persists even after two or three visits to a healer, the people of Benighat seek modern medicine. Many of them also use self-medication, with medication bought at the medicine shop. Others try herbal medications they have tried before. However, treatment-seeking behaviour is changing with the availability of the modern health care facility in the area.

Despite the presence of the health post in the area for about two decades, about 42 per cent of the people do not visit it but go to a traditional healer. Table 2 shows the use of health-care facilities by the socio-economic characteristics of the respondents. Use of modern health care is directly related to socio-economic status: in general the higher castes and educated people are more likely to seek modern treatment than any other socio-economic groups.

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[4] Several studies of an anthropological nature deal with concepts of illness and cure in different communities in Nepal (Hofer 1973; Bennett 1974, Stone 1976, Blustein 1976; Molnar 1981; Paneru 1980).

Women who had attended school for a few years used modern medical facilities more than illiterate women; similarly, those whose husbands had been to school show significantly higher rates of health care use. Distance to the health care facility is another factor in seeking medical treatment. People who are close to the roads where the health post is located (settlement cluster I) were found to seek modern treatment more than people who are far away (settlement cluster II). From settlement cluster II, only severe cases were brought to the health post, often too late to treat. The age pattern of health-care use shows a peak in the middle age (25-34). Women at both age extremes use modern health care less, but for different reasons according to the age group. Younger women are more restricted in household decisions: lack of autonomy hinders them in seeking modern health care. Moreover, younger women also have fewer children and less need of the health care services. Women who are aged 35 years and above are traditional and want to keep to traditional modes of treatment, from local healers; they also tend to distrust modern medicine.

Of those who did not use modern health-care services (N=299), about 71 per cent of respondents gave reasons: the distance to the health post was cited by about 29 per cent as the main deterrent, followed by bad treatment at the health post (22%) and high cost of treatment (21%). The remainder of the respondents (29%) said that there was no need for them to use the health care facility.

'No need' for seeking treatment was highest for the Brahman caste (42%), while long distance to the health post was the main reason for not using the health-care services (41%) by the ethnic groups. The non-use of health-care services was higher for those who had not attended school than those who had, and it increased with age of the respondent. About 43 per cent of the women in settlement cluster I reported that they never had a 'need' to attend to the health post, and 35 per cent in settlement cluster II said the health post was 'too far' for them to seek treatment. One lower-caste respondent in settlement cluster II explained why there was less use of the health post:

> ...there is differential treatment in the health centre. If someone higher-caste and influential goes for treatment, he or she not only receives most of the time of the health post staff, but also receives free medicine. As for us, the poor, they direct us to buy from the shop. ....When a family planning or health worker comes to the village, he never comes directly to us. He or she finds difficulty even to speak to us.

There is a possible link between socio-economic status and use or non-use of the health care system. Because Brahmans are socio-economically better-off, they are probably more healthy and need less health care;and when they do need it, they are able to pay the associated cost of using the services. The lower caste and ethnic groups are poorer and less likely to be healthy: their reasons for non-use varied from 'too far' to 'expensive treatment' and 'bad treatment'.

Table 1 shows that caste-ethnicity and other socio-economic measures are related; Tables 2 and 3 show that use or non-use of the health services is closely related to socio-economic status including caste-ethnicity, education and proximity to health care centre. This means that caste on the one hand and other socio-economic measures on the other are interrelated. For example, the service castes and ethnic groups not only have lower status in the caste hierarchy, they also have less education, a measure of social status, and own less land, a measure of economic status. Similarly, people who are closer to the health post (settlement I), are more likely to use the

health post. To determine the strength of each socio-economic variable included in the health behaviour model on the use of health services, I use the multivariate regression analysis.

Table 2:

Use of modern health facilities according to Socio-economic status

Socio-economic status	Use of health facility		
	Yes	**No**	**N**
Caste-ethnicity			
Hindu Castes			
Brahman	70.3	29.7	232
Chhetri	63.5	36.5	137
Untouchables	43.2	56.8	125
Other Hindu castes	54.8	38.0	79
Tribal and ethnic groups	47.5	52.5	146
		(χ^2 significant at <0.001)	
Respondent's schooling (years)			
No schooling	56.1	43.9	643
1-3 years	74.5	25.5	51
4 and above	84.0	16.0	25
		(χ^2 significant at <0.01)	
Husband's schooling			
No schooling	49.4	50.6	310
1-3 years	62.4	37.6	218
4 years and above	68.6	31.4	191
		(χ^2 significant at <0.01)	
Settlement cluster			
Near highway	75.7	24.2	350
Off highway	42.2	58.0	369
		(χ^2 significant at <0.01)	
Age group of respondents			
15-24	51.1	48.9	176
25-34	63.0	37.0	254
35 +	58.8	41.2	289
		(χ^2 significant at <0.05)	
Total	58.4	41.6	719

Regression results

The dichotomous use of the modern health care system and various socio-economic characteristics is further analysed using logistic regression. The dependent variable is coded 1 if the respondent has used the modern health care service and 0 if she has not used it at all. Results are discussed by looking at the odds ratio which is the exponent of the coefficient of the regression estimates and takes a value between zero and infinite. Results are compared to the

reference group which always has an odds ratio of one. An odds ratio greater than the reference category implies a higher probability while an odds ratio less than the reference group implies a lower probability than that of the reference category.

Table 3
Reasons for non-use of modern health facility

	Far away	Bad treatment	Expensive	No need	N
Caste-ethnicity					
Hindu Castes					
Brahman	27.0	14.9	16.2	41.9	69
Chhetri	31.3	22.9	18.8	27.1	50
Untouchables	23.7	27.1	22.0	27.1	56
Other Hindu	18.2	23.6	23.6	34.5	36
Tribal and ethnic groups	40.8	23.9	22.5	12.7	87
Respondent's schooling					
Illiterate	28.9	23.0	21.3	26.8	282
Up to 3 years	26.7	13.3	6.7	53.3	13
3 years +	20.0	—	20.0	60.0	4
Settlement clusters					
Near highway	21.3	18.8	17.5	42.5	85
Off highway	31.3	23.3	21.6	23.8	214
Age of women					
15-24	22.2	14.4	18.9	44.4	86
25-34	27.6	26.5	21.4	24.5	94
35+	34.5	24.4	21.0	20.2	114
Land ownership					
Landless	23.7	18.2	9.1	45.5	12
Up to 0.5 ha	32.3	25.3	21.2	21.2	98
0.5 to 1 ha	29.9	20.7	26.4	23.0	84
1 to 1.5 ha	21.6	23.5	17.6	37.3	47
1.5 ha.+	27.1	18.6	15.3	39.0	58
Total	28.7	22.1	20.5	28.7	100
(N)	(86)	(66)	(61)	(86)	(299)

The relationship of all the three demographic variables to use of modern health care is in the expected direction. Respondents' age and size of the family show a negative relationship. An increase of one year in a woman's age reduces the probability of her using modern health care; the number of living children in the family increases the probability of using it. The odds of using

the health care system for women with living children is 1.23 times higher than for women without living children. The second block of variables is related to social structure: respondents' education, husbands' education and caste-ethnicity are in this category. Of the social-structural variables, only women's schooling is statistically and positively related to the use of modern health care. Women who had been to school were more likely to use modern health care by an odds of 1.84 than those who had not. However, husbands' schooling was not significant. Contrary to our expectation, caste-ethnicity is not statistically significant even though the lower caste and ethnic groups tended to have lower odds of using the modern health care system than the higher castes, Brahman and Chhetri.

Separate models were run to test the significance of caste-ethnicity on health care use (results not shown here). We modelled for all the caste and ethnic groups in the study including the relationship between high castes and low castes, Hindu castes and tribal ethnic groups, lower untouchable castes and tribal ethnic groups. Only among caste Hindus does caste have an effect on use of health services at a 10 per cent level of significance. In all other models, caste is not statistically significant in use of modern health care.

Settlement cluster, knowledge of health worker and value of land are the 'enabling' characteristics in the model. All enabling characteristics were found to be positively and statistically significant. Women who knew a health worker were 3.75 times as likely to use the health facility as those who did not know a health worker. Similarly, women who lived in settlement cluster I, where the health post was located, were 3.5 times as likely to use the modern health facility as women who lived far from the road in settlement cluster II. Value of land, a measure of both economic and social status, was also positively related and was statistically significant. Women whose households owned higher-valued land had higher odds of using modern health care than the landless poor and households that owned less-valued land. Finally, the 'need' characteristic in the model is represented by women's experience of child death. This variable is positively and statistically significant. The odds of using a health care facility are higher for women who have lost their children than for those who have not had such an experience.

As noted earlier, a set of variables from the same family of characteristics represents a block. Entering one block of variables at a time and adding it to another block makes it possible to examine the changes to the explained variances of the dependent variables[5]. An examination of the pseudo-R^2 increments reveals the strength of the variables in each block of the health behaviour model (HBM). Of the three blocks of variables, the major predictors are the enabling variables which account for the largest increment in R^2, followed by the predisposing and need variables. The predisposing characteristics together explain about six per cent of variations in the use of modern health care services in Benighat area. The need variables in the model are somewhat weak because there is only one indicator; but the finding that the enabling factors are more important than any other factors in this model is consistent with expectation. In rural areas like Benighat, the use of health care services is determined by factors such as proximity to the health care centre and value of land, which is an indicator of economic status.

[5] Analogous to R^2 in ordinary least squares regression, one can also look at pseudo-R^2 to examine the effect of each block of independent variables.

Table 4
Logistic regression estimates of the influence of socio-economic characteristics on use of modern health care services

Characteristics	Odds Ratio	t	P>|t|	Mean	Std
Predisposing					
Demographic					
Living children	1.28	4.52	0.000	3.4	2.3
Age	.96	-3.12	0.002	32.4	9.8
Family Size	.94	-1.73	0.084	6.8	4.1
Social					
Caste[a]	.94	-0.803	0.422	0.48	0.5
Respondent's schooling	1.21	1.99	0.047	0.4	1.2
Husband's schooling	.99	-0.19	0.846	2.4	3.5
Enabling					
Nearness to highway[b]	3.40	6.24	0.000	0.48	0.50
Knowledge of health worker[c]	3.84	5.57	0.000	0.23	0.42
Value of land owned (in Rupees, 43= US$1)	1.01	2.79	0.005	70499	136676
Need					
Experience of child loss	1.29	2.63	0.009	0.7	1.0

Statistical note: N = 719; χ^2_{10}= 177.12 (significant at 0.0000); Log Likelihood = - 399.59; pseudo R^2 =0.1814

[a] High castes (Brahman/Chhetri) =0, Others=1

[b] Near highway, Yes=1, No=0

[c] Knows health worker, Yes=1, No=0

Discussion and summary

In a transitional society where both traditional and modern methods of treatment are used, the choice between them is determined by socio-economic status and belief systems which are themselves in the process of change. Use and non-use of the health care facility is significantly related to demographic variables. Number of living children is positively related to the use of the health care facility, even after sex of children is controlled for. This is an important finding

because it is believed that children of different sexes are treated differently: this is not supported by the study.

In general, the older the woman, the less she will use modern health care,which is consistent with our expectation of older rural women. In rural areas like Benighat, women adhere to traditional values which encourage them to cling to traditional modes of health-seeking behaviour. Older women are also more likely to be prejudiced against the methods used by the health care providers, as is illustrated by the following case.

> Devaki aged 40 accompanied her daughter Janaki aged 21 to the health post to seek treatment for Janaki's swollen breast (*thunilo*). The baby was not sucking it properly. Before they had finished explaining what had happened to Janaki, the health worker injected something into her. Both Devaki and Janaki wanted some 'medicine' to reduce the pain from the swollen breast, not an injection. After the injection, Janaki complained of increased pain and fainted. According to Devaki, there was nervousness and chaos among the health workers and they did not really know how to handle the situation. The health worker had to use two or three other 'injections' to bring Janaki back to normal. Devaki said she was scared to death to see her daughter like that. After they went back to their house, the infant did not like the taste of his mother's milk. Devaki complained that the injections given by the health post staff had diluted her daughter's milk which the child could not drink. She accused the health workers of being negligent and arrogant towards her daughter. She noted that she would have been better off had she decided to treat her daughter with the local medicine.

In rural areas, health workers are projected as ruthless, cruel and insensitive to others' sufferings. Mothers and other child care providers threaten their children that they will 'take them to the doctor' if they misbehave. This creates and perpetuates negative stereotypes about modern health care providers among the rural population.

Schooling of women was found to be a significant predictor of the use of health services. Education is associated with knowledge and imitation of Western values, and ability to manipulate circumstances according to need, and meet the cost of rearing children. It is argued that the better educated are more willing than the less educated to adopt innovative behaviour and shun traditional practices (Caldwell 1979). Such change often leads to the motivational and ideational change that is thought to be at the heart of the demographic transition in the contemporary world (Caldwell 1982; Retherford 1985; Cleland and Wilson 1987). The enabling factors are those which are associated with access to the health centre, economic status of the household and knowledge of the health workers. The health post is in Benighat, which is the hub of social and political life. It is also a local bus stand. As noted earlier, because of the opening of the highway, new employment opportunities were created and some women in the study have taken advantage of the opportunities. These women now mingle with passers-by and are exposed to various ways of life that affect and change their own daily life-styles, including health seeking behaviour. The following is what we observed in a tea shop.

> One day, while having tea in a tea shop, we heard a small child's cry. The baby was coughing and crying at the same time. The proprietress rushed to pick up the baby

> while her husband helped in preparing tea. When the proprietress came she was trying to breastfeed but the baby was not interested. We heard her saying that the baby might have developed fever. People who were there offered different opinions about the nature of the illness and possible treatment. While there was no consensus on the precise nature of the illness, most of them suggested that the lady should not waste time before seeking proper treatment for the baby at the nearby health post.

This type of interaction with outsiders affects people's behaviour. We were relieved to find that the parents decided after discussion to take the baby to the health worker, who treated it for acute respiratory disease. Once a women uses a health post, she is more likely to use it in future. People who live far from the road do not have this level of interaction with outsiders and are less likely to use modern health care.

Observation and discussion of health-seeking behaviour reveals that promptness in seeking treatment or cure depends on the age and sex of the sick person and the status of the primary carer. While we observed no systematic difference in treatment for sons and daughters (a finding also confirmed in the quantitative analysis), gender differences are more marked in adult treatment: males are more promptly advised to seek treatment than are females. There is strong pressure to seek treatment from all members of the group, particularly from the patient's mother and wife. The treatment of women patients is further affected by the ideology of the patriarchal society: a woman during menstruation is polluting, untouchable. Since none of the health workers are women, a sick woman has considerable problems in seeking treatment during her periods, both at the household level and in the community at large. Usually a service provider is a high-caste, educated, urban male and a patient may be a lower-caste, illiterate, poor and rural female. Such glaring status differences between the service providers and receivers creates communication gaps and shadows the objectivity of the service.

When we asked women why they do not go the health post, they responded that they have to speak to the 'doctor' whom they do not know and 'he asks too many questions'. In a society where pregnancy and birth and body organs are not subjects for uninhibited public discussion, the presence of an army of male health workers limits the use of such programmatic efforts in carrying out the messages of the program. Because of their upbringing, the health-post staff maintained a good working relationship with the village elite who are not only few but also in a position to make use of health services elsewhere. These findings are not atypical of villages in Benighat area. Several other studies point to similar findings (Schuler et al. 1985; Justice 1986; Schuler and Goldstein 1986).

The differences in seeking modern health care are consistent with the socio-economic status. Contrary to general expectations, traditional medicine still thrives in Benighat area. When Chandra, aged 38, was asked why she did not go to a doctor for treatment of her frequent headaches (*adho*), she responded:

> I suffer from *adho* frequently. Whenever I have it, I visit the *dhami dai* (shaman brother). He chants some *mantra* touching my head three times and I feel much better after some time. *Dhami dai* is just across the house and I do not pay him anything for his services. If I go to the health post, it takes time and money. Where on earth am I

> going to get that much money for my illness? I get satisfaction from the services from him.

Unlike the urban high-caste, educated men who mostly staff the modern health facilities, the traditional health providers are the same sort of people as the villagers. Villagers have social relations with the traditional practitioners. The persistence of the traditional health providers is even facilitated by the advent of modern medicine, with its inadequacy to provide a better cure and its incompability to the lifestyle of rural people. People expect treatment at the doorstep; they also expect early treatment and cure from the medicine. But getting service is time-consuming and expensive: often it takes hours to walk to the health care facility, only to either find that the main health provider is away or have to wait a long time. At times there are personality conflicts among the staff. In a couple of instances, the chief of the post did not leave the store room key to his juniors: people who came to the health post on those days received low-quality care, and the whole health post was deprived of essential supplies. The quality of the treatment is poor: there is little communication between the providers and the patient, and the patron-client type of relationship predominates. In most cases, health care providers are arrogant.

The findings have underscored the importance of socio-economic variables for health behaviour. While the present health care system is dismally inadequate, the challenge Nepal faces to provide primary health care for the growing population is quite high. A large majority of people continue to live in poverty and tangible attempts have to be made to empower them. Agricultural production programs that encourage healthy food habits should be linked with programs to increase economic standards. The caste-ethnic composition of the service providers should be a point in considering relocation of health care staff. Education, an important factor that provides exposure to the outside world and promotes use of health care facilities, needs to be expanded. Creating a conducive environment for girls' education would have a positive impact on maternal and child health.

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The effect of physician training on treatment of respiratory infections: evidence from rural Egypt*

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Abstract

A three-round survey of child mortality, morbidity and treatment conducted in rural lower Egypt in 1990-91 found relatively poor treatment practices for respiratory infections. Only about 56 per cent of children with a respiratory infection received appropriate treatment. Antibiotics were prescribed for more than half of all mild coughs and colds, but were not prescribed for a quarter or more of serious cases. A training program for government physicians conducted midway through the survey improved treatment practice slightly in government facilities. However, training alone is unlikely to improve treatment much. Better supervision, and information campaigns focused directly on mothers, are suggested as necessary components of a successful project.

Introduction

Acute respiratory infections (ARI) kill large numbers of young children in developing countries. UNICEF (1993) estimates that 3.6 million children under age five died worldwide of respiratory infections in 1990. The World Bank (1993) estimates that 18 per cent of the entire burden of disease of children under five in developing countries, with the loss of some 93 million disability-adjusted years of healthy life, resulted from respiratory infections. The great majority of the life-threatening respiratory infections are bacterial in origin, and respond readily to timely treatment with antibiotics. The recommended intervention in low-income settings for combating life-threatening ARI is early case identification by health providers, and early treatment with antibiotics following standard case management (SCM) protocols.

A recent meta-analysis of several field trials of the case management approach to treatment of pneumonia concludes that this strategy can have a substantial effect on infant and child mortality, at least in settings where infant mortality rates are relatively high (Sazawal and Black 1992). Extrapolating from such results to population-based interventions whose primary activity is training of primary health care workers in SCM assumes that health care personnel use correctly the training they are given, both in accurately diagnosing the illness, and in properly treating the sick child. Appropriate treatment involves use of an antibiotic in all cases of suspected pneumonia, often in combination with an antipyretic. Antibiotics are also appropriate for some upper respiratory infections, such as streptococcal

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pharyngitis or otitis media. However, antibiotics should not be used for uncomplicated coughs which are primarily viral in origin.

ARI case management in the Egypt Child Survival Project

Combating acute respiratory infections in children was one of the main components of the Egypt Child Survival Program (CSP), activities of which began in earnest in 1990 (Bermawy et al. 1992). The objectives set for the ARI component were: to reduce mortality from ARI, in particular pneumonia; to reduce the severity and complications of ARI; to reduce inappropriate use of antibiotics and other drugs; and to reduce the incidence of ARI, in particular pneumonia (CSP 1994)[1]. To accomplish the first three goals, the ARI program has used a single strategy of training Ministry of Health primary care physicians and nurses in 'standard case management' (SCM).

This paper examines mothers' reports of case management of respiratory infection in a rural area of Egypt. Fortuitously, training of some health workers in ARI- SCM in this area took place during the course of field work. This training consisted of a two-day course of instruction for primary health care physicians in government clinics and hospitals in the governorate.

The training in SCM consisted of teaching physicians to evaluate signs and symptoms in a specific order so as to be able to categorize children correctly as having very severe disease, severe pneumonia, pneumonia, or no pneumonia: that is, simple cough and cold. Once the child has been correctly categorized, the physician must prescribe appropriate treatment. This includes antibiotics for all severe disease and pneumonia. For simple coughs and colds, no antibiotic should be given; the child should receive only home care. Home care includes keeping the child warm, providing adequate nutrition, increasing the intake of liquids, soothing the throat (preferably with traditional liquids), and watching for any change that would require a return visit to the physician (CSP 1990). The training was exclusively didactic. There were no clinic based exercises.

The data indicate that the program's efforts have had some positive effect, but have made little progress in reducing inappropriate use of antibiotics. The results of the informational and training efforts of another national child health program in Egypt, the recently completed National Control of Diarrheal Diseases Project, provide some interesting parallels with, and useful lessons for, the ARI program.

The Child Survival in Rural Egypt Study 1990-91

The Child Survival in Rural Egypt Study (CSRES) was conducted from 1990 to 1991 to measure childhood mortality and to explore factors associated with differentials and changes therein in a sample of twelve rural villages in Menoufia governorate. Menoufia is regarded as being broadly similar to most other parts of rural Lower Egypt, so the results of the survey are likely to be representative of the 25 million inhabitants of this area (Langsten and Hill, forthcoming a). The twelve villages were chosen for CSRES because they had been randomly selected for an earlier prospective survey conducted from 1979 to 1983. The intention of the earlier survey was to evaluate an integrated social services delivery project implemented throughout Menoufia governorate from 1979 to 1983 (Gadalla et al. 1983).

CSRES itself was a three-round prospective study, with rounds spaced at approximately six-month intervals. The survey covered the entire population of the twelve villages, amounting in the first round to nearly 9,900 households, almost 58,000 people, and more than

[1] The fourth objective had received no programmatic input at the time this research was conducted, and has received relatively little attention since then.

8,600 ever-married women 15-49 years of age. Questionnaires focusing on morbidity and treatment were completed for all children currently under five years of age at each round. In the first round there were just over 8,600 such children. Children passing age five between rounds, and out-migrants, were dropped from subsequent data collection. New births and in-migrants under five were added to the pool of eligible respondents. Thus just over 8,900 children were included in the second round and slightly more than 8,700 children in the third round, for a total of just over 26,200 questionnaires completed for children under five. A total of 10,300 children are represented, some with questionnaires completed in all three rounds, some in just one. Refusals to co-operate were extremely rare: fewer than ten during the first round, and fewer than ten more dropped out during the remainder of the work. Details of the study design, and an overview of results are available in Langsten and Hill (1991, 1992).

Of particular relevance here is the monitoring of respiratory infections. At each round the mother or carer of each child was asked whether the child had suffered from any respiratory infection during the two weeks before the interview, and, if so, what health care was sought and what treatments used. This paper examines treatment of 5005 episodes of respiratory infection reported at rounds 1, 2, and 3 of CSRES in children under five, considering sources of care, treatments used, and how the source of care affects treatment. Comparison of data from the first and third survey rounds permits evaluation of the impact of the training that took place at the same time as the second round. Finally, this same data set is used to compare respiratory infection treatment with diarrhoeal disease treatment (Langsten and Hill forthcoming a). There are substantial similarities in the training given and the patterns of treatment for the two diseases: lessons about the effectiveness of physician training emerge from these similarities.

Results

Throughout the analysis that follows we have controlled for the severity of each episode of respiratory infection by differentiating between those cases where the mother reported that the child had only a cough, and those where the child's cough was reported to be complicated by fast or difficult breathing[2]. This division of cases is not entirely satisfactory. Ordinarily, fast or difficult breathing would suggest very serious illness; yet 48 per cent of all cases were reported to have these complications. It appears that these symptoms of serious illness were considerably over-reported by mothers. However, this is the only indicator of severity that is available for all three rounds of data collection: therefore, it is necessary to use it for the analysis.

Before continuing with the analysis it is useful to examine this indicator of severity, complicated cough, in greater detail: the first concern is that it substantially overstates the number of children who are seriously ill. In the third round of data collection we added a number of additional indicators of severity of respiratory infection to the questionnaire. These were: the mother's report of the presence of wheezing and of chest indrawing; of whether the child was listless, or not; and finally, of whether the child's illness was severe or mild. All of these indicators yield a substantially lower proportion of children who would be considered to have serious illness: between 19 and 31 per cent. Nonetheless, the indicator of severity, 'cough only' versus 'cough complicated by fast or difficult breathing' is highly correlated with all of these other indicators. Therefore, though the 'not complicated/complicated' variable overstates the number of serious cases, and this

[2] From 1990 to mid-1991, the SCM courses lasted for two days, and were exclusively didactic. The length of the courses was increased to three days in mid-1991, and to four days in early 1994, to provide time for clinic-based exercises.

overstatement must be considered in the discussion of results below, it is a useful indicator of severity.

Table 1 a
Source of care for respiratory infection[a] by presence of complications, 12 Menoufia villages, 1990-91 (percentages)

	Complicated[b]		
	No	**Yes**	**Total**
Of those seeking care:			
Govt clinic only	15.2	15.8	15.5
Private doctor only	43.1	53.6	48.8
Pharmacy only	20.7	22.3	21.5
Mix of sources	0.5	0.8	0.7
Other	20.5	7.6	13.5
Total	100.0	100.0	100.0
Seeking care	63.8	83.4	73.2
Not seeking care	36.2	16.6	26.8
N	2616	2389	5005

Table 1 b
Source of care for respiratory infection[a] by education, 12 Menoufia villages, 1990-91 (percentages)

	Complicated[b]							
	No				**Yes**			
Educational level:	None	Some Prim	Prim Com Prep	Sec+	None	Some Prim	Prim Com Prep	Sec+
Of those seeking care:								
Govt clinic only	16.4	12.7	23.7	10.9	17.2	14.9	13.9	12.3
Private doctor only	39.3	45.1	38.9	54.3	50.9	55.4	60.2	57.9
Pharmacy only	21.3	18.5	17.6	22.5	23.2	21.1	18.1	22.3
Mix of sources	0.3	0.3	1.5	0.6	1.0	0.6	1.2	0.0
Other	22.6	23.5	18.3	11.6	7.6	8.0	6.6	7.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Seeking care	62.1	63.5	68.9	67.2	81.2	84.5	85.1	87.3
Not seeking care	37.9	36.5	31.1	32.8	18.8	15.5	14.9	12.7
N	1450	510	190	463	1426	414	195	354

[a] In the two weeks preceding each round.
[b] Complicated: No = cough or cold only. Yes = cough or cold complicated by fast or difficult breathing. All three rounds are included.

Another concern is that all these indicators are based on the mother's report, which may differ substantially from the evaluation of the physician examining the child. Certainly, as noted immediately above, mothers overstate the degree that children are suffering from complications of fast or difficult breathing. The more important question is whether the overstatement is affected by the mothers' characteristics in a way that might influence other results. For example, is the accuracy of mothers' reports affected by their educational attainment? Briefly, we do not believe that the mothers' reports are biased in any way that substantively affects the analysis. Throughout the analysis the influence of mother's education is taken into consideration.

The following analysis also differentiates between children treated by physicians at government clinics and hospitals, and by physicians in private practice. This is an important distinction because it is clear in the data and from other studies that doctors in government clinics prescribe differently from those working in private practice. The irony in this situation is that private physicians are, for the most part, the same people as public physicians, but at different times of the day. The exact degree of overlap between public and private doctors is not known. There is, however, general agreement that almost all government physicians have a private practice. The more important question from the point of view of this work is: what proportion of private physicians work in the government sector? This is a critical issue because public physicians receive training in SCM and demonstrate better prescribing behaviour than private doctors. If it can be assumed that most private physicians also work in the public sector, then it can be more confidently asserted that the private physicians have been trained and that physicians actually change their behaviour from one time of the day to another. Unfortunately, there are no concrete data on this question, but most people agree that many private physicians also work in government facilities; whether this means 70 per cent or 90 per cent cannot be specified. The overlap between government and private physicians is discussed at greater length below.

The pattern of sources of care used is very similar to those found in other studies in Egypt, regardless of region or disease (Table 1, top panel). Overall, private physicians are preferred for treatment, with almost half the sick children who go for any treatment being taken to them. Only about 15 per cent of the treated children are taken to government health clinics; even pharmacies are more frequently used sources of care than government clinics. Moreover, when the illness is viewed as serious, the use of private physicians increases substantially, while use of other formal sources of care remains largely unchanged.

There are educational differences in choice of practitioner (Table 1, bottom panel). Among those with simple cough and cold, the better educated are the least likely to get no care or care from other, often informal, sources, and the most likely to go to a private physician. Conversely those with no education are the most likely to get no care or care from other sources. The pattern of differences is similar but the degree of the differences greatly attenuated when the respiratory infection is complicated by fast or difficult breathing.

The effect of education on source of care is further reduced when other background characteristics are controlled (Table 2) using multivariate techniques. Multinomial logistic regression has been used to evaluate the determinants of the sources of care because few cases report using more than one source. The only strongly significant educational effect is that those with no education are less likely than all others to get care from a private physician, but only when the seriousness of the illness has been controlled. Those with some primary education are more likely to use informal sources such as traditional practitioners, friends and relatives, while those with primary complete or preparatory education are more likely to use government health facilities. Other variables also have some effects on source of care used. Males are more likely than females to be taken to private physicians; children in the youngest and oldest age groups are less likely than those in the middle groups to go to government

clinics and pharmacies; the poor and middle wealth groups are less likely to go to a private physician than to other sources or to no source of care.

Overall, the variable with the strongest effect on source of care used is the complications variable. Those whose infection is complicated by fast or difficult breathing are more likely to use each of the formal sources of care. Among these formal sources, private physicians are the most preferred, followed by pharmacies, and then government clinics.

Table 2
Multinomial logit models of likelihood of visiting a source of medical care: 12 Menoufia villages, 1990-91

	Dependent variable categories [a]							
Predictor variables	**Model 1**				**Model 2**			
	1	2	3	4	1	2	3	4
Mother's education								
none	.12	-.22	-.15	.31	.04	-.32**	-.23	.30
prim inc.	.00	-.12	-.29	.43*	-.03	-.17	-.32	.43*
prim. comp./prep	.48*	-.02	-.23	.29	.40	-.13	-.32	.29
secondary/more	-	-	-	-	-	-	-	-
Age of mother								
<25 yrs	-.06	-.11	-.09	.02	-.04	-.08	-.07	.02
25-34 yrs	-.13	-.07	.06	.07	-.13	-.07	.06	.07
35+ yrs	-	-	-	-	-	-	-	-
Child's sex								
male	.07	.21**	.13	-.02	.05	.18*	.10	-.02
female	-	-	-	-	-	-	-	-
Child's age								
[2]1 months	-1.88**	-.63	-1.23*	.01	-1.88*	-.62	-1.22*	.02
2-5 months	-.41	.11	-.69**	.11	-.36	.16	-.64**	.11
6-11 months	-.17	.22	-.34	-.06	-.14	.25	-.31	-.05
12-17 months	-.32	.14	-.22	-.03	-.30	.16	-.20	-.03
18-23 months	-.50*	-.13	-.44*	-.17	-.48*	-.11	-.42*	-.17
24-35 months	-.49**	-.10	-.28*	-.33*	-.47**	-.07	-.26*	-.33*
36-59 months	-	-	-	-	-	-	-	-
Wealth								
Poor	.24	-.41**	-.26	-.19	.20	-.46**	-.29	-.20
middle	.18	-.31**	-.02	-.16	.15	-.36**	-.05	-.17
well off	-	-	-	-	-	-	-	-
Hours/day of television watched								
none or little	-.16	.17	-.17	.18	-.08	.27	-.08	.20
2 or 3 hours	-.15	.08	-.15	.20	-.04	.21	-.04	.21
4 hours or more	-	-	-	-	-	-	-	-
Complicated respiratory infection								
yes	-	-	-	-	1.05**	1.32**	1.11**	.08

no	-	-	-	-	-	-	-	-
Constant	-.71**	-.57**	.00	-1.25**	-1.16**	-.02	-.47*	-1.27**

Level of Significance: ** Pr. < .01, * Pr. < .05

[a]1. Government health facility
2. Private doctor
3. Pharmacy
4. Other (Traditional practitioners, friends, neighbours, etc.)

When we analyse the treatments the child has received we rely on the mother's report of the type of medicine prescribed by the practitioner. It is widely believed among medical researchers that the terms used in Egypt for each type of medicine, and most importantly for antibiotics, are well understood by most mothers, but we have no way of verifying this belief.

Table 3 a
Treatment of respiratory infection[a] by presence of complications, 12 Menoufia villages, 1990-91 (percentages)

	Complicated[b]		
	No	**Yes**	**Total**
Of those treated			
Used cough syrup	96.3	97.0	96.6
Used cough syrup only	55.2	36.0	45.3
Used antibiotics	39.1	52.9	46.2
Used antibiotics only	0.5	0.4	0.5
Total	100.0	100.0	100.0
Treated	77.2	89.9	83.3
Not treated	22.8	10.1	16.7
N	2592	2376	4968

[a] In the two weeks preceding each round.

[b] Complicated: No = cough or cold only. Yes = cough or cold complicated by fast or difficult breathing. All three rounds are included.

Table 3 b
Source of care for respiratory infection[a] by education, 12 Menoufia villages, 1990-91 (percentages)

	Complicated[b]							
	No				**Yes**			
Educational level:	None	Some Prim	Prim Com/ Prep	Sec+	None	Some Prim	Prim Com/ Prep	Sec+
Of those treated:								
Used cough syrup	95.8	97.4	96.0	96.5	96.5	97.0	97.7	98.2
Used cough syrup only	57.9	56.1	41.7	52.0	38.0	32.9	32.0	34.3
Used antibiotics	35.7	38.7	51.7	44.0	49.8	58.8	55.2	56.9
Used antibiotics only	0.6	0.0	0.0	1.3	0.6	0.5	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Treated	74.6	75.1	80.7	86.1	88.2	89.6	89.6	97.2
Not treated	25.4	24.9	19.3	13.9	11.8	10.4	10.4	2.8
N	1434	506	187	462	1419	414	192	351

[a] In the two weeks preceding each round.

[b] Complicated: No = cough or cold only. Yes = cough or cold complicated by fast or difficult breathing. All three rounds are included.

Virtually every child (96 per cent or more) suffering from respiratory infection who received any medicine at all received cough syrup (Table 3, top panel), irrespective of the severity of the illness. Antibiotics were also widely used, being prescribed for 46 per cent of the children, almost always in combination with cough syrup, and often with some other medicine. Although antibiotics were more commonly used among those who were reported to have complications, they were given to almost 40 per cent of children with only a cough. More than 20 per cent of children were given other medicines: presumably antipyretics, antihistamines, expectorants, and the like; other research has identified an extensive list of medications given to children with ARI (Harrison and Abashawl 1992). A high proportion of the children given other medicines were also given both antibiotics and cough syrup.

The differences in treatment by education are relatively small (Table 3, bottom panel). Those with no education are the least likely to receive antibiotics, whether or not the child's cough was accompanied by complications.

The CSP recommends that children with a cough be given cough syrup ; thus the almost universal use of cough syrups is consistent with recommended practice. Use of other medicines may be appropriate for treating fever or other symptoms, but we do not have adequately precise information about each case to evaluate the appropriateness of such use. Only for antibiotics can we approximate an assessment of whether treatment is appropriate or not. Therefore, the remainder of this paper focuses on use of antibiotics, though occasional mention is made of cough syrup and other medicines.

In the following discussion it is assumed that children with complications should be treated with antibiotics. This is not strictly true, especially for our data set, since the level of complications is clearly overstated. We can say with greater confidence that children whose respiratory infection is described as not complicated should *not* receive antibiotics. Appropriate treatment therefore is the sum of the 'not complicated' cases *not* given antibiotics plus the 'complicated' cases *given* antibiotics, whereas 'inappropriate' treatment is the sum of the complicated cases *not* given antibiotics and the not complicated cases *given* antibiotics.

Table 4
Treatment of respiratory infection and percentage of children 'appropriately' treated by presence of complications and source of care, 12 Menoufia villages, 1990-91.

	Govt health facility		Private doctor	
	Complicated[a]		Complicated[a]	
Treatment	**No**	**Yes**	**No**	**Yes**
Used cough syrup	96.9	96.9	98.1	98.8
Used cough syrup only	44.6	27.6	21.2	13.0
Used antibiotics	50.0	63.0	73.2	74.7
Used antibiotics only	1.2	0.6	0.3	0.1

'Appropriately' treated [b]	57.2		55.4	
N	258	319	721	1073

[a]Complicated: No = cough or cold only. Yes = cough or cold complicated by fast or difficult breathing. All three rounds are included.

[b] 'Appropriate' treatment: No antibiotics for an uncomplicated or mild case; Antibiotics for a complicated or severe case.

The overall pattern of treatment is similar regardless of type of practitioner, particularly the universal use of cough syrup. Despite similarities, however, private physicians are far more likely than government doctors to prescribe antibiotics, with the excess use of antibiotics concentrated in uncomplicated cases (Table 4). Private physicians are also more likely to prescribe other medicines, generally in combination with cough syrup or antibiotics.

Despite private physicians' greater use of antibiotics for uncomplicated cases, there is little difference between government and private doctors in the percentage of all cases treated appropriately (57.2 and 55.4 per cent). The private physicians' greater use of antibiotics for mild cases is balanced by the lower use of antibiotics for complicated cases in government clinics. The estimates of level of appropriate treatment are distorted by the overstatement of complicated cases, and the tendency of mothers of children who are more seriously ill to prefer care from private doctors. Nevertheless, consideration of antibiotic use by children without complications clearly indicates that too many antibiotics are being used by all physicians, though particularly by those in the private sector.

In summary, at least 45 per cent of those who go to private doctors receive inappropriate treatment. Even at government clinics the proportion of cases not treated correctly is very high. Of greatest concern is the level of failure to treat serious cases with antibiotics, since such failure may be life threatening. Government health facilities failed to treat 37 per cent of complicated cases with antibiotics, the comparable figure for private physicians being 25 per cent. This may exaggerate the actual risk to life, however, since many of the 'complicated' cases result solely from overstatement of the level of fast or difficult breathing.

Comparing the treatment practices of each source of care during the first round of data collection (before training in SCM) with those of the same source during the third round (after training) gives a rough indication of the impact of the training that took place during the second round (Table 5). At government clinics, in the third round, slightly fewer children without complications were treated with antibiotics, while somewhat more children with complications received antibiotics than in the first round. As a result the percentage of children appropriately treated increased from 59 per cent in round 1 to 65 per cent in round 3. This change is not statistically significant, but it is fairly large, and in the right direction.

Among children treated by private physicians, however, use of antibiotics was unrelated to the severity of the illness in both rounds, though use did increase between rounds. Private physicians gave appropriate treatment to 53 per cent of children in round 1 and 55 per cent in round 3. The slight increase in appropriate treatment is caused by the preference for private physicians among mothers of children who are most seriously ill, combined with the tendency of private physicians to prescribe antibiotics for the vast majority of all children suffering from ARI.

The determinants of the type of treatment chosen have been analysed in greater detail using multivariate techniques. Dichotomous logistic regression has been used to evaluate the determinants of each treatment because there is a great deal of overlap in treatments. Four models were fitted to each treatment. The first two are: (1) background characteristics only, and (2) background characteristics plus perceived severity of the illness. The third model

adds the source of care to model 2. The fourth model specifically tests the impact of CSP training activities, dropping all observations from round 2 and adding a dummy variable marking round 3, plus a series of interactions of round 3 with source of care and episode complications.

The results for all types of treatment are similar. To simplify the presentation, only the results for antibiotics are presented and discussed (Table 6). The risk factors for use of antibiotics include a consistent and fairly strong impact of sex of the child, with males more likely to receive medication. Young children, and those whose mothers have little education, are the least likely to receive antibiotics, though the effect for age of child is not statistically significant. Wealth, based on an index computed from household assets, has only small effects, and seems to work through seeking health care in the first place rather than through treatment obtained (models 3 and 4). Breathing complications, the key indicator of need for antibiotics, increase the likelihood of their use, but only to a modest degree. Source of care is, by far, the most significant risk factor for use of antibiotics. Children taken to either a government clinic or a private doctor are much more likely to receive antibiotics than those who are taken to neither: compared to the latter children the odds of getting antibiotics are about eight to ten times higher among those treated at government clinics and these odds are approximately doubled again for those taken to a private doctor.

Table 5.
Treatment of respiratory infection and percentage of children 'appropriately' treated by symptoms, source of care, and round of data collection, 12 Menoufia villages, 1990-91.

Treatment from government health facility				
	Round 1		**Round 3**	
	Complicated[a]		**Complicated[a]**	
Treatment	**No**	**Yes**	**No**	**Yes**
Used cough syrup	96.2	96.6	100.0	100.0
Used cough syrup only	47.2	26.2	59.7	27.0
Used antibiotics	43.4	60.4	40.3	69.7
Used antibiotics only	0.9	0.0	0.0	0.0
'Appropriately' treated[b]	58.8		65.2	
N	106	149	72	89
Treatment from pivate physician				
	Round 1		**Round 3**	
	Complicated[a]		**Complicated[a]**	
Treatment	**No**	**Yes**	**No**	**Yes**
Used cough syrup	98.3	99.1	95.9	99.2
Used cough syrup only	25.3	18.6	17.6	11.6
Used antibiotics	67.9	66.7	77.1	76.9
Used antibiotics only	0.3	0.2	0.6	0.0

'Appropriately' treated[b]	52.7		54.6	
N	293	430	170	242

[a] Complicated: No = cough or cold only. Yes = cough or cold complicated by fast or difficult breathing.

[b] 'Appropriate' treatment: no antibiotics for an uncomplicated case; antibiotics for a complicated case.

Net of background characteristics, complications, and source of care, overall use of antibiotics is basically unchanged in round 3, though children treated by a private physician were more likely to be given antibiotics at round 3 than at round 1. The more interesting changes, however, took place in treatment patterns at government facilities. The odds ratio for the government facility - round interaction is substantially (though not significantly) below unity, while the odds ratio for the additional interaction with episode complications is significantly above one. The implication is that children taken to a government facility at round 3 (after physician training) were more likely to be given antibiotics for complicated episodes, and less likely to be given antibiotics for mild infections than had been the case at round 1 (before physician training).

Discussion

The CSP physician training aimed at improving pneumonia case identification and, once identified, at improving case management. The data do not address the issue of diagnosis, but suggest that treatment was, at best, improved only modestly by the training program. Other studies also show that both diagnosis and treatment are frequently flawed, even after physicians have been trained in SCM (El-Mougi 1990; Bermawy et al. 1992; Harrison and Abashawl 1992; Harrison et al. 1993).

In our data, over 70 per cent of children with ARI received care from a formal source — public or private doctor, pharmacy, or some other practitioner — or from a friend or neighbour. Among those given treatment, the private physician is the preferred source, particularly when the illness is complicated or viewed as severe. The preference for private physicians is supported by two recent ethnographic studies examining treatment of respiratory infection in two other governorates of Egypt (cited in Bermawy et al. 1992), and by two nationwide surveys (SPAAC 1992; Mohamed 1992). In our study, about 85 per cent of all children with ARI were given some treatment. Among those treated, almost all got cough syrup, close to half were given antibiotics, and more than 20 per cent got some other medicine.

Though overall patterns of treatment are similar whether the child is taken to a government health clinic or to a private doctor, there are some differences. The most important of these is that private physicians are much more likely to use antibiotics. This disparity in use of medicines is greatest in the case of children whose respiratory infection is *not* complicated by fast or difficult breathing. Thus private physicians are less likely than government clinics to give appropriate treatment. These patterns, seen clearly in Table 4, are reinforced by the multivariate analysis for use of antibiotics that controls for a number of background characteristics of the child and of the child's mother or carer (Table 6).

A consistently significant result in Table 6 is that boys are more likely to be given antibiotics than girls. This difference does not seem to arise from differences in the severity of the disease (whether real or perceived), since the odds ratio for boys receiving antibiotics relative to girls hardly changes when the 'respiratory infection complicated' variable is introduced in model 2. Nor do the source of care (model 3) or training variables or

interactions affect the odds ratio, though its significance is reduced slightly. Thus, even allowing for other variables in the model, boys are more likely than girls to be given antibiotics, though the effect ceased to be significant once source data were controlled (Langston and Hill, forthcoming Table 11).

The impact of training

The CSP's strategy for reducing mortality from ARI, improving diagnosis of respiratory disease and increasing antibiotic use for pneumonias, relies solely on short training courses to teach physicians standard case management (SCM). Our results indicate that the training that occurred during the second round of CSRES data collection improved the treatment given by government health facilities, though the impact is modest and not statistically significant. The proportion of children appropriately treated increased from 59 to 65 per cent. In the multivariate analysis, the strongly positive and significant coefficient for the interaction term identifying third round cases that are complicated by breathing difficulties and treated at government clinics (Table 6, model 4) implies that there was a strong and significant effect on the use of antibiotics in the third round for cases treated at government clinics. Despite modest improvement in treatment practices by government doctors, there was no improvement among private physicians; indeed, prescription of antibiotics by private physicians increased from round 1 to round 3 for both complicated and uncomplicated cases. Overall, appropriate treatment increased from 53 per cent at round 1 to 55 per cent at round 3.

Table 6
Logistic regression analysis of likelihood of using antibiotics for respiratory infection, 12 Menoufia villages, 1990-91.

	Used antobiotics			
Predictor variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Mother's education				
None	0.70**	0.67**	0.64**	0.66**
Prim incomp	0.83	0.82*	0.80	0.85
Prim comp/ prep	1.04	0.99	0.87	0.79
Secondary/ more[a]				
Child's sex				
Male	1.20**	1.17**	1.19*	1.23*
Female				
Child's age				
0-1 month	0.51*	0.53*	0.54	0.47
2-5 months	0.86	0.89	0.63**	0.74
6-17 months	1.03	1.04	0.83	0.79
18-35 months	0.95	0.97	0.92	0.81
36-59 months				
Wealth				
Poor/middle	0.87	0.86*	0.99	0.99
Well off[a]				
Respiratory infection complicated				
Yes	-	2.05**	1.39**	1.32**
No[a]	-	-	-	-
Source of care				

Government facility	-	-	10.68**	8.14**
Private physician	-	-	23.04**	14.73**
Neither[a]				
Training evaluation variable				
Round 1[a]	-	-	-	-
Round 3	-	-	-	1.07
Interaction 1[b]	-	-	-	0.65
Interaction 2	-	-	-	1.57*
Interaction 3	-	-	-	2.60**

Level of Significance: ** Pr. < .01, * Pr. < .05

[a] Omitted category.

[b] Interaction 1 - Round 3 and Government Health Facility.
Interaction 2 - Round 3 and Private Physician.
Interaction 3 - Round 3 and Government Health Facility and Complicated ARI.

A health facility survey in five Egyptian governorates (including Menoufia) early in 1991 also found that antibiotics were overused (Harrison and Abashawl 1992), as had a similar, earlier study in another governorate (Harrison et al. 1993). The performance of trained physicians was somewhat better than those without training in both classifying and correctly treating sick children, but the differences were not statistically significant. More importantly, the performance of all physicians, whether trained or not, was poor. Just 38 per cent of trained physicians correctly classified more than 50 per cent of respiratory infection cases, and only 31 per cent gave the correct treatment to more than half of the cases seen.

Our results suggest a somewhat higher level of appropriate treatment than was found in the clinic evaluations, probably primarily because of the relatively crude nature of our indicator of serious illness and of the appropriateness of the treatment. Despite the relatively favourable situation revealed by our data, a large proportion of children still receive inappropriate treatment, and it is clear that the CSP training in SCM had, at best, a small impact. It is evident from these results that much more needs to be done to improve the management of ARI in Egypt.

Public and private physicians

The overlap between public and private physicians has been discussed above, yet throughout the analysis a distinction has been made between public and private physicians. This is an important distinction because private physicians are the preferred source of care, particularly when the illness is severe, and the treatment practices of private physicians are very different from those of the doctors in government health facilities, as has been shown. Private physicians prescribe more drugs, and specifically more antibiotics, than do the government physicians. Moreover, the training that took place at the time of the second round improved the treatment practices of the government doctors, while treatment given by private physicians was no better in the third round than in the first.

Again, this is an ironic situation since private physicians are, to a large (although unknown) degree, the very same people as public physicians, but at different times of the day. Assuming substantial overlap, the clear implication is that a physician prescribes in one way when working at the government health clinic, and very differently when at private practice. This further indicates that, even though at least a proportion of doctors know the recommended treatment, and give it when working at the health centre, they prescribe additional medicines known to be unnecessary when at their private clinics.

Unfortunately, we have no data to examine the reasons for this behaviour. Two explanations are often suggested. First, doctors may gain financially from prescribing

medications. If this motivation operates in Egypt at all, it is said to be unusual. The alternative explanation is that mothers want, and insist on, 'serious' medicine that will 'cure' the illness. Though antibiotics have no useful effect on viral respiratory infection, mothers may not know or believe this. Antibiotics are viewed as 'serious' medicine, however, and a physician wishing to build or sustain a practice will want to satisfy patients that they are receiving the best possible treatment. This sort of problem is believed to be common in Egypt, and has been mentioned in health programs in other parts of the world (Cherian et al. 1988; DeClerque et al. 1992).

Whatever the explanation, it is clear that brief training in proper diagnosis and treatment does not ensure that respiratory infection in children is properly treated. Not only must the physician know and be convinced of the proper treatment, but so must the client. There must also be effective incentives to encourage proper diagnosis and appropriate treatment, as well as mechanisms to limit unnecessary use of antibiotics.

The CSP, like other programs (Tupasi et al. 1988), is planning a media campaign to teach mothers and carers the early signs of pneumonia, and to urge them to take their children to a trained physician. But this approach, though important, may also be inadequate. In addition, it may be necessary to educate mothers directly about the signs the doctor should be checking to make a correct diagnosis and about the role of antibiotics and other medicines in the treatment of ARI.

Parallels with the National Control of Diarrheal Diseases Project

The National Control of Diarrheal Diseases Project (NCDDP) was implemented in Egypt from 1983 to 1992, and has been described as the most successful USAID-supported oral rehydration program (USAID 1988). The success of NCDDP was primarily in increasing the use of oral rehydration, and was achieved mainly by directing messages straight to mothers. Like CSP, NCDDP sought to rationalize the use of drugs by reducing the amount of antibiotics used for simple, acute diarrhoea, and by eliminating the use of other medicines such as antidiarrhoeals. Like the ARI program, this change in drug use was to be brought about solely through the training of physicians working in government health facilities. NCDDP made a conscious policy decision not to deal with drug use in the public service announcements aimed at mothers, which as a result focused primarily on symptoms of dehydration and use of oral rehydration (Miller 1992). No effective mechanisms to monitor and enforce responsible performance were implemented.

The similarities in antibiotic use for diarrhoea and respiratory infection are striking. In both cases, CSRES found that 45 to 46 per cent of treated children were given antibiotics. Use was greater when the diarrhoea was severe (56 per cent) and when the respiratory infection was complicated by fast or difficult breathing (53 per cent). For both illnesses, private physicians, the preferred source of care, were substantially more likely to prescribe antibiotics than were the doctors in the government clinics.

Despite the success of NCDDP in increasing use of oral rehydration salts (ORS) and altering feeding practices during diarrhoea, inappropriate use of antibiotics and other drugs remained very high at the end of project efforts (Langsten and Hill, forthcoming b). Other reports on NCDDP also document the lack of success in changing the way physicians prescribed drugs for diarrhoea (Miller 1992). This failure raises serious questions about the ability of short physician training courses to alter significantly the use of antibiotics in treating respiratory infection in the absence of sustained incentive or sanction programs.

Use of antibiotics

It is sometimes argued that excess use of antibiotics is not a serious problem for an ARI control program. The main concern is to treat a high proportion of seriously ill children, even

at the cost of substantial overtreatment of mild cases. At the level of the individual child, this argument is persuasive, but at the level of the health system it is much less compelling. First, the indiscriminate use, and particularly incomplete use, of antibiotics is likely to hasten the emergence of microbe strains resistant to front-line drugs. Second, in a resource-constrained health sector, money spent on unnecessary antibiotics is money not spent on other interventions. The cost-effectiveness of standard case management would be substantially reduced by such wasteful drug use, calling into question the priority that should be given to ARI programs. Third, over-use of drugs may reduce a provider's ability to follow up cases and monitor compliance. Evidence from Egypt suggests that only one half of patients complete the prescribed course of treatment, and a similar proportion fail to return to the doctor for a check-up on completion of the prescribed course (SPAAC 1992). Prescribing antibiotics for a child who does not need them is a lesser evil than failing to prescribe antibiotics for a child who does need them, but it is still an evil, at least at the health system level..

Conclusion

Acute respiratory infections are among the most important causes of early child mortality in the developing world. In the absence of effective vaccines to protect children against such infections, ARI control programs are currently based on standard case management, consisting largely of early detection of pneumonias and their early treatment with antibiotics. The Child Survival Project in Egypt has used short training courses of physicians in standard case management as its main mechanism for ARI control. Data from a longitudinal survey in rural lower Egypt show that training modestly improved ARI treatment patterns in government clinics, but just increased antibiotic use for all respiratory infections, regardless of complications, by private physicians.

In order to increase standard case management substantially, implementation strategies must combine a number of features. First, the training of physicians must focus on practice rather than theory, and provide for regular follow-up and additional training; participants' performance must be evaluated on the basis of observation rather than written examination. Second, appropriate incentives and sanctions need to be introduced to reduce over-prescription of antibiotics for mild coughs and colds. It is not clear what these incentives or sanctions should be, since they are likely to be setting-specific, but they should include better supervision and quality control in government facilities. Third, efforts must be made to educate mothers to improve the recognition of warning symptoms that indicate the need to consult a physician, and to understand that antibiotics are essential for the treatment of some respiratory infections but are inappropriate for others. Greater emphasis on these three areas will allow ARI control programs to realize a higher proportion of their theoretical potential to improve child health in developing countries at low cost.

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Forum: Parental education and child mortality

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Education has been one of the key concepts used as a variable in explaining health. The influence of parental education on infant and child health and mortality has proved to be universally significant. In the literature on child health, maternal education has received particular attention, as indeed have all other social, demographic and health characteristics of the mother.

I wish to challenge this focus on mothers and expand on the question of the significance of gender differences when considering the influence of parental education on child health. I think it is still an enigma that in some cultures or subcultures it is fathers' and not mothers' education that becomes a more significant variable in explaining child mortality. There is a need to discuss gender differences in the significance of education and the cultural context within which education finds meaning.

Research on the cultural factors related to infant and child mortality, carried out in a low-income area of Istanbul (1986 - 89), found that the most significant variables associated with child mortality were not attributes of the mother, but attributes of the father and the characteristics of the household. After analysis of more than 500 variables for each woman interviewed, in a multiple regression analysis four variables stood out as being the most significant. These were, in order of significance, the father's education; the household composition; the mother's attitude towards abortion; and the amount of drinking and smoking by members of the family other than the mother. In the sample in the above research, the husbands' formal education surpassed the women's formal education as well as all other criteria in explaining child mortality. I described this research in GŸrsoy-Tezcan (1992).

In view of these results, I argued for the need for a review of the theoretical paradigm that necessitates an almost exclusive linkage of child health to a focus on mother-child bonding. In line with this perspective, education should be viewed within a cultural context that also allows for a comment on gender power dynamics within the family and within society at large.

In a cross-national study by Mensch, Lentzner and Preston (1985), it was shown that mother's education was a more powerful explanatory variable than father's education in rural areas (see Aksit and Aksit 1989). It is suggested that in urban areas variations in fathers' education were more extensive and associated more with class and status differences; perhaps for these reasons, father's education rivalled the explanatory effectiveness of mother's education. Hobcraft, McDonald and Rutstein (1984) showed in their cross-national study that in Latin American countries, mother's education had more explanatory power, while in some Asian and Islamic countries, father's education and occupation and mother's work status emerged as rival predictor variables (Aksit and Aksit 1989:571-572).

Similarly, in a study of the 1982 birth cohorts in Turkey, Toros and Kulu (1988) found father's education to stand out as one of the most important factors associated with infant survival. They report that babies whose fathers do not have primary school education are 1.6

times more likely to die within the first year of life than babies whose fathers have at least finished primary school. Babies whose mothers have no primary school education, however, are 1.15 times more likely to die in their first year. Nevertheless, even though father's education has more explanatory power than mother's education in their study, in their conclusion Toros and Kulu give prime importance to mother's education. They cite mother's level of education as one of the most influential factors affecting child health, and only secondarily cite father's level of education as also ensuring lower levels of infant mortality.

These findings and their interpretation of course pose more questions about the process of change that education initiates or provides, and the ideological significance attributed to education. Nevertheless, the findings show that a father's education can be more significant in explaining child health variables and that we need to look at mother's education within a cultural context that also accounts for gender ideology as it operates within the family.

In my Istanbul study, the women's comparable formal education did not emerge as one of the most important variables. I find it extremely meaningful that the compound variable measuring women's attitudes towards abortion had more explanatory power for child mortality than the variable showing literacy and women's formal schooling. Women with the most conservative attitude towards abortion had the highest child-mortality statistics.

The Istanbul sample suggested two extreme types, representing two different social environments. In the 'bad cases' there is extreme patriarchal control of the woman in that she lives with her in-laws; her husband has a poor education, and thus his dependency on his family is greater; she has internalized reproductive values which leave her without much capacity for autonomy; and there is heavy drinking and smoking in the household.

In contrast to this picture, in the 'good cases' there is high education for fathers and, together with this, a separate, nuclear family residence into which babies are born. The woman's views on abortion are more liberal than religious or secular dictates, indicating a woman ready to try alternatives; and the household is free of the ill-effects of alcohol or cigarette consumption.

It appears from the above research that only one of the most important four compound variables is a personal characteristic of the mother herself: her attitude towards the 'legitimacy' or acceptability of abortion. The other three variables, her husband's education, the presence or absence of agnatic in-laws, and heavy drinking and smoking in the household, are all environmental factors within which the mother tries to nurture her child.

For the Istanbul sample, the husband's education may be a more important determinant because the women are considerably restricted in their environments, and subject to the authority of their husbands in making daily decisions (see GŸrsoy-Tezcan 1992).

In response to a set of questions meant to ascertain decision-making behaviour, only a minority of women said they had more say over certain issues than their husbands. In general, the majority of women did not feel themselves to be the decision makers in their households. Thus within this relatively homogeneous low-income group some extra years of schooling did not necessarily translate to autonomy and behaviour change that influences child health[1].

[1] In the sample (N-229) the women's formal education ranged from 0 to 11 years of formal schooling: 29 per cent of the women had no schooling, 18 per cent had 1 - 4 years of schooling, 45 per cent had five years of schooling and only 8 per cent had six or more years of schooling. Their husbands had more schooling: only 8 per cent had no schooling at all; 10 per cent had 1 - 4 years, 62 per cent had five years of schooling and 20 per cent had further education.

As for their husbands' education, more education for the husband may mean easier access to important institutions like hospitals and to relevant health-related knowledge. Also, it may mean that the men are less dependent on the world view imposed by their own families. More than the content of the education they have received, their years of schooling may mean an external reference point for the men and thus a break from the patriarchal constraints which also affect their wives and children. The emancipation of men by educational experience may benefit women by allowing men more freedom to support the women in their own lives, which includes their reproductive choices and how they raise their children.

In conclusion, rather than simply concentrating on measuring and assessing education and the mechanisms through which education contributes to child health, we have to look at the gender relations, family dynamics and wider social implications of formal education when thinking of education and its relationship to child health. What is the functional market outcome of education? How much earning capacity and therefore autonomy does it bring to men and women? In what ways (if at all) does it challenge the existing power dynamics within the family and within society? There must be a critical evaluation of mother's *and* father's education, individually, cumulatively and as these contribute to family dynamics. Social scientists may need to develop new criteria for the successful nurturing of children.

Finally, on the significance of the above discussion in a world where infant and child mortality is decreasing but survival problems are becoming increasingly more complex: research on infant and child mortality inevitably takes the researcher to low-income regions of the world. Thus, the above concerns seem to be confined predominantly to groups with poverty problems. However, similar dynamics may be relevant when looking at health issues of surviving children, including psychiatric disorders. When the focus is shifted away from mortality onto a range of health issues we may find that an analysis of gender power dynamics and their implications for the relationship between health and education becomes a fruitful area of investigation for affluent societies too. Furthermore a shift of focus from concentrating on mothers to an approach that integrates fathers will open the grounds and facilitate the discussion and analysis of the relationship between nation-states, the family, democracy, religion and the institution of education and their influence on child health at national and international levels.

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Maternal literacy and health care in three countries: a preliminary report

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Is literacy a missing link between female schooling and reduced child mortality in developing countries? An affirmative answer might be based on Preston's (1989) model of mortality reduction, which gives a central place to literacy in the spread of improved health knowledge to mothers of young children. Other analysts of the demographic evidence (LeVine 1987; Cleland 1990) have been sceptical about literacy and other skills in the school curriculum, finding it implausible that the level attained in a few years of attendance at low-quality schools during her childhood could be retained by the average woman in her childbearing years and have an impact on her child health care and reproduction sufficient to affect birth and death rates. But answering the question requires measuring literacy directly, which has not been done in demographic research to date. This report presents the first results of literacy assessment in three community-level studies, indicating that literacy skills acquired in schools of rural Mexico, rural Nepal and urban Zambia are retained to some extent into the childbearing years and may affect the reproductive and health behaviour of women with young children.

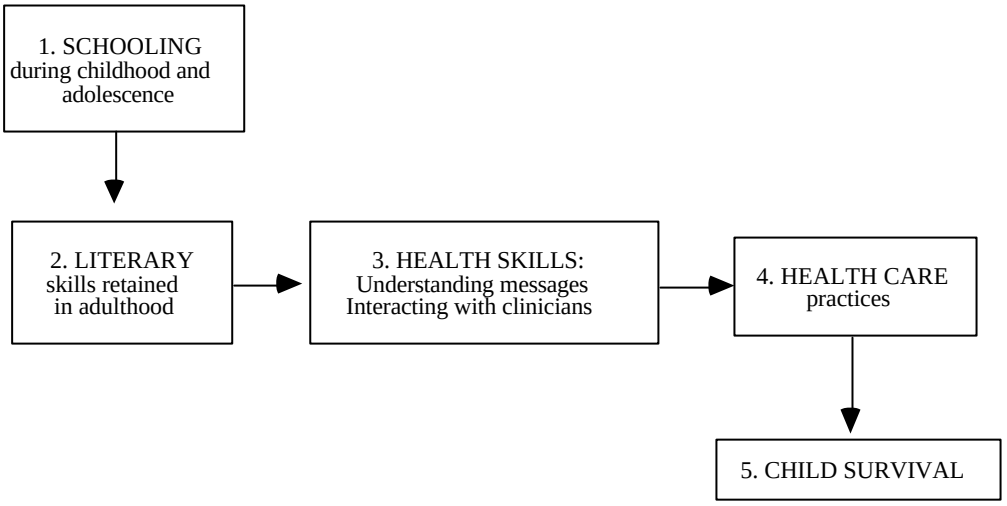
Figure 1 shows a theoretical model of the pathways that might link maternal schooling with child survival through a causal impact of school attendance on literacy, health skills and health-care practices. National censuses and demographic and health surveys have shown robust associations between Boxes 1 and 5 without clarifying the intervening variables that might connect them. There is also a good deal of evidence indicating associations between maternal schooling and health care (Box 4), suggesting that maternal use of health and contraceptive services, as well as domestic sanitary and dietary practices, may be involved, but this still leaves unknown the processes by which attending school during childhood and adolescence affects maternal practices during the childbearing years. Figure 1 proposes a model by which schools do what they are officially intended to do, transmit the literacy skills (Box 2), enabling women to acquire health information and interact effectively with medical personnel (Box 3) on the basis of which they engage in health care practices (Box 4) which reduce the risks to their children's survival. This has seemed an unlikely causal sequence to analysts aware that in many developing countries schooling is of poor quality, there is little apparent support for women to retain literacy skills in their adult lives, and the associations of formal education with mortality and fertility in many populations do not exhibit the thresholds and asymptotes one would expect if they were attributable to the curriculum at a particular level of schooling (such as learning to read in primary school). In other words, the link between Boxes 1 and 2 has seemed implausible, leading analysts to consider more seriously processes other than literacy acquisition to account for the links of schooling to health care and child survival. But the model has not been tested empirically, and that was the aim of the research reported here.

The overall strategy of our research has been to conduct approximate replications of a community-level study, including an interview survey and home observations, in diverse

settings throughout the world that have a substantial population of childbearing women who had attended school. Mexico, Nepal and Zambia were chosen for the first studies because of

Figure 1

Theoretical model linking maternal schooling with child survival through literacy, comprehension of public health information and health practices



our connections with those countries, but they are also extremely diverse in geographical locations, cultural traditions and socio-economic indicators. Mexico is an 'upper-middle income' country far advanced in its demographic, health and educational transitions, though with a high degree of socio-economic inequality; Nepal is a 'low-income' country at an early stage in these transitions; and Zambia is a 'low income' country that was once wealthier and relatively more developed than it is at present (for example, under-five mortality *increased* by 15 per cent from 1980 to 1992), though it is still one of the most urbanized countries in Sub-Saharan Africa. UNESCO estimates of female illiteracy in 1990 are 15 per cent for Mexico, 87 per cent for Nepal and 35 per cent for Zambia (World Bank 1993). Our Mexican research site was the small town of Tilzapotla, Morelos, located in a rural area unusual for the high proportion of women who had attended school; in Nepal it was Godavari, a rural Kathmandu Valley area similarly advantaged; and in Zambia, an urban neighbourhood of Ndola, a copper-mining town in which residents had access to health and educational services not found in the rural areas.

National data for all three countries show maternal schooling to be associated with lower levels of mortality and fertility. The sample mothers we tested for literacy and language skills had the following mean levels of schooling: Mexico, 7 years (S.D. = 4.1, range = 0-17); Nepal, 1.4 years (S.D. = 2.9, range = 0-12); Zambia, 7.7 years (S.D. = 2.1, range = 0-12). In our Mexico and Nepal research samples, maternal schooling was significantly related to prenatal care, hospital or clinic delivery and contraceptive use, controlling for socio-economic advantages; the Zambia sample also showed relationships between maternal schooling and indicators of health risk, though not the same ones. Thus the 'educational differentials' familiar in the demographic and health literature were found in the three countries and samples being compared.

What is literacy?

There is no single definition of literacy or approach to its measurement prevailing among contemporary literacy specialists, but all would agree on a definition far broader than a minimal ability to read and write and on the need for direct assessment of the skills involved (Wagner 1992). In this view, literacy is not a dichotomous trait acquired in the first five years of primary school that permits the adult population of a country to be divided into literates and illiterates (as in the convention used by the *UNESCO Statistical Yearbook*), but a package of cognitive and language skills which make it possible to participate in literate discourse and communication, and which can improve during postprimary schooling.

Two basic literacy skills usually acquired in school were the focus of our study: reading and decontextualized language ability. Reading begins with the ability to decode print into speech but progresses through stages that entail comprehension of increasingly complex written texts (Chall 1983). Decontextualized language ability means competence in speaking and comprehending the formal, distanced language of written texts; this is 'oral literacy' (Olsen 1977; Tannen 1982). It is possible to speak a language competently without this ability, particularly among members of a small community whose shared experience creates common contexts that can be referred to implicitly in conversation. Understanding conversational speech depends on sharing the context (e.g. 'They went there yesterday'), whereas decontextualized language as the communicative medium of public institutions presumes no shared context and is highly explicit (e.g. 'The President and Vice-President went to Washington DC on Thursday'). Decontextualized language has distinctive linguistic characteristics (vocabulary, syntax, pragmatics), including the use of superordinate categories (Snow 1990). For example, in answering the question, 'What is a clock?', mastery of decontextualized language is shown by a child who says 'A clock is a machine that tells time', but not by one who says 'They are like watches, but larger' (Snow and Tabors 1993). Research in the United States has shown decontextualized oral language ability to be associated with reading comprehension in school-aged children (Velasco 1989; Dickinson and Tabors 1991; Snow 1991).

Both reading comprehension and decontextualized language ability are relevant to the question of how school attendance affects mortality and fertility because, as skills improved through schooling but not restricted to the curriculum of a specific level, they could be distributed throughout the range of school attainment levels usually studied in demographic research. Furthermore, decontextualized language is dominant in the discourse of health and family planning clinics and public health announcements as well as classrooms.

In this report we discuss the results of five assessments, two of literacy skills (Box 2, Figure 1) and three of health skills (Box 3):

1. Reading Comprehension. This test assessed the ability to decode a first-grade text by reading aloud; and the ability to explain orally, after reading silently, the meaning of health-related passages taken from primary-school texts at third, fifth and eighth-grade levels.

2. Noun Definitions. This is a test of decontextualized oral language skill (Snow 1990). Each woman was asked for definitions of ten common objects such as 'table' and 'dog', in order to explain them to someone who did not know what they were. Responses were scored as formal by such criteria as the use of superordinate categories: for example, ''furniture' for table, 'animal' for dog.

3. Reading Health Advertisements. Each mother was asked to read and then report orally the meaning of passages taken from health information leaflets circulated by the government. This assessed the ability to comprehend printed health messages actually disseminated by the health bureaucracy (except in Nepal, where none were available).

4. Listening to Radio Advertisements. Each mother listened to the interviewer's reading of health information announcements taken from radio broadcasts, and then reported orally on what they meant. This assessed the ability to comprehend health messages broadcast on the radio.

5. Health Interview. The mother was asked about her health and that of her child by a nurse (in Mexico) or doctor (in Nepal). Zambia results are not available. Responses were scored for the amount of information in response to each question the interviewer asked. This assessed the mother's ability to report information fully in a medical setting.

The mother was also asked to estimate the frequency of her reading newspapers and other printed materials. The results from this measure will be published later.

Are literacy skills retained by childbearing women?

To answer the question whether the mothers of young children retain the literacy skills they acquired in school, Column 1 in Table 1 shows for the three samples the zero-order correlations (Pearson r's) of a woman's schooling with her performance on literacy tasks. In Mexico, reading comprehension has a 0.44 correlation with years of school attended, in Nepal 0.95[2], and in Zambia 0.50 (all significant at the .001 level), indicating that there are differentials by schooling in the ability to read and comprehend text. This does not mean that the sample mothers in Mexico and Zambia are reading at the levels of the reading texts used in the grades at which they left school; their performance is lower, indicating either that they did not reach that level originally (which we believe) or that their comprehension deteriorated over time. This represents an educational deficiency, probably attributable to low-quality schools, but it does not confirm the null hypothesis that schooling has no effect on level of adult reading comprehension. On the contrary, the correlations suggest that reading skill is retained during the childbearing years. The same is true of decontextualized language skill as assessed through Noun Definitions, which are correlated 0.72 with maternal schooling in Mexico, 0.67 in Nepal and 0.50 in Zambia ($p<.001$ in all three cases). More years of school attendance has resulted in better performance on literacy tasks in all three settings. Column 2, Table 1, shows that Reading and Noun Definitions are also highly but far from perfectly correlated with each other in all samples, suggesting that while they share variance, they are not simply indicators of the same skill.

Does literacy predict comprehension of health messages?

As Table 1 (Column 1) shows, maternal schooling is correlated with the ability to read printed health material in Mexico (0.37, $p<.001$) and Zambia (0.65 in English, 0.42 in Bemba, $p<.001$) and with listening comprehension of radio health advertisements in all three samples (0.71 in Mexico, 0.38 in Nepal, and 0.68 in Zambia for English, all at the .001 levels; 0.20, $p<.05$, in Zambia for Bemba language). It is particularly noteworthy that unschooled and illiterate women are less capable of understanding radio health messages even when the messages are spoken in a language they understand; this suggests the impact of schooling on aural discourse comprehension. There is also a basis, in the correlations of Columns 2 and 3 on Table 1, to propose that literacy skills as assessed through Reading and Noun Definitions influence a woman's ability to understand public health messages in print and over the radio.

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2. In the Nepal sample, only 23 out of 74 women had attended school at all, and the test was administered in a preliminary version that served to increase further its correlation with maternal schooling. The test procedure was modified for its later use in Mexico and Zambia.

Does literacy predict health interactions?

As indicated in Table 1, the mothers' performance on the Health Interview in Mexico and Nepal is correlated with their schooling (0.40, p<.001 and 0.31, p<.01), and with some of the other skill variables. In Mexico, health interaction shows almost no relationship with reading skills but is related to Noun Definitions (0.37, p<.001) and Listening Comprehension (0.30, p<.001), both of which involve the ability to use decontextualized language. In Nepal, with a small number of readers, it is related to Reading Level (0.47, p<.05) as well as Noun Definitions (0.46, p<.05) and Listening Comprehension (0.30, p<.01). Thus more effective interaction with a health practitioner is positively correlated with school attendance, literacy skills and aural comprehension of health messages in Mexico and Nepal, though at a lower level than the other variables are related to each other, as might be expected from the fact that giving information to a health care provider resembles school testing less than the other literacy and health tests. We cannot yet answer the question of whether literacy predicts health interactions with any certainty, but the results are positive enough to pursue the problem in multivariate analysis.

Table 1

Intercorrelations of maternal schooling, literacy skills, comprehension of health advertisements, and health interactions.

	1. Maternal schooling	2. Reading level	3 Noun definitions	4. Reading: health ads	5 Listening: radio ads
MEXICO (N=85-109)					
Maternal schooling	X				
Reading level	0.44+	X			
Noun definitions	0.72+	0.47+	X		
Reading: health ads	0.37+	0.69+	0.56+	X	
Listening: radio ads	0.71+	0.61+	0.74+	0.73+	X
Health interview	0.40+	0.13	0.37+	0.07	0.30+
NEPAL *(N=74)*					
Maternal schooling	X				
Reading level	0.95+	X			
Noun definitions	0.67+	0.63+	X		
Listening: radio ads	0.38+	0.49*	0.40+	-	X
Health interview	0.31**	0.47*	0.46*	-	0.30**
ZAMBIA *(N=160)*					
Maternal schooling	X				
Reading level	0.52+	X			
Noun definitions	0.50+	0.55+	X		
Reading ads: English	0.65+	0.75+	0.49+	X	
(Bemba)	(0.42+)	(0.63+)	(0.43+)		
Listening: English	0.68+	0.65+	0.55+		
(Bemba)	(0.20*)	(0.042+)	(0.37+)	-	X

*p<.05 **p<.01 +p<.001

Conclusions: pathways from schooling to health care

This brief report suggests that mothers who attended school longer in three socially and culturally diverse populations retain a higher level of literacy from their childhood school

experience, and that even though their reading performance is below the level at which they left school, their literacy in adulthood enables them to understand health messages in print and over the radio with greater proficiency and, less consistently, to interact more effectively with a nurse or doctor. These findings support a model of demographic and health transition such as Preston's (1989), in which maternal literacy plays a critical role in facilitating the spread of health information. Despite the limitations of small samples studied with a restricted number of instruments, these preliminary results demonstrate that literacy can be considered part of the pathway through which the schooling of women affects demographic change; and the acquisition of decontextualized language skill, 'oral literacy', has been identified as a potential mediating factor worthy of further research. This skill represents the language of the classroom, the clinic and other bureaucratic settings, and it appears that its acquisition by schoolgirls in childhood makes them better able to use bureaucratic health services as mothers. This literacy skill seems to be acquired even in low-quality schools and to increase with the years spent in school, suggesting an impact corresponding to the most widespread relationships of schooling with mortality and fertility.

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Parental education and child survival: can the DHS tell us anything new?

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The World Fertility Survey (WFS) and the Demographic and Health Surveys (DHS) have been the foundation for most generalizations regarding the causal impact of parental education on child mortality. Given the limitations of these data sets, it is appropriate to question whether conclusions based on these surveys are justified; a clear understanding of the true relations between education and mortality must precede further study of the mechanisms linking the two. This caution is especially appropriate given that the DHS (including upcoming phases) will continue to be the main source of cross-national information on this relationship for the next ten to fifteen years. We also explore whether further analysis of the DHS is likely to contribute to our understanding of the link between parental education and child mortality.

Research on determinants of child survival based on the DHS must first consider the limitations of retrospective birth histories and child health information contained in the DHS. The failure of many previous studies to account for several obvious shortcomings of these data has undermined the credibility of research findings: see, for example, Hobcraft, McDonald and Rutstein (1984); Cleland and van Ginneken (1988); Bicego and Boerma (1991); and Hobcraft (1993). A few critical, neglected limitations of the DHS that confront all hypothesis testing on this subject are noted below. These problems apply to data collected in the first phase of the project (up to 1990), as well as to those now emerging from the second and third phases.

Inadequate information on mother-child co-residence. While respondents are asked whether currently alive children are living with them, they are not asked whether either surviving children or those now dead resided with them in the past, when the children were exposed to the risk of mortality. For those children fostered out or reared by their father at an early age, advantages of maternal schooling would hardly seem to apply. The absence of a childrearing history is especially problematic for analyses that seek to link parental education and child survival, in light of evidence of moderately high levels of fosterage under age five in some areas, especially in West Africa (Page 1989); elevated mortality risks of fostered children (Bledsoe and Brandon 1992); and possible differences in fostering practice according to mother's education. Some mothers, for example, migrate alone to urban areas to pursue advanced schooling or to capitalize on their schooling in the labour market (Lloyd and Desai 1992).

Differential omission of births and child deaths by level of education. It is widely believed that less educated women are more likely to omit births from retrospective histories, especially those of children who died (Rutstein 1983). This is presumed to result in underestimation of child mortality differentials by level of education. Among the cross-national analyses on which are based most generalizations concerning parental education and child mortality, none has considered whether the completeness of birth or child-death reporting varies systematically across countries by level of education; this has been raised as

an afterthought by Cleland (1990) and Hobcraft (1993) to explain implausible findings, and dismissed without scrutiny. Satisfactory accounting of differential omission would involve comparison by level of education of (1) mean number of children born by age of mother, to see whether average parities increase consistently with age; (2) sex ratios at birth, to detect selective omission of males or females; (3) infant and child mortality rates by period for similar age groups, to examine the plausibility of trends; and (4) the proportion of recent deaths before age five contributed by infant deaths, and the proportion of infant deaths contributed by neonatal deaths. Such an assessment may find that the weaker association between parental education and child survival observed in sub-Saharan Africa than in higher-income regions is attributable to more consistent reporting or omission of events in African countries than elsewhere, for reasons of cultural or socio-economic homogeneity, for example.

Differential exclusion from DHS sample by level of education. Mothers who died during their reproductive ages are excluded from the DHS sample. Orphaned children of these mothers, also excluded, are believed to experience greater risks of dying at early ages than children whose mothers are alive (United Nations 1994). Maternal mortality may be more common among uneducated than educated mothers, as a result of the former's non-modern health beliefs and practices or their poorer access to health services. In this case, effects of education on child mortality would be underestimated using the DHS, particularly where levels of maternal mortality are high. This seems most likely in sub-Saharan Africa, given, for instance, that the DHS recently recorded much poorer knowledge of modes of AIDS transmission among unschooled women in Burkina Faso, Kenya, Malawi, Tanzania, and Zambia.

Insufficient observations of morbidity and health interventions. In a review of DHS health data, Hobcraft (1993:172) finds 'fairly clear evidence of differentiation according to the level of mother's education in the prevalence, but more especially in the treatment of childhood diseases'. The evidence is far from clear. The most comprehensive review of these data notes that 'in most cases it is not possible to judge the quality of the data' (Boerma et al. 1994:17). Better reporting of disease incidence by more educated mothers may account for the generally weak relationship between educational attainment and child morbidity, and more educated mothers may report disease episodes more completely in some countries than in others, as a result, for instance, of poor interviewing and field supervision in some surveys. The observed education-morbidity relationship, based on living children only, may also be attenuated if, as seems likely, children of unschooled mothers are more likely to die from disease and hence be excluded from calculation of disease prevalence. Even assuming non-selective mortality, most surveys record insufficient cases of child morbidity, prevention, treatment and nutritional status for women with secondary or higher schooling to assess through multivariate analysis whether differences in these measures are related to maternal education as compared to other factors.

In sum, these data problems suggest a need to further explore the association between child health and survival and women's education as a prerequisite to more detailed investigation of possible causal pathways involved in this relationship.

The core questionnaires of DHS-3 developed in 1993, like their predecessors, provide insufficient information to test hypotheses currently in vogue regarding parental schooling and child survival. The most noteworthy additions of DHS-3 for research in this area are questions on income earned in time units for women who worked for cash in the last twelve months; on who decides how the woman's income will be used (woman, husband or partner, joint decision, someone else); and on ideal number of male and female children. These questions will probably have negligible utility as measures of female autonomy and

differential valuation of children as a result of high levels of measurement error. Furthermore, USAID's long-standing interest in the DHS as a vehicle for collection of basic information on fertility and contraceptive use suggests that the fourth set of DHS questionnaires to be developed and implemented in 1997 is unlikely to stimulate further research on pathways linking parental schooling and child health outcomes. A challenge for the many analysts of DHS data in future will therefore be to make more creative use of existing information in explorations of this topic.

Despite the many cautions outlined above, the DHS can be an important source of information on this issue. One promising area for future research, unexamined to date, is the role of 'passive' education in promoting child survival. By this we mean modern identities, occupational, childrearing and communication skills, reproductive and child health knowledge and beliefs imparted outside of primary and secondary schools through prolonged exposure to and absorption of information from print, radio and television media, and through interaction with 'modern' individuals, including husbands, relatives, neighbours and group associates and with modern institutions, including health facilities. Presumably, passive reception of ideas and messages is facilitated by lifelong residence in large urban centres, increasing density and heterogeneity in such centres, the communication revolution under way in more advanced developing countries, and the increased volume of circular migration in most countries during the process of urbanization. Universal health education from non-school channels and subsequent behavioural change parallel the notion of idea diffusion popular in studies of family planning program growth.

The sum of maternal attributes acquired outside of schools in modernizing cities may be sufficient to overcome any child-survival disadvantages associated with lack of schooling. Confirmation of this hypothesis would have particularly important implications for child survival in sub-Saharan Africa, in light of projected increases in the number of girls not receiving primary schooling (Couclough and Lewin 1993), and evidence of constant or increasing mortality at ages 1-4 (when education effects are most pronounced) in Kenya, Niger, Nigeria, and Zambia, which may reflect a regional trend.

This hypothesis is explored using pooled regional samples of post-neonatal infants (1-15 months) and young children (16-59 months) born in the largest cities of 15 countries. The conventional age group of 0-12 months is not examined because neonatal deaths are known to be largely biologically determined, and because of the pronounced heaping at age of death twelve months in all of these surveys, which may reflect an upward or downward trend and may differ by maternal characteristics. The Table presents estimated relative risks of mortality by level of educational attainment among mothers who are lifelong city residents (natives), and mothers who migrated to cities directly from villages during adulthood. To obtain independent estimates of schooling effects, the models are controlled for characteristics that proxy exposure to modern ideas regarding childrearing, as well as other variables commonly associated with child survival in low-income countries (variables shown in notes, estimates not shown). In short, the results do not indicate that women who grew up in cities without attending school experience significantly higher child mortality risks than the most educated city natives. We interpret this to mean that uneducated women who are exposed to modern media, marry educated or professional husbands, or experience the moderate fertility patterns and modern household facilities characteristic of modernizing cities, enhance their children's survival chances to the level conferred by formal education. We leave it to others to examine whether urban schooling increases women's likelihood of experiencing these social and reproductive conditions.

Interactive migrant status-maternal education logit models of the relative risks of infant (1-15 months) and child (16-59 months) mortality in big cities of developing countries

	Age	
	1-15 months	**16-59 months**
Urban native		
Secondary+ education	1.000	1.000
Primary education	1.373	1.611
No education	1.257	1.740
Rural-urban migrant:		
Secondary+ education	1.214	1.046
Primary education	1.754*	3.105**
No education	1.576	3.781**
Constant	-6.237****	-5.003**
Model x^2 (df=22, 23)	478.301****	245.722****
Cases	13,543	6,935

Significant at *p<.10, **p<.05, ***p<.01, ****p<.001, two-tailed test

Notes

1. Based on births in largest cities of 15 countries: Bolivia, Ecuador, Mexico, Peru, Egypt, Morocco, Sudan (north only), Tunisia, Ghana, Kenya (south only), Mali, Senegal, Togo, Uganda (south only), and Indonesia.

2. Migrant births are those occurring in city (post-migration).

3. Models are controlled for husband's level of education, husband's occupation, ownership of television, ownership of radio, weekly listening to radio, floor material, drinking water source, lavatory facilities, electricity in dwelling, length of preceding birth interval, length of succeeding birth interval (16-59 months only), birth order, mother's age at birth, and region of residence (North Africa, sub-Saharan Africa, Latin America, Indonesia).

Our results also imply that the relationship between maternal education and post-infancy survival is mediated by location in which schooling is received. After settling in the city, migrants who (presumably) received secondary schooling in rural areas achieve child survival chances similar to those of the most educated lifelong city residents. Less educated migrants, however, experience child mortality risks over three times as high as more educated urban natives, as well as higher risks than low-educated natives and more educated migrants (not shown). The quality of primary schooling appears to vary more between rural and urban areas than does the quality of later schooling. These findings, based on data from a broad cross-section of countries, obviously suggest a need to further investigate mechanisms by which schooling in urban or rural areas influences child survival. Since schooling in low-income countries is generally superior in big cities, owing to more resources, better teachers, and more modern content, it seems premature to conclude, as Cleland (1990) does, that quality of schooling is an unimportant influence on child survival.

We have presented this exploratory evidence to show that the DHS can still be useful in examining the relationship between parental education and child mortality despite some important limitations. Further research on this topic using the DHS needs to take account of these limitations, particularly in settings where they are most likely to influence mortality differentials.

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Maternal education and child survival: anthropological responses to demographic evidence

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The positive effect of parental education on child survivorship is well established. The risk of mortality of the under-fives decreases by 2-5 per cent with each year of maternal schooling (Cochrane, O'Hara and Leslie 1980; United Nations 1985). The demographic evidence points to a consistent and pervasive monotonic decline in infant and child mortality associated with increasing education of mothers. It is not clear, however, why education should apparently have such a universal effect on the risks of child death nor what constitute the vital ingredients of this powerful relationship: there is a great need to unpack the contents of the relationship between mortality and education. Anthropology can often be used to interpret

demographic associations; here we highlight some of the anthropological responses to questions raised by demographic evidence.

One of the significant features of this relationship is the fact that it appears to hold across cultures. It might be plausible to argue that education therefore has some universal feature that affects all individuals in the same way. Does education lead to a shift in behaviour, in attitude or perhaps thinking? Anthropologists for their part have concentrated on the acquisition of literacy rather than education *per se*. Initially concerned with showing that preliterate thought was less rational than literate thought, anthropologists are now keen to show that rationality is an essential characteristic of all societies. In any event it is not the acquisition of literacy alone that affects mortality since even two or three years of schooling (rarely enough to make someone literate) has a beneficial effect on child survival. It is more useful to see education not as a single act but as a 'social process involved in instructing, acquiring and transforming knowledge' (Pelissier 1991:75). It is not merely a question of acquiring specific knowledge, but also of individuals' social identity being transformed by the fact of having been schooled. It is pertinent to the debate on the effect of education to view it as an empowering process. Not only is education a process associated with socio-economic development, but it can transform demographic regimes through changes in individual actions. Education has a transformatory force on individuals, social relations and actions (Goody 1977:2-3; Akinnaso 1981:164; Street 1990:6). It is possible that despite variations in the composition of the educational process, its transformatory effect produces similar results in different settings.

If knowledge is the key ingredient to this relationship we might expect better educated mothers to be more successful at preventing the death of their children because of either their school- derived wisdom or their increased openness to non-familial learning. However, the evidence demonstrates that uneducated and educated mothers hold similar views about the causes, prevention and treatment of disease (Caldwell, Reddy and Caldwell 1983; Lindenbaum, Chakraborty and Elias 1985; Zeitlyn and Islam 1993; Basu 1993). Additionally, the wholesale adoption of new ideas and the rejection of old ideas can have dire consequences for children's survival chances: for instance in Brazil, women have 'learnt' that bottlefeeding is better than breastfeeding (Scheper-Hughes 1992:316-326). Data from the Demographic and Health Surveys (DHS) suggest that education does not necessarily make mothers better hygienists (Cleland 1990; Boerma, Sommerfelt and Rutstein 1991).

It is commonly assumed that greater empowerment and autonomy are inevitable consequences of schooling and that these are the main pathways that link education to better child survival. When Caldwell (1979:408) observed that education increased the likelihood of independent decision making he seemed to be confirming an obvious expectation. More recent studies (Zeitlyn and Islam 1993; Jeffery and Jeffery 1993) show that, despite the high value placed on education, educated women are if anything less autonomous than their uneducated counterparts, at least in South Asia. In Islamic societies education may be an asset than enables a woman to make a good marriage. The better the marriage, that is, the wealthier her husband, the more likely it is that she will be confined to strict purdah. It is the less educated women who are forced to become independent decision makers because of the difficult social circumstances in which they find themselves (Zeitlyn and Islam 1993: 5,7).

If education does not necessarily impart better knowledge or greater autonomy to mothers what can it be achieving? An almost universal characteristic of education, more so than the actual content of lessons, is the respect that it commands. Women who are educated gain esteem and self-worth. The consequences are hard to evaluate, but studies are beginning to show that educated women are likely to be better service-users than less-educated women. The complexities of health care services can be daunting and require a combination of

expertise and confidence to cope with bureaucracy. Women often need to be very resourceful and it seems that education is recognized as an asset in this context (Nations and Rebhun, 1988: 153-157; Kaufmann 1991:11; Scheper-Hughes 1992: 100). Being educated often enhances the ability of women to express themselves and communicate effectively with health workers (Karki and Levine 1993). Furthermore, they are likely to better treated by health workers (Maclean 1974). By seeking an explanation in terms of the higher-quality health care that educated mothers may be able to evoke, it becomes possible to explain why, for instance, the difference in childhood survival related to maternal education persists in urban areas where there is a much greater availability of health services (Cleland and Van Ginneken 1989; Bicego and Boerma 1991).

Thus the positive effect of education on women's care for their children manifests itself less in direct changes in domestic behaviour but more in a general transformation of women's social value. This may or may not be exhibited in greater autonomy — that depends on local mores — but it does appear to affect the quality of service use by women. In this sense education continues to remain a proxy for other social factors. The question could be turned round by seeing, not an educated woman as the product, but education as part of an individual process. Why do some women in adverse circumstances persist in getting educated? Do the same characteristics that led them to study make them more confident, more able to confront recalcitrant health workers? As Das Gupta (1990: 490) says, women's 'basic abilities and personality characteristics... independently of education, occupation, income and wealth' can alone explain to a large extent the survival chances of their children. This leads us to posit that one reason, though not the only one, for the strong association between maternal schooling and child survival is that education is acting to reinforce pre-existing circumstances and traits that are favourable to effective mothering in later life.

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Maternal education and childcare

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Why are children of educated mothers exposed to lower risks of morbidity and mortality than those of mothers with little or no education? A search for answers to this question is guided by academic as well as programmatic interests. This paper addresses this issue from a programmatic and policy perspective. It focuses on the identification of mechanisms through which mothers' education might influence the risk of child mortality.

In terms of public policy, improvements in female education and improvements in health services are not interchangeable as far as their effects on infant and child mortality are concerned. The effect of female education is complementary to that of health services. In fact, under certain circumstances the effects of the two factors may even be synergistic, because both facilitate changes in health seeking behaviour. These points were illustrated in an earlier study by comparing education-specific infant mortality rates among rural women of two states in India, Kerala and Uttar Pradesh (Jain 1985b). The present study takes that

analysis one step further and focuses on the changes in actual behaviour associated with mothers' education. The aspects of behaviour changes that have been selected for illustrative purposes refer to the care of children, which is also believed to be related to child health and mortality.

This paper does not focus on the determinants of child health and mortality, nor on what mothers learn through schooling which might in turn influence their actual behaviour. For the latter, the reader is referred to other sources (see for example, Joshi 1994 and literature cited therein).

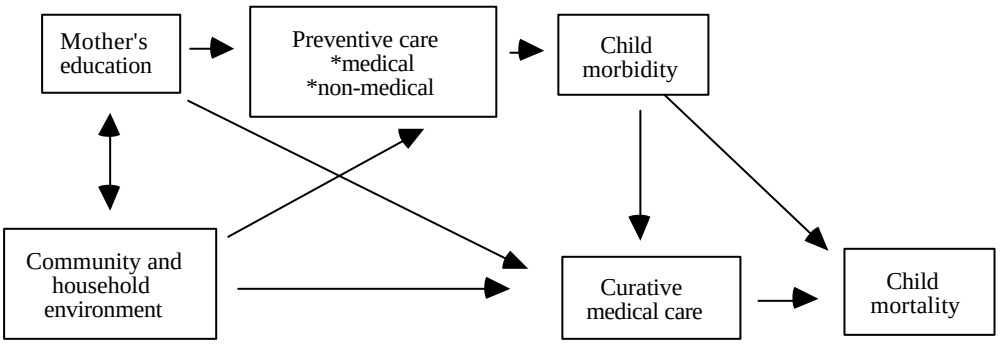
Analytical framework

The analytical framework used in this analysis is similar to the one used in an earlier analysis, which highlighted the importance of timing and type of care for understanding the determinants of infant mortality in India (Jain 1985a). In trying to identify the mechanisms through which mother's education affects child mortality, I have focused on maternal behaviour with respect to care of the child, considering for this purpose the period from its conception to the date of the survey (see Figure 1). The care variable is first divided into preventive and curative care; preventive care can be further subdivided into medical and non-medical elements. A time dimension can be added to both the preventive and curative care in order to relate it to the age-dependent outcome variables such as neonatal, postneonatal, infant, or childhood mortality. For example, the preventive care during the antenatal period and during the delivery of the child would influence the level of neonatal mortality. The influence of these factors will diminish in the progression from neonatal to post-neonatal mortality and to mortality beyond infancy.

It is hypothesized that the mother's education influences the degree of preventive care which in turn determines the extent and severity of sickness suffered by a child. Mother's education in conjunction with the severity of an illness episode determines the need and use of curative medical care which in turn determines the outcome of a particular episode of sickness.

Figure 1

Schematic presentation of relationship between mother's education and child mortality



The availability of medical services can modify the relationship between mother's education and care received by a child. It is hypothesized that since all mothers can be assumed to be equally interested in saving the life of their children, they, irrespective of their education, will seek curative care within their means and depending upon the severity of illness. For this reason, the association between mother's education and curative care is

likely to be weak. On the other hand, educated mothers are more likely to use preventive care than mothers with little or no education, because education may lead them to modify their behaviour to reduce risks, in general. While the extent and the severity of illness is also determined by factors other than preventive care, such as availability of safe drinking water, these factors are not included in this analysis because it is concerned with the mechanisms and not the determinants of child morbidity and mortality. For this reason, community and household environmental factors are treated as covariates of maternal education.

Data and method

The data for the present study are taken from a representative sample survey of married women of reproductive age conducted in two districts of Gujarat (see Visaria, Visaria, and Jain 1994 for further details of the survey). These districts had a combined population of 4.4 million in 1991. Women included in the survey were asked about antenatal, perinatal, and postnatal care for the last two live births preceding the survey. They were also asked about their health-seeking behaviour in terms of visits to a health facility within six months and the purpose of those visits. The survey does not contain information on non-medical care such as nutrition or food intake during pregnancy or about cleanliness and hygienic practices. However, the available information is adequate for assessing the effect of maternal education on preventive and curative medical care.

The index of preventive medical care is constructed from the following eight items:

I. Antenatal Care
   1. Pregnancy registered with ANM
   2. Blood sample for haemoglobin test taken
   3. Iron and folic acid tablets given
   4. Tetanus injection given

II. Perinatal Care
   5. Child delivered by trained medical professional

III. Post-natal Care
   6. DPT injections given
   7. Oral polio vaccine given
   8. BCG injection given

In terms of curative medical care, I have first considered a theoretical construct of autonomy that indicates whether or not the mother requires permission from her in-laws or husband to buy clothes for her children. The degree of her autonomy in buying clothes is then compared with the degree of her autonomy in taking a sick child to the doctor[3] . Next considered is whether or not the mother has visited a health facility during the six months before the survey, and if so, whether this visit was for the treatment of her sick child. This index of curative care is different from one based on information about the illness of a child and whether or not the mother sought medical treatment.

The effect of maternal education on preventive and curative medical care is examined separately for rural and urban areas to control for the differences in community environment in availability of social amenities such as safe drinking water, and availability of medical or health services. I have also adjusted the means and percentage for each education category for the effect of other factors by using the Multiple Classification Analysis. Other factors included in the analysis as main effects are: place of residence (rural, urban); district of residence (Bharuch, Panchmahals); exposure to mass media (radio, cinema and newspaper);

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3 See Visaria 1993 for various indicators of female autonomy, its determinants and effect on contraceptive use.

and ownership of modern consumer durables. The two residence factors provide a control for the differences in the availability of medical services and other social amenities; exposure to mass media provides a control for information obtained or disseminated from these channels on hygienic practices and availability and importance of using medical services; ownership of modern objects provides a control for the economic status of the household. In addition, age of the mother is included as a covariate to control for the life-cycle stage of the mother.

Results

The infant mortality rate in Gujarat state in 1989 was about 86 deaths per 1000 live births in comparison to 91 for all of India. The infant mortality rates in 1989 were 92 in Bharuch and 99 in Panchmahals districts. I have not estimated the education-specific infant or child mortality rates for the two districts included in the present study, nor the effect of care variables on the levels of infant and child mortality in these two districts.

The index of preventive medical care (PMC) varies between 0 and 8; 29 per cent of children received no preventive care and only 3 per cent received the full care. The average value of this index is 2.9 with a standard deviation of 2.6. The PMC index by mother's education, shown in Table 1, clearly indicates that the use of preventive medical care increases with education. The relationship holds in both rural and urban areas and even after adjusting for the effects of other factors mentioned earlier. The adjusted averages shown in column 6 indicate the net effect of mother's education on the increased use of preventive medical care.

Table 2 shows the degree of autonomy in purchasing clothes for children and in taking a sick child to the doctor. While 27 per cent of the mothers said that they can buy clothes for their children without the permission of their in-laws or husband, 58 per cent said that they can take a sick child to the doctor without such permission. The effect of mother's education on perceived autonomy with respect to buying clothes, a behaviour that can be postponed, is more pronounced than its effect on autonomy with respect to taking a sick child to the doctor, a behaviour that cannot be postponed. Fifty-six per cent of mothers with no schooling said that they can take a sick child to the doctor without the permission of their husband or in-laws. This adjusted percentage is much higher than the 37 per cent of mothers with at least eight years of schooling who said that they can buy clothes for their children without any permission. These comparisons suggest that mothers will do whatever is within their means and whatever is required as far as curative care is concerned and that their education level plays a minor role in health-seeking behaviour to cure a sick child.

The effect of maternal education on actual behaviour in regard to curative care is indicated by the percentage of mothers who have taken their children to a health facility during the six months before the survey. About 18 per cent of women visited a health facility during this period; about 30 per cent of them did so in connection with the health of their children; 90 per cent of these visits were to an outpatient clinic, to take care of an illness episode, and seven per cent were for the immunization of their children. Thus, only about six per cent of the women visited a health facility for curative medical care of their children. As can be seen from Table 3, maternal education has no effect on this index of curative medical care in rural as well as urban areas.

Table 1

Average index of preventive medical care received by mothers and their last child by mother's education, Gujarat, 1989

Mother's education (years of schooling) (1)	Number of women (2)	Average preventive medical care received			
		Rural (3)	Urban (4)	Total (5)	Adjusted (6)
0	3437.00	2.3	3.3	2.3	2.6
1-4	362.00	3.4	3.8	3.5	3.3
5-7	518.00	4.1	4.3	4.2	3.6
8+	540.00	5.0	5.1	5.0	4.1
Total	4857.00	2.7	4.2	2.9	2.9

Note: Preventive medical care includes antenatal, perinatal, and postnatal care. The index ranges from 0 to 8. Means for the total sample are adjusted through Multiple Classification Analysis for the main effects of place of residence (rural/urban), district of residence (Bharuch, Panchmahals), exposure to mass media, and ownership of modern objects, and age of the mother as a covariant.

Table 2

Percentage of mothers who do not require permission of husband or in-laws for buying clothes for children and taking sick child to doctor by mother's education, Gujarat, 1989

Mother's education (1)	Number of women (2)	Permission not required			
		Buying children's clothes		Taking sick child to doctor	
		Observed (3)	Adjusted [a] (4)	Observed (5)	Adjusted[a] (6)
0	3472.00	22	25	54	56
1-4	364.00	33	27	60	58
5-7	517.00	36	28	66	53
8 or more	569.00	49	37	74	68
Total	4922.00	27		58	

[a] For the procedure to adjust percentages, see Note, Table 1

In brief, maternal education increases the use of health services for preventive medical care but has no effect on their use for curative medical care. Since these relationships are not affected by the place of residence, it can be concluded that the different availability of health services does not influence the relationship between a mother's education and her use of these services. However, the effect of maternal education on care variables in the absence of health services cannot be ascertained without actually considering the availability of these services at the community level.

In order to indicate the joint effect of mother's education and availability of health services, the information in Table 1 is shown in Table 4 in a slightly different form.

Table 3

Percentage of mothers who took their child to outpatient clinic at a primary health centre or subcentre during the six months before the survey, Gujarat, 1989

Mother's education (1)	Number of women. (2)	Visited health facility (%)			
		Rural (3)	Urban (4)	Total (5)	Adjusted[a] (6)
0	3785.00	6	6	6	6
1-4	390.00	5	3	4	4
5-7	578.00	9	6	8	8
8+	655.00	6	3	5	6
Total	5408.00	6	5	6	6

[a] For the procedure to adjust percentages, see Note, Table 1

First the index of preventive medical care for each education category is expressed in relation to the value of this index for mothers with no schooling. The results for rural and urban areas are shown separately in columns (2) and (3). These results indicate the effect of education at different levels of the availability of health facilities. Second, the ratio of urban to rural values of this index for each education category is shown in column (4), which indicates the effect of medical services at different levels of mother's education. The health services in urban areas can be assumed to be more available than in rural areas. If so, columns (2) and (3) suggest that the effect of mother's education diminishes with the expansion in health services; nevertheless, it remains quite substantial. In rural areas, mothers with at least eight years of schooling are twice as likely to use health services for preventive medical care as those with no schooling. In urban areas, the likelihood of the use of these services for preventive medical care increases by 50 per cent with the increase in mothers' education from none to eight years of schooling.

Table 4

Relative index of preventive medical care by mother's education, Gujarat, 1989

Mother's education (1)	Rural (2)	Urban (3)	Ratio of urban to rural (4)
0	100	100	143
1-4	148	115	112
5-7	178	130	105
8+	217	155	102

Source: Columns 3 and 4 in Table 1.

Column (4) indicates that the expansion in health services increases their use for preventive medical care among mothers with no schooling to a greater extent than among mothers with higher education. The effect of greater availability of health services appears to diminish with an increase in mothers' education. It may be tempting to conclude that a similar level of preventive medical care can be achieved either by expanding the availability and quality of health services or by increasing female education; however, such a conclusion will not be appropriate for two reasons. First, since these data do not reflect the use of services provided through the private sector, the effect of education may be underestimated,

and the extent of this underestimation in urban areas may be higher than in rural areas. If so, the effect of female education and the effect of improvements in health services would be additive. Second, there is a time lag between changes in education policies and realization of their effect on female education and eventually on maternal behaviour in the use of existing health services. On the other hand, expansion in health services can disproportionately change the behaviour of those women with little or no education who are already going through their childbearing period; investments in female education are unlikely to have any effect on the behaviour of these women.

Concluding remarks

A number of hypotheses have been advanced to explain the relationship between maternal education and child mortality. For example, Caldwell and McDonald (1981) put forward the hypothesis that 'schooling brings in a new family system in which children (and women) are awarded higher priorities in terms of care and consumption than in traditional societies'. Cleland (1990) discarded the hypothesis about domestic hygiene advanced by Lindenbaum, Chakraborty and Elias (1985) as a pathway linking maternal education to child survival. He then advanced a number of hypotheses, one of which stated that 'schooling enhances knowledge about effective ways to prevent, recognize, and treat childhood illnesses'. Very few studies, however, present information on the effect of maternal education on the type and timing of care. The analysis presented in the present study shows that the level of maternal education is related to the increased use of available health services for preventive but not for curative care. Moreover, these relationships are not greatly affected by the different availability of health services through the public sector. In fact, availability of these services has an important and substantial effect on the behaviour of women with no education. These findings need to be confirmed by further analysis of these data by incorporating the use of health services provided through the private sector; and by considering the availability of health services at the community level.

The lack of a relationship between maternal education and curative medical care observed in this study may be an artefact of the index of curative care used in this study. This index is made up of two components: (1) the probability that a mother has a child who was sick during the six months before the interview, and (2) the probability that the sick child was taken to a health facility. The value of the first component is likely to decrease with an increase in maternal education because the extent of preventive medical care increases with maternal education. If so, the value of the second component, the probability of taking a sick child to a health facility, is likely to increase with an increase in maternal education. We have no direct information to test this hypothesis.

Another factor that needs to be considered in understanding the effect of maternal education is the severity of sickness. It is likely that there is a threshold in terms of the severity of sickness beyond which a majority of mothers, irrespective of their education, would seek curative medical care to save the life of their children. It is below this threshold level that one may find a positive relationship between maternal education and curative medical care. Given the cost of medical care, mothers with low or no education may ration the use of health services for curative purposes whereas mothers with education and resources may over-use the available health services for curative purposes. Some of this over-use of health services may not be effective in reducing child mortality; however, some of it may reflect an early intervention by educated mothers which reduces the incidence and severity of later illness episodes and, thereby, the need for emergency care. Thus, a proper understanding of the effect of maternal education on the use of health services for curative

purposes would require information on the incidence and severity of sickness, timing, and type of care sought by mothers.

While it is important to understand what it is in schooling that changes maternal behaviour, significant progress can be made by focusing and documenting the relationship between maternal education and type and timing of care received by children and their mothers during the gestation period and at the time of delivery. This information can then provide important insights to design health service programs and enhance their use to reduce infant and child mortality.

It is unnecessary to debate the relative importance of female education and primary health care, a debate started by Mosley (1983) in analysing macro-level data from six provinces in Kenya. Mosley (1983) claimed that 'child survival is primarily determined by the social and economic resources in the child's family'. An analysis (Jain 1985a) of the macro-level data from India did not support this claim, which has also been refuted by LeVine and Dixon (1990). The Indian study demonstrated the importance of both medical factors and socio-economic factors such as maternal education and household-level poverty. The present study based on micro-level data further corroborates the importance of both the maternal education and medical-care variables, at least those related to preventive care. Incorporation of non-medical care, for example, practices related to infant feeding, and preventive care made possible by the availability of social amenities like safe drinking water and waste disposal, will further enhance the explanatory power of the analytical model used in the present study.

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Maternal education, fertility and child mortality: disentangling verbal relationships

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While the statistical picture on the quite dramatic universally negative relationship between maternal education and child mortality needs no further sophistication to be validated, the actual behaviours or attitudes or abilities that lie behind the statistics are another matter altogether. In spite of much effort to distil the more important of these behaviours, attitudes and abilities, the conclusions reached are far from dramatic or even universal.

Two questions can be asked. The negative relation between maternal education and child mortality is universal, but are the causal mechanisms that underlie it much more specific to the cultural, spatial or temporal context? Does education confer different advantages on women in different settings, advantages which then, coincidentally or otherwise, all end up in the better survival of children? This is not completely improbable, given the range of possible routes to low mortality and the range of socio-economic and cultural environments in which women may acquire some education, as well as the range of schooling or teaching processes that pass for education in these different societies. It is also not improbable, given the amount of contradictory evidence that seems to be emerging on the possible mediating factors in the education-mortality relationship (Hobcraft 1993).

The second question is more methodological. Our techniques of data collection and analysis are steadily improving, but are they still unable to capture much of the reality of women's everyday lives, especially their lives with their children? Perhaps some matters simply cannot be quantified even if the outcomes of these matters can be easily quantified in a series of unambiguous measures such as age-specific mortality rates and indirect estimates of such rates.

Even if the second question is only partly valid, there is a case for occasionally abandoning quantification to complement our knowledge of the mechanics of the education-mortality relationship. There may also be a case for occasionally abandoning the direct qualitative field method. Instead, perhaps the researcher can (even if only very occasionally) fruitfully speculate on the possibilities, using intuition, direct or indirect knowledge of other cultures, and some conception, however naive, of human nature.

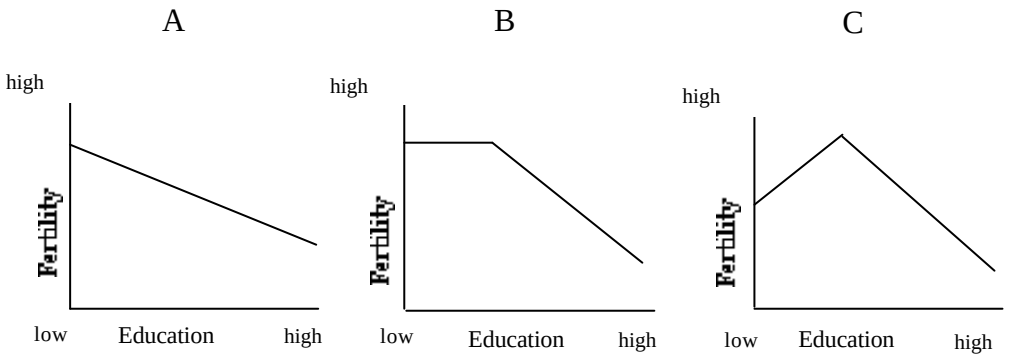
In this paper, I want to illustrate this armchair approach by trying to disentangle in words the mediating roles of the maternal education-fertility and maternal education-child mortality relationships. Can at least a part of the education-child mortality relation be explained through the education-fertility relation and vice versa? Even if the result is a surfeit of words which are virtually impossible to test empirically, the theoretical possibilities should not be discounted. Indeed, the decision to eschew empirical demonstration makes this task more appealing; it is now possible to speculate on interrelationships which the hard-core statistician or demographer would not touch with a bargepole.

Background

Figures 1 and 2 illustrate the stylistic relationships between maternal education and fertility and between maternal education and child mortality. While both these relations are broadly negative in most data sets it appears that the education-fertility relationship may not be as straightforward at the early stages of education, whether this early stage is defined as one in which few women have education or in which women in any number have only a few years of education. Cleland and Jejeebhoy (1994) present three possible representations of the education-fertility relationship, depicted in the three panels of Figure 1 . Panel C is the most interesting in this figure because it suggests that at the early stages of a spread of female education, it is quite possible that there is a real, even if temporary, rise in fertility. This rise is particularly common in the countries of Africa and Asia, in contrast to Latin America and the Arab countries where the education-fertility relation is much more often monotonic (Cleland and Kaufmann 1993). For example, in the early 1970s, marital fertility rates for women with no schooling, and schooling of 1-3 years, 4-6 years and 7+ years were 6.6, 6.7, 7.5 and 6.5 respectively in Bangladesh and 6.4, 7.1, 6.1 and 3.0 respectively in Nepal (Cleland and Jejeebhoy 1994). Such a rise in fertility is analogous to the rise in fertility which seems to universally precede a demographic transition, as demonstrated, for example, by Dyson and Murphy (1985).

Figure 1

Maternal education and fertility



In contrast, the maternal education - child mortality relationship is almost boringly linear in virtually every data set that has been studied. It seems that maternal education exerts an effect on child mortality even at very low levels of education, that is, no threshold level of maternal education is necessary (Figure 2); and it continues to be thus effective as levels of education rise virtually indefinitely (Caldwell 1979; Hobcraft, McDonald and Rutstein 1984; Mensch, Lentzner and Preston 1985; Hobcraft 1993).

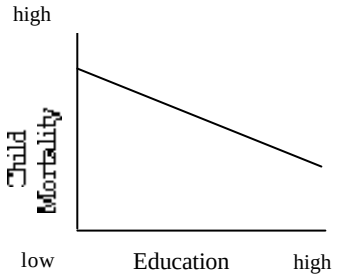
Given what is known about fertility-child mortality interactions (for example, Trussell and Pebley 1984; National Research Council 1989), Figure 2 would be consistent with Figure 1A even if one were seeking an explanation of the education-child mortality link based entirely on the education-fertility relation. Figure 1B is also consistent but suggests that, at least at the early stages of education, the effect on child mortality needs explanations outside the fertility-child mortality connection.

But such explanations are not the focus of this paper. The strain on imagination and intellect is the greatest if one dares to explain Figures 2 and 1C in terms of one another, and I

will dwell on the possibilities in this direction. The greatest challenge is posed by the initial rise in fertility that accompanies education in figure 1C: how can this be reconciled with the simultaneous fall in child mortality depicted in Figure 2? While the latter reflects several pathways which have nothing to do with fertility as an intervening variable, here I try to explore some additional pathways which allow the mortality decline to be explained at least

Figure 2

Maternal education and child mortality

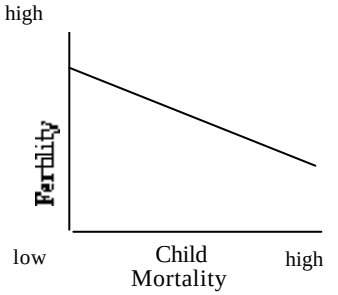


partly by the initial fertility increase with maternal education, and vice versa. Can the fall in fertility associated with education theoretically explain at least a part of the initial rise in fertility with such education?

To explain thus at least a part of the education-child mortality and education-fertility relationships each in terms of the other, the relation between fertility and child mortality is represented stylistically in Figure 3.

Figure 3

Fertility-mortality interactions associated with maternal education



Does this representation make logical sense? The next two sections speculate on some of the ways in which it may or may not make such sense. This is not to suggest that the education-mortality relationship is solely or even largely an outcome of that between education and fertility; all I seek are some possibilities consistent with our wider knowledge or intuition.

Finally, in suggesting ways in which the education-fertility and education-child mortality relationships mediate each other, I also look briefly at the more conventional part of the curve in Figure 1, where fertility declines with maternal education; but seek some relatively unconventional explanations for its consistency with the negative education-mortality relation

of Figure 2. But most of these possibilities focus on the impact of changes in child mortality on fertility rather than the other way around.

Fertility as an intervening variable in the maternal education - child mortality link

We now have sufficient quantitative and qualitative, micro and macro-level, evidence on the positive relationship between fertility and child mortality. But does this mean that a rise in fertility can never lead to a fall in infant and child mortality? That is, is the right hand part of the curve in Figure 3 inconceivable? To make it more conceivable, it is necessary to decompose the concepts 'fertility' and 'child mortality' into their several immediate determinants and to appreciate that these determinants need not all move together or even in the same direction.

A fertility outcome, that is, the total number of births that a woman has, is determined by three factors: the age at which she begins childbearing, the pace at which she bears children, and the age at which she ceases further childbearing. More importantly, the same fertility outcome can be achieved by different combinations of these three proximate determinants of fertility. For example, a woman can end up with, say, four live births by the age of 35 because she begins childbearing at the age of 18 and then spaces her births four years apart, or by starting childbearing at the age of 21 but maintaining birth intervals of only two years.

Similarly, she may end up with more births by shortening her birth intervals but leaving unchanged her ages at the start and cessation of childbearing. She may end up with more births even if she delays the start of childbearing as long as she shortens her birth intervals sufficiently.

Indeed, the literature suggests that this last kind of behaviour defines the educated woman who has more children than her illiterate counterpart. In turn, what does this imply for this woman's child mortality experience? The net impact would depend on the balance between the adverse effect of shorter birth intervals and the positive effect of a delay in the age at first birth. Reviews suggest that birth intervals have a noticeably larger impact on infant and child mortality than does maternal age, even maternal age at first birth (for example, National Research Council 1989; Hobcraft 1993). But the same reviews also make it clear that the birth-interval effect really begins to operate when the gap between successive births is less than about two years; above this point, there is not a progressive reduction of child mortality risks with increasing times between births.

However, the South Asian region, which is the one most consistently exhibiting an initial rise in fertility with maternal education, is known for its unduly long birth intervals. Even the modernization associated with education does not really seem to shorten the interval between births enough to bring them into the potentially dangerous range of one to two years. This kind of rise in fertility therefore is unlikely to increase child mortality through the child-spacing effect. At the same time, the rising age at marriage which definitely seems to accompany education in this region must be exerting a beneficial effect, however small, on the risks of child death. The net observable relationship between fertility (that is, fertility as an outcome of education and not just fertility *per se)* and child mortality in such a situation could well be positive. Admittedly, its underlying cause is not the increase in the number of live births but some of the other changes which accompany this increase.

The higher fertility associated with maternal education in some contexts also decreases the proportion of first-order births in the educated group. It therefore decreases the proportion of high-risk births of one kind without really increasing the proportion of high-risk births of another kind, that is, very high-order births. All evidence suggests that the initial

rise in fertility in Figure 1C is never large enough to lead to parities of seven or more, which is when the birth order impact on child mortality begins to make itself felt (National Research Council 1989). Nor is such a rise in fertility caused by any remarkable increase in the proportion of births to older women (another high-risk category) and certainly not to the extent where it may make a difference to their child mortality experience[4].

Further theoretical explanations for a real relationship between increased fertility and decreased child mortality are possible if the determinants of child mortality are decomposed into those which affect the risk of illness and those which affect the outcome of an illness. For example, one of the factors definitely influencing infant mortality, particularly in the first weeks of life, is the conditions surrounding births: the place of delivery, the prenatal attention available to the mother, and so on. These circumstances affect the foetus's and the infant's risk of falling ill. For older children, the use of the health care system affects the outcome of an episode of ill-health; there are now numerous studies demonstrating the value of prompt modern medical care in averting death from many of the otherwise fatal diseases.

From all accounts, educated women are more likely than uneducated women to have their deliveries in an institution or at least attended by trained practitioners. The higher their fertility then, the greater presumably is their exposure to the modern health sector and the greater the ease and confidence with which they can deal with this sector. I refer here to the increasing confidence that comes with repeated exposure independently of the confidence instilled by education. This increased confidence should in turn lead to increased ability to deal with the modern health system during child illness, and therefore to improved child survival.

Another factor that appears in the literature to affect child development as well as survival is the physical and psychological attention to the child; the amount and quality of such attention is believed to be important both in reducing the risk of ill-health and in increasing the speed and efficiency with which ill-health is recognized and treated; in addition, the nature of the care-giver is believed to be important, parents having a more crucial role to play in this regard than siblings, servants or other outsiders. For discussions, often at loggerheads, of various aspects of this issue of childcare, child welfare and child survival see Shah, Walimbe and Dhole (1979) ; Sussman (1980); Hilderbrand et al. (1985); National Research Council (1989); Bledsoe (1990) LeVine et al. (1991); Basu and Basu (1991); Cleland and Kaufmann (1993).

While increased fertility should decrease each child's access to parental, that is usually maternal, time and care, there is a possible outcome of higher fertility which actually increases such access. This is based on the admittedly limited evidence that high fertility may reduce the participation of women in economic activity (as opposed to the reverse causation, that is, the effect of employment on fertility, which is a contentious matter in the literature). In the Indian context it is certainly true that women with a little education are less likely to be economically active than women with no schooling (Basu and Basu 1991). If this finding is more universally true and if their economic passivity is even partly a result of their higher fertility, then the higher fertility associated with education can work in the direction of improved child health and survival, as long as the loss of attention per child due to more births is not greater than the gain per child due to the mother's presence at home.

All these matters are certainly difficult to investigate empirically, but recent research suggests that they are not impossible to investigate. A mix of more sophisticated data

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4 Although there is some evidence that effective terminal contraception is less readily accepted by those who are slightly better off socio-economically; this is partly to do with the greater attractiveness of sterilization incentive programs to the worst-off.

analyses as well as more innovative data collection can take us far on these unexplored routes. For example,it appears that detailed time allocation studies hold some promise for elucidating the links between child care and child welfare. Similarly, statistical analysis of the conditions of delivery of higher-order births and the use of modern care according to birth order, controlling carefully for the host of contaminating variables, should provide some insights into the hypothesis that the experience of childbearing improves the quality of childbearing and child care.

Child mortality as an intervening variable in the maternal education-fertility link[5]

In principle, child mortality can affect fertility in more ways than have been traditionally considered in the academic literature on mortality-fertility interactions[6]. Broadly, these can be classified into those effects which govern natural fertility and those which work through changes in volitional fertility. To begin with natural fertility, improved child survival should, on the whole, impinge negatively on natural fertility because, *ceteris paribus*, a child that survives should increase the length of postpartum amenorrhoea if it is breastfed. At the same time there is a potential opposing force. If increased child survival also means, as it usually should, improved foetal survival, then natural fertility should rise, because less time is lost through foetal loss and the waiting time to another conception. The net effect of reduced mortality on natural fertility is therefore somewhat uncertain.

The possible impact of reduced child mortality on controlled or wanted fertility is also ambiguous. The consistent assumption in the literature that the relation between child mortality and fertility is necessarily positive seems rather one-sided. Standard theories of fertility decline have focused on the 'insurance' and 'child replacement' motivations through which higher mortality is associated with higher fertility. It is argued that both these motivations imply that the demand for children (or some variant of demand) should fall as the prospects for child survival improve; though the strength of the relationship is debatable: see for example, Preston (1978). If the child replacement motive dominates, the effect of falling mortality should be on the number of live births wanted, as opposed to the number of living children or the ideal family size; whereas if it is the insurance motive that dictates fertility, then declining mortality should also lead to a decline in the number of children wanted because there is now less need to guard against potential mortality by having more births than are considered ideal.

Whatever the underlying motive therefore, the overall impact of child mortality on volitional fertility is believed to be positive. That is, the child-mortality impact on volitional fertility should be concentrated on the second part of the fertility curve in Figure 1C: on the part where the education-fertility relationship is negative. Any positive child-mortality impact on the first part of the fertility curve, where the education-fertility relation is possibly positive, is believed to be entirely attributable to the impact of child mortality on natural fertility. In turn, this implies that if there is a link between child survival and fertility at this earlier stage, it is foetal rather than child mortality which is the operative factor.

But this reasoning is based on the untested assumption that any initial increase in fertility with maternal education is solely the result of increases in natural fertility. There is no

5 This section draws heavily on a section of the introductory chapter of Basu and Jeffery (nd).

6 The neglect of some of these factors is quite understandable as long as it is accepted that only those hypotheses must be developed which are amenable to empirical testing. But in this paper I am ignoring this assumption and therefore feel freer to roam widely in search of explanations.

provision in the literature for the possibility that at least a part of the fertility increase at lower levels of education may reflect rises in *wanted* fertility. If this presumption can be re-examined, then it is also possible to concede a stronger role to child mortality in volitional fertility outcomes.

Is it really implausible for women with some education, and therefore by extension women who experience lower child mortality, to want more children than women with no education? The plausibility of this assumption is best supported by analogy. The standard economic argument which seeks to explain a relationship between income and fertility expects the demand for children to rise with income, at least until further increases in income result in changes in tastes, aspirations and ideas about the quality-quantity trade-off in children. The economic model therefore allows fertility to rise with income and there is some empirical support for the validity of this model.

But where female education is concerned, it is taken for granted that any positive relation with fertility reflects merely changes in the supply of children, through behaviours which are modern in the sense of loosening shackles on breastfeeding and intercourse frequency but not yet modern enough to embrace contraception as well. This limited interpretation is particularly surprising given the attempts in the literature to attribute at least a part of the education-fertility link to an education-income link.

How could there be a rise in desired fertility with education which is independent of associated rises in income? One possibility is through the falls in infant and child mortality which seem to universally accompany education,. independently of changes in income. That is, at the early stages of a decline in infant and child mortality, there could be a rise in the demand for children, even if the overall impact of child mortality on volitional fertility is positive. This is a difficult proposition to test empirically, but is not intuitively or logically outlandish. Just as very poor households may limit fertility because they cannot afford many children, high-mortality households may find it rational to limit fertility because of the higher costs associated with childbearing. If the expenditures on children that subsequently die are included in the calculation of the costs of a living child, then such a child can be very expensive in a high-mortality situation even if its quality is worse (Basu 1991).

If that is the case, the declining child mortality associated with female education should, other things remaining the same, decrease the costs of a surviving child and increase the number of children wanted. Declines in child mortality could make mothers more confident about their child-raising abilities and more willing to bring up an additional child, at least until other cost-increasing factors step in, as they do once the education-fertility relationship becomes more obviously inverse.

Some other possibilities

Finally, there is a third kind of explanation for a possible inverse relation between fertility and child mortality, when the fertility and child mortality are differentiated by education. This is the explanation in which education leads to other changes which have simultaneous opposite effects on fertility and child mortality, *ceteris paribus.* For example, in the absence of countervailing forces, the improved health (particularly the lower incidence of maternal infections) and nutritional status that educated women themselves presumably experience should in principle lead to higher fecundity. At the same time, these maternal advantages should confer some advantages on the foetus and infant, resulting in a lower proportion of high-risk (pre-term or low birthweight) babies and a lower exposure of these babies to maternal infections (National Research Council 1989).

Education, through such means as better biological capabilities as well as through less risky health behaviour, should also reduce maternal mortality per birth. In turn this greater survival of women increases the total period of their exposure to the risk of pregnancy; so that if the denominator in fertility estimates includes all women, those who survive a pregnancy as well as those who do not, educated women should end up with higher fertility than uneducated women. At the same time, this reduced maternal mortality should translate into reduced child mortality if it is true that maternal time and attention are important determinants of child survival.

Finally, perhaps one should not too readily dismiss the simultaneous contradictory impact of the fact of education on fertility and child mortality, through its impact on the personality and attitudes of the woman. If as has been persuasively argued in the literature, the initial rise in fertility experiences by educated women is partly a result of the incomplete modernization that discards traditional fertility-inhibiting behaviours, this same modernization can also lead to a greater commitment to child survival[7]. This commitment may arise not just from the reduced sense of fatalism that is supposed to result from schooling but also from the reduced emotional ability to be consoled any more by the comforting cultural myths surrounding child death[8] and a consequent increased vigour in preventing such death.

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7. I refer to a greater commitment to the survival of births which were wanted in the first place. There is some evidence now of the greater vulnerability of the unwanted births of educated mothers.

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Maternal education and theories of health behaviour: a cautionary note

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Perhaps the most consistent finding in demographic research on child mortality is the strong relationship between the level of maternal education and child survival. This finding has intrigued demographers because it provides us with an opportunity to study how social, economic and behavioural factors affect mortality. It has led to numerous studies of how and why educated mothers behave differently from uneducated mothers.

In contrast, anthropologists seem to be less interested in the relationship between maternal education and child mortality. I think many anthropologists are surprised that we would study the role of culture and social change using a characteristic of an individual. In addition, the phrase 'maternal education' seems to suggest rational-actor models in which an individual makes decisions about behaviour based on rational analysis of the advantages and disadvantages associated with possible actions or inaction. Maternal education suggests this approach since it identifies a central individual — the mother — and the word 'education' implies knowledge and skills associated with logical decision making.

The demographic literature on the relationship between maternal education and child survival relies almost entirely on single decision-maker models. They are generally either rational-actor models or models based on single decision makers who tend to chose either 'modern' or 'traditional' modes of behaviour. These are not the complete rational-actor models used by economists in which all decisions about resource allocation are made

simultaneously (Pollak and Watkins 1993). Instead, these are more partial models in which all decision makers tackle one problem at a time or decide how they will behave in matters of health.

An alternative approach is to examine the behaviour of mothers in a broader social context including the effects of social interactions and social norms. In some instances, a model of health behaviour based on a single decision maker is adequate for designing interventions or summarizing research findings. Some aspects of this broader social or cultural perspective can be built into rational-actor models (Pollak and Watkins 1993). However, by discussing the effect of maternal education on child survival in such a narrow theoretical framework, we risk missing social and cultural features that may be more important than the knowledge and attitudes of mothers.

Rational-actor models of health behaviour

Rational-actor models, such as the Health Belief Model, are most frequently used explicitly in studies that take a KAP or Knowledge-Attitudes-Practices approach to studying health behaviours (e.g., Streatfield, Singarimbun and Diamond 1990). However, the importance of increased knowledge is almost always a central attribute ascribed to more educated women in any study of the social determinants of child survival. Although many demographers shy away from the simplest rational-actor models, they often maintain a role for knowledge and rationality. For example, Das Gupta (1990) stresses the effect of maternal education on women's autonomy. However, in discussing vaccination coverage, she writes that

> Having an infant immunized requires a considerable degree of active participation on the part of the parents, in knowing and remembering when to have the child immunized, and in being convinced enough of the benefits of modern health care to put up with the distressing side-effects of immunization... for the sake of the less tangible benefits of preventive health care (Das Gupta 1990: 449).

While some degree of knowledge is certainly necessary, it is not clear that health behaviour is determined by the rational weighing of costs and benefits with knowledge pushing the balance towards the 'right' decision.

Many writers have criticized the use of rational-actor models in different areas of research. In his book *Medicine, Rationality, and Experience,* Byron Good (1994) criticizes what he calls the 'common-sense or empiricist approach to medical social sciences' which he ascribes to the 'medical behavioural sciences' including medical psychology, the sociology of illness behaviour, applied behavioural sciences in public health, and epidemiology:

> In large measure... these writings rely on belief and behavior models firmly rooted in a positivist or empiricist paradigm . . .. The individual actor . . . is analytically primary. And applications are largely directed at educating individuals to modify irrational behavior - to reduce risk factors, comply with medical regimens, seek care appropriately (Good 1994: 9).

He identifies three essential elements of this approach: 'the analysis of illness representations as health beliefs, a view of culture as adaptation, and an analytic primacy of the rational, value-maximizing individual' (Good 1994: 39). He is highly critical of each of these elements.

When Good uses the word 'belief' it is in the context of his extensive critique of its use in medical anthropology. He states that in many studies (in particular those applying the

Health Belief Model) ‘"belief" serves as an unexamined proxy for "culture" ‘ (Good 1994: 39).

> The wealth of meanings associated with illness in local cultures is thus reduced to a set of propositions held by individual actors, which are in turn evaluated in relation to biomedical knowledge.... [In these models] lay medical culture is the precipitate of rational, adaptive behaviors of individuals, and it takes the form of more or less accurate beliefs which are held in individual minds (Good 1994: 42).

Culture is much more than simply a collection of beliefs.

Single decision maker, single-decision models

Some demographers have moved away from discussing the mother’s knowledge or beliefs about disease and have tried to place maternal decision making in a broader cultural context. For example, Caldwell states that ‘the evidence does not seem to point to women with some schooling knowing much more about disease causation than women with no schooling’ (Caldwell 1989b: 105). However, the alternative models generally continue to rely on the notion of the mother as the decision maker and to downplay social expectations and cultural norms of behaviour.

For example, Caldwell (1989a), Das Gupta (1990) and others have discussed the importance of maternal education in freeing women from the social constraints imposed on them in many societies. Bourne and Walker (1991) express this approach quite well when they hypothesize that maternal education works through ‘the improved ability of an educated woman to take action: to seek health care; to give her children food; to retain rights to her children’s upbringing; in other words, to increase her autonomy’ (Bourne and Walker 1991:210).

The first problem with these approaches is that they provide little insight into why mothers with more autonomy choose modern health practices. Das Gupta (1990) refers to the educated woman’s increased abilities and knowledge (e.g., of immunization). Caldwell, however, states that

> These changes do not arise primarily from the acceptance of school instructions, but rather from a feeling that the school has enrolled [educated women] in a different society, not necessarily wholly Western but certainly transitionally so. They are aware that the health centre, the medical practitioner, immunization of children against disease and taking early action about infant diarrhoea all belong to the same system as their school, the officials, the government and themselves (Caldwell, Reddy and Caldwell 1983:198).

In other words there is only one decision to be made: the decision to be modern. Joshi (1994:3) explores this acceptance of modern behaviour using the ‘identity acquisition hypothesis’ which ‘assumes that schooling leads to a behavioural change through imitation of people in the "modern sector."’

In these formulations education makes women better rational actors not because they have more knowledge but because they have increased freedom to act and they base their decisions on ‘modern attitudes’ This approach does not offer much chance of explaining variation in behaviour among educated women. It also seems to abandon rational decision making although the woman enters the ‘modern world’ which is often thought to be characterized by rational decision makers.

The single decision maker is just as problematic as the single decision. Good (1994) is very critical of models based on decisions made by individual actors even after consultation with family and close acquaintances:

> The ability of the individual to appraise symptoms, review available resources then make voluntary choices is simply a myth for many in our society and in other societies.... It is rather a model of how members of our society are thought to act, an ideological model which reproduces conventional understandings and serves best when used to study middle-class Americans (Good 1994: 43).

In particular, these models may not be appropriate for developing countries where extended family relationships and local attitudes may impose more restrictions on individual action. For example, Nichter (1990: 199) points to the role played by influential community leaders in encouraging women to get their children vaccinated. More general community attitudes can also play a role. In a study in Haiti by Coreil et al. (1994: 235), women report that there are unexplained differences between communities that affect receptivity of vaccination. 'In some neighborhoods groups of women walk together to and from the [health] post and take turns watching the children. Social support appears to be an important positive reinforcement for utilization'.

Social expectations

We cannot understand changes in child survival without taking due note both of women's knowledge, attitudes and behaviour about child health, and of societal expectations. In all societies women perform almost all of the tasks associated with feeding, educating, and preserving the health of children, especially very young children. In some societies, especially those in which the emotional bonds between husband and wife are weak, fathers are notoriously uninvolved in the concerns of young children. When health programs address child health issues and when surveys collect information about child health they must deal primarily with women, including mothers, grandmothers, and older sisters. However, this does not imply that the rest of society is not concerned about the health of young children. Women are never exempt from blame or scorn if they are judged to have failed to raise a healthy child or if they are seen to risk failure. For example, when Coreil et al. (1994) asked women why some mothers don't get their children vaccinated the term 'negligence' was mentioned frequently. Women told them that 'there are people who just don't care' (Coreil et al.1994: 234).

We cannot ignore the fact that society has strong expectations for the care of children and that changes in these expectations are a central part of the revolution in child survival. These expectations include concepts of proper foods, acceptable forms of discipline, and concerns about specific threats to the social and physical development of children. Social concepts of what is expected of mothers vary by education and social class and may reflect limitations facing an individual woman such as her physical strength or her marital status. These social expectations may provide a better approach to understanding behaviour than attempts to understand the decision-making processes of individuals. Although rational actor-models can easily incorporate the costs associated with rejecting social expectations (Pollak and Watkins 1993), this implies that these costs are only a part of the total picture, a part that is often ignored in research.

In some settings, rational-actor models have proved to be quite useful and many researchers will defend their theoretical strengths. At a minimum, these models often provide simple 'commonsense' idioms for describing the observed relationships between social

variables and intermediate variables. However, rational-actor models are very clumsy at explaining social change. It is clear that increasing proportions educated do not fully explain (even in a statistical sense) the changes in behaviour and child survival that have been documented over the last century. It does not help us much to postulate some kind of spillover effect in which uneducated women who are in the minority in a community may learn from observing the educated women. To understand societal-level changes, we need to move beyond models of what individuals learn and how they make decisions.

A societal view of maternal education and childrearing

In Lindenbaum's (1990a, b) widely quoted work on the effect of women's education on childrearing, she seems to avoid any suggestion of a single decision maker but she also avoids a simple social-expectations model in which women do what is expected of them. She stresses that the education of women changes the way society sees women and what society expects from women. This goes beyond how women see themselves and what they see as their proper courses of action. This unique feature of Lindenbaum's work is easily seen in a comparison of some of her statements about maternal education in Bangladesh with comments by LeVine and his colleagues (1991) about Mexico. Although both Lindenbaum and LeVine (both anthropologists) point to changes in attitudes about women and child care, they discuss these changes in very different ways.

In their excellent study of Mexico, LeVine and his colleagues discuss the effects of women's education on fertility and child mortality in terms of women's attitudes about themselves and about child care. For example, they state that 'schooling influences *individual* attitudes in the direction of modernity and individualism as embodied in Western ideologies' (LeVine et al.1991: 485, emphasis added). This concern for the attitudes and beliefs of women is reflected in the three questions their research addresses (LeVine et al.1991: 460). Their first question concerns the effect of education on 'women's preferred patterns of health and reproductive behaviour'. The second asks `What kind of education experience do girls have in school that might plausibly influence their behaviour as mothers years later?'. The third asks about the potential importance of 'a broad process of school-influenced change in parental investment strategies and child care practices'. This third question moves beyond the woman to the couple.

In contrast, Lindenbaum sees these as changes that pervade those parts of society (men and women) affected by Western education, and affect the expectations for educated women. For example she states: 'The "hygienic" disciplines of the body reflect also what is currently perceived to be desirable, polite, or modern behaviour, embodied in the person of the "educated woman" ' (Lindenbaum 1990a: 437). Similarly,

> Those who favour female education thus dwell on manners and social attributes as well as the useful and worthy tasks (keeping household accounts, tutoring children, nursing family members) now expected of women in 'respectable' households (Lindenbaum 1990a: 433).

These attitudinal changes affect women, but they are shared by others in society and affect what others expect of women and mothers. Lindenbaum does report differences in behaviour and attitudes between educated and uneducated women, but she avoids language that suggests a simple linkage between women's attitudes and their behaviour.

Lindenbaum's formulation of these issues in terms of general social attitudes and expectations for educated women provides an important alternative to models based on decisions made by individual mothers. This approach is sometimes reflected in the writings

of Caldwell and others. Caldwell (1989b: 106) notes that 'It is not so much what you learn or understand, but how you see yourself and how others see you'. However, most of his examples stress how women see themselves. For example, he states that 'illiterate women do feel a lack of capability when dealing with the modern world' (Caldwell 1989b: 106). This can be contrasted with Lindenbaum's quotation from an impoverished woman: 'If I send my daughter to school, other people will speak badly about me' (Lindenbaum 1990a: 433). Caldwell seems to emphasize how women see themselves and what degree of autonomy they are granted whereas Lindenbaum stresses the expectations of society which are shared by men and women.

Macro studies of social change

There is another strain of demographic research on the cultural aspects of recent health transitions that takes a macro-social, comparative perspective. This approach grew out of a conference on 'Good Health at Low Cost' (Halstead, Walsh, and Warren 1985) which focused on how a few societies have achieved low mortality rates without massive increases in per capita income. The conclusions of this approach are significant because they invoke increases in female education as a part of the process, but do not depend on models of individual actors.

Caldwell has made several contributions to the literature on this subject. When he takes this macro-social view, he relates the high levels of female autonomy and education to other features of society. For example, he discusses the effects of religion on the demand for education and notes that one condition for unusual educational advances is 'a basic reverence for enlightenment or education' (Caldwell 1989a: 21). He also notes that 'countries that advance most rapidly in this area are those in which parents achieve as much satisfaction at seeing their daughters at school as their sons' (Caldwell 1989a: 21). However, when he compares educated and uneducated mothers in a single society this perspective of education as a reflection of societal attitudes is replaced by education as a force that changes individuals. For example, in discussing the effect of education on women in South India, he notes that

> the woman who has been to school knows that the school expects her to take action and that she should not be bound by deference to traditional decision-making patterns and excessive female modesty when children's health is at stake. *Strangely enough, this is a view usually shared by her parents-in-law* (Caldwell 1989b: 106, emphasis added).

The macro-social approach leads to a view of societies as organisms which develop over time in a manner that reflects both their history and their current circumstances. This is a useful approach in many ways. It recognizes the historical context of culture, it provides an overview of cultural changes, and it reflects the fact that individuals are not completely autonomous actors. It also has the advantage of avoiding simple mechanistic assumptions about how changes in 'knowledge' affect social reality. However, this approach has the disadvantage that it leaves behind the micro-social perspective in which individuals take actions. It leaves us with a vague feeling that individual behaviour is somehow an illusion, or that it reflects only small deviations from a societal average.

Individual behaviour and the social environment

The macro-social and individual approaches to studying the relationship between social and economic factors and child mortality reflect the spectrum of philosophies of culture described by Hammel (1990: 466). He reviews a range of philosophical approaches that extends from 'an autonomous, almost totalitarian "culture" that determines social action to an almost anarchic one in which culture is shaped by the hands of independent participants'. He tries to bridge this gap by proposing a more elaborate view of culture:

> Culture is an evaluative conversation constructed by actors out of the raw materials afforded by tradition and ongoing experience. It is continually modified by them in processes of social interaction, and their behavior is guided by anticipation of such cultural evaluation (Hammel 1990: 457).

In order to understand the context in which individual actors behave and how that context changes, we must examine the nature of the 'evaluative conversation' in which they participate.

Following similar approaches to culture, many medical anthropologists now investigate the nature of this 'evaluative conversation' through the use of narrative. This approach involves asking individuals to tell detailed stories about illnesses. Narrative is seen as a natural way in which individuals try to understand their own past and present. In their introduction to an issue of *Social Science and Medicine* devoted to narrative research, Mattingly and Garro (1994) write:

> Narrative offers what is perhaps our most fundamental way to understand life in time. Through narrative we try to make sense of how things have come to pass and how our actions and the actions of others have helped shape our history; we try to understand who we are becoming by reference to where we have been. . . . Social and cultural context informs and forms narratives. Reflections on social roles, probable causes, assessments of alternative ways for responding to illness, and moral commentaries are among those aspects that may be included (Mattingly and Garro1994: 771).

Narratives are not just an important research tool. They may be a major mechanism of social and cultural change. They serve this function because they transmit more than just facts. Narratives serve as a central mechanism for reaching and communicating consensus on what the 'facts' are and what social meanings are attached to them.

This role of narrative is suggested by Farmer's (1994) research on the development of cultural concepts of AIDS in a rural area of Haiti. He interviewed the same 20 villagers at least once in each of six consecutive years to document the developing awareness of AIDS. When he began the interviews in 1983, the villagers knew very little about AIDS and had no stories to tell about it. He says that 'before the advent of truly natural discourse about *sida* [i.e., AIDS], there was simply no consensus as to what *sida* was' (Farmer 1994: 806). However, after a man in the village died of AIDS, the illness stories became quite common.

> People began to recount the 'same story', and the illness of which they spoke came to have characteristics and features that varied less and less from informant to informant. The consensus was cobbled together towards the end of 1987 (Farmer 1994: 807).

Although this process of consensus building through stories or narratives is very clear in the case of this new disease, a similar process probably drives changing perceptions of more common diseases and the effectiveness of preventive and curative measures.

Using narratives to examine differences between educated and uneducated mothers might lead to a better understanding of the contributions of different knowledge and experiences, different reference groups and role models, and different social expectations. It might also prove to be a useful link between changes in individual behaviours and macro-level social changes.

Conclusions

Differences in child survival by maternal education continue to provide a valuable opportunity for uncovering the ways in which culture and social change affect health. However, we must be careful in selecting the theoretical models that shape our discussions and the design of future research. Theoretical models based on the actions of individual decision makers will lead us to more studies of the knowledge, attitudes and practices of those individuals. A theoretical perspective that focuses on the broader society might lead to very different types of studies. For example, many researchers are now interviewing men about their fertility preferences. However, there is very little similar research by demographers on the opinions on child care among anyone other than mothers and other caregivers.

Not all demographers will, or should, run to the field to collect narratives about health. There is still great value in statistical approaches to documenting the associations between demographic, social, and economic characteristics and health practices and mortality. However, in describing our research we should be very careful when using language that suggests theories of culture and behaviour. Instead, it is generally preferable to stick to the language of intermediate variable models which indicate the behaviours through which education affects mortality without attempting to explain the motivations for behaviour. When we use language that implies theories of behaviour, we should be explicit about the theory we are choosing and we should discuss the limits of our data when it comes to testing that theory. In many cases it is preferable to use 'theory neutral' language, insofar as that is possible, and stick to pure description.

We are often tempted to move beyond intermediate-variables models which merely describe behaviour rather than explaining it. Unfortunately, this often leads us to draw conclusions that focus on specific elements of what is in fact a very complex web of factors. Careful, precise descriptions of societies, whether in statistical or qualitative terms, can be more enlightening than a simplified explanation for a complex phenomenon. For example, a careful review of Lindenbaum's widely respected work shows that she is basically describing the meaning of education in the society she studied. Although her research clearly reflects a theory of culture and behaviour that emphasizes the broad social context, she has not attempted to articulate a theory of mortality change. She has not attempted to isolate a single change in attitudes or knowledge or societal expectations which provides the key to understanding the observed link between maternal education and child survival. She has not tried to determine whether the differences in behaviour are attributable to women's different attitudes about themselves, society's expectations of educated women, or changes in women's status.

In most demographic research, the theories of behaviour we employ are implicit in the language we use rather than stated explicitly. Therefore, the language we use both reflects and affects the way we think about things. It would be a mistake to let a narrow interpretation of the effect of maternal education limit our thinking about how individual women decide to

care for their children. We must be careful not to chose models of individual decision making simply because surveys of women report a characteristic of individuals that suggests knowledge and logical thinking. We cannot let our variables choose our theoretical models or direct our future research.

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How is greater maternal education translated into lower child mortality?

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A large number of studies have shown, almost as convincingly as anything can in the social sciences, that a mother's education has an independent, strong and positive impact on the survival of her children. Nevertheless, unless the mechanisms whereby maternal education is converted to low child mortality can be worked out, some researchers will continue to doubt the finding. Furthermore, the finding will prove of little use for the short-term reduction of child mortality, although it will reinforce the existing arguments for a greater emphasis on the schooling of girls, in this case to give the next generation a greater chance of survival.

This forum was organized in order to encourage the exploration of these mechanisms and in the hope of recording new advances in this direction. In spite of good contributions throwing light on important aspects of the question, and suggesting leads for future work, it is still hard to avoid the conclusion that the full exploration of the mechanisms with the obtaining of clinching proof has hardly begun. The major difficulty is the kind of research that must be done to obtain proof. There is general agreement that the reduction of child mortality must be achieved in one of three ways: by mothers co-operating to a greater extent with preventive health services; by mothers co-operating to a greater extent with curative health services;and by mothers being more active in the household and everyday life to ensure that the child does not become sick or have an accident in the first place, or that the sickness is soon brought under control so that medical intervention is not necessary. The first two mechanisms are ones that demographers given to the design of quantified field investigations ought to be able to test. The last is a very different matter and requires subtle anthropological techniques, especially participant observation. This is not merely a question of interesting anthropologists in such research, but of their developing techniques which can establish a level of 'proof' which will convince others in the social sciences community. Traditionally, anthropologists have devoted most of their interest not so much to behaviour as to the concrete results of behaviour: kinship links formed, exchanges carried out and so on. The study of events that do not happen, for instance the elements in maternal care which explain why children did not get sick, is research of a different order. Yet such maternal behaviour is probably important: in an area in Nigeria far from medical services much better survival rates were found among the children of mothers with schooling (usually incomplete primary schooling) than those without (Orubuloye and Caldwell 1975; Caldwell 1979). How far, then, has this forum allowed us to proceed?

Akile GŸrsoy argues that fathers have been mysteriously ignored and that the Turkish evidence shows this to be unwarranted. I could not agree more, and I have increasingly tried to lay stress on parental education. There are two reasons. The first is the fact that, if the nature of the household and of the parent-child relation is substantially changed by the education of the mother, it seems most unlikely that the education of the father will have no impact, although it might be a lesser one.

The second is that father's education shows up in the World Fertility Survey (WFS) and Demographic and Health Surveys (DHS) as also being an important factor in increasing child survival. Indeed, in some countries it appears to be as important as mother's education, or even more important. The tendency for demographers to ignore these findings is probably explained by a fear that men's education is so strongly interrelated with their incomes that any attempt to control for income would not be wholly successful (demographers used to argue this about women's education and its relation to whom they married and hence household incomes). They are also aware that mothers are usually more sensitive to children's illnesses than are fathers, and this is undoubtedly correct as measured by the likelihood of first noticing that something is wrong (Caldwell et al. 1989: 376). Yet, as GŸrsoy argues is the case in Turkey, fathers may well be the parents with the most resources and the most influence among healers and medical institutions. There are also other circumstances when fathers' influence may be particularly strong. One is tight nuclear families where fathers are expected to nurture as well as mothers. The other is when the whole society is conscious of health, and agreed on the need for early treatment, and when free health facilities are easily available, as is exemplified by the situation in Sri Lanka (Caldwell et al. 1989).

The question has inevitably arisen as to why education has an impact. Many demographers have concluded that it has little to do with the content of the lessons, noting that even a little schooling of future mothers in poor rural schools with undereducated teachers has an impact on child survival and that the impact of education seems to vary little between areas with good schools and those with poor ones. Robert LeVine and colleagues have presented evidence in the forum that maternal literacy does have an impact on child survival in locations as widely apart as rural Mexico, rural Nepal and urban Zambia. Without disputing the accuracy of this finding, one might note that the association between being literate and attending school is much stronger in the contemporary Third World than it was, for instance, in early nineteenth century protestant northern Europe with its biblical literacy. One could also argue that literacy has its impact less in the sense of what is read and learnt than in how people see themselves and others see them. This certainly seemed to be the societal emphasis in our South Indian experience (Caldwell, Reddy and Caldwell 1985: 37-39). Nevertheless, the LeVine contribution is salutary, for social scientists can overlook the obvious, and it is true that Third World school lessons contain a great deal about cleanliness, hygiene and avoiding disease. Lindenbaum, Chakraborty and Elias (1989) concluded from research in rural Bangladesh that school children assumed that they were being taught how educated (or perhaps 'civilized') people behaved and followed these rules in later life without consciously doing so to minimize illness.

If the effect of schooling is to change people because of the experience rather than the content of the syllabus, and to change the way that they see themselves and others see them, then Martin Brockerhoff and Laurie De Rose may be right in arguing that the urban experience is the equivalent of a substantial amount of schooling in rural areas. Their statistical findings argue this case eloquently, although it should be noted that the comparison is between the urban-born and the rural-urban migrant. At each level of maternal education, child mortality might well be higher still among those who stayed in rural areas. There are other possibilities. Those who had their education in the urban areas might have been most

transformed as individuals not so much by their lifelong urban experience as by the interaction of urbanization and education during their schooling. Or they might just have had better schools. Alternatively they might live closer to health facilities than the migrants residing in squatter areas on the urban fringe, or a lifetime of urban experience and contacts might give them greater skills in making the system work than are possessed by the relative newcomers. If my suspicion is correct that in turn rural-urban migrants' children have better survival rates than the children of those of similar educational levels but who remained in rural areas, there could be many explanations: the influence of the urban milieu, the absence of the constraints of older relatives and relatives-in-law, the selectivity of migration for the more determined and innovative, or access to better health services. Whatever is the case it is clear that education must be one part of a larger process in the transformation of individuals to be better parents as measured by the propensity of their children to survive.

Georgia Kaufmann and John Cleland argue that this distinct personality that assists the survival of their children may either be inborn or formed at a very early age so that persistence in getting education, or doing well at school, or just staying on at school is evidence of the same integrated personality, or the innately bright individual, that will later prove to be, in health terms, the most successful parent. In a health transition sense, the best and the brightest almost automatically survive the system and rise to the top. In our research in South India (Caldwell et al. 1985) parents practically never gave as a reason for sending children to school that they were likely to succeed or had urged their own enrolment, but 55 per cent of the removal of boys from school and 35 per cent of that of daughters was explained by the fact that the child had failed, was not doing well, did not wish to stay there, or did not get on well with the teachers. Thus the selectivity of school survivors may be a factor, but the school must add a great deal too for otherwise, in a system like South India where almost two-thirds of girls are removed from school for reasons other than their success or compatibility with it, we would not anticipate child survival rising almost linearly with the duration of maternal schooling. It is also possible that some of the drop-outs are natural rebels who would be most likely to fight the system to obtain treatment for their children.

Anrudh Jain presents interesting data indicating that duration of maternal education has no impact in making mothers more likely to seek curative help for their children but does make them more likely to make use of preventive health measures like immunization. This conflicts with the commonsense assumption that in any rational parent both tendencies would move in the same direction unless there were reasons for suspecting the curative services to be worthless or expensive. It also conflicts with our experience in rural South India (see below). It is possible that more educated mothers are more compliant to the official will, or just receive the message, in that everyone is urged to have their children immunized while there can be no such definite message about seeking a cure for the whole range of sicknesses from which children suffer. We might also conclude that mothers who are more likely to seek preventive care are also more likely to try to prevent illness or accident in the home.

Alaka Basu's paper will be treated briefly here, not because it is not of value, but because it parallels this commentary in being another commentary rather than the presentation of findings upon which to comment. It might be noted, however, that child survival seems to increase linearly with maternal education and not to be U-shaped as I believe would follow from her education-fertility-child mortality model.

Finally, I want to point to possible lines of investigation which are suggested by three groups of publications from our work. These are not completely distinct areas and they are certainly not in conflict with each other.

The first is the 1979-84 research in rural South India (Caldwell, Reddy and Caldwell 1983a, 1988; Caldwell et al. 1990). That research found three quantifiable differences by

education of mother that were significant in their magnitude and each likely to result in the greater survival of the children of more educated mothers. The first of these is that educated mothers were more likely to take children to the health centre for both preventive and curative medicine. Their mothers-in-law allowed it and expected it, for most parents now try to arrange their sons' marriages to educated young women and one of their strongest motives is that such women are more likely to ensure the survival of their grandchildren (Caldwell, Reddy and Caldwell 1983b: 357). Why the young educated mothers are more likely to go to the modern health centre is more complex. Their schools' attitudes certainly encouraged it and the school sometimes sent children to the centre. But, when questioned, they just seemed to take it for granted: they had been to school, a part of the modern world, and the clinic was just another part of that world. It was very different among the unschooled illiterates who believed that they did not understand these institutions and that the institutions were not for them. The second difference was that the more educated the mothers were, the longer time they spent with the doctor. This is because the doctor expects to understand the educated woman and he expects them to understand him. Inevitably, the doctor is more likely to be right about his diagnosis and the mother is more likely to be able to carry out the treatment accurately. The third difference is that, when the treatment fails to improve the child's condition, the educated are much more likely to report this back to the clinic. The uneducated just shake their heads, say the doctor has done his best, and assume — often correctly — that the clinic would shelve responsibility by accusing the mother of irresponsibility and of not having followed the prescribed treatment.

The second approach was work on the locus of responsibility (Caldwell and Caldwell 1994). Going to school makes females (and males) feel that they have more control over events and more responsibility if they do not intervene to prevent undesirable outcomes. They feel guiltier if they do not take a sick child to the health centre for treatment, or if they are unaware of where their small children are and what they are doing. Going to school is itself clearly different from the ancient ways and schools emphasize the new. In addition, educated mothers do have more control over events in that mothers-in-law are likely to cede this to them.

The third approach originated in the Forum of this journal (*Health Transition Review* 1, 2). That forum was centred on Samuel Preston and Michael Haines's book, *Fatal Years: Child Mortality in Late Nineteenth Century America* (1991). There Preston and Haines presented their unanticipated finding that there was little difference in child survival by mothers' education in the United States around the turn of the century. My explanation (Caldwell 1991) was that even the less educated women in the America of a century ago believed whole-heartedly, often pathetically, in modern science. They often did not know much about it but they did not question it. For it was part of their culture which had been developing for centuries. They had no alternative explanations of ill-health and subscribed to no alternative treatments. Their children's cures were a product of how good medical science was at the time and whether they could afford access to it. There are alternative explanations for sickness and alternative treatments in the Third World and how quickly, consistently and thoroughly mothers resort to modern medical services is a product of just how strongly and single-mindedly they believe in modern medicine and how much they feel personally responsible for controlling the situation. Faith in modern, Western science is taught only partly by the health system itself. The main proselytizer for modern science is the school, even in its earliest grades when no science is taught formally (cf. Caldwell 1980: 237-245). Belief in the necessity of access to modern health services intensifies with each year at school. It is this import of both modern medicine and modern education with its commitment to modern medicine, and indeed all modern science, which determines how thoroughly both curative and preventive services are used; it explains the large differentials in child survival

by maternal duration of education found in the contemporary Third World to a greater degree than has ever been the case in the West. Substantial levels of female education in Sri Lanka could not be translated into low child mortality until a comprehensive free health system was put in place after the Second World War; and a dense provision of modern medical services in oil-rich Libya and Saudi Arabia could not yield low child mortality until a cohort of educated young mothers came onto the scene (Caldwell 1986: 173-178).

These explanations are different facets of the same thing. The imparting by the school of a belief in modern science and of an individual locus of responsibility are by no means wholly different. They are each expressed in the way educated mothers use the health services. In terms of the relationship between the duration of maternal education and the effective use of modern health services to lower child mortality, much of the explanation is probably found in this complex of factors and much of it can be quantitatively researched. But a substantial part of the explanation for the impact of maternal education in the reduction of child mortality may lie in home caring behaviour and in the prevention of sickness or accidents happening at all. We have been less successful in researching this area, not necessarily because it is quantitatively less important but because much of it cannot be quantitatively researched, except perhaps as a residual effect.

Douglas Ewbank provides us with a stimulating review of the problem, reminding us that we should devote more time to looking at societies rather than individuals. In some ways this is a comforting view for demographers working with samples of whole societies. The paper is so comprehensive that I wish to make only two points. The first is that, whether we are placing stress on whole societies or on individuals, there must be mechanisms which translate the behaviour of individual mothers into their children's survival, and, although Ewbank says very little about these mechanisms, we will undoubtedly be closer to understanding the whole process when we have teased them out. The second point is, given that child survival rates vary between different communities in the same society, what role is played by different levels of education between the communities or between their leaders.

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Book Reviews

Disease and Social Diversity: the European Impact on the Health of Non-Europeans. By Stephen J. Kunitz. Oxford University Press, 1994. viii +209pp. Hardback US$49.95.

Disease and Social Diversity is the harvest of wide experience in medical practice, acute intelligence, and deep research and reading in the social and natural sciences. Stephen Kunitz observes that the development of physiology and bacteriology transformed the practice of medicine by revealing universalistic 'natural histories' of germs and bacteria. He proposes that these insights be tempered by renewed attention to individual, cultural and institutional circumstances. Cross-fertilization between biomedical (universalistic) and anthropological (particularist) models of causation is now essential: each approach yields insights into lives and deaths, but each is dangerously incomplete without the other. Mere fame and fortune attend those who adopt extreme positions. Kunitz's aim is more ambitious: to alter the agenda of epidemiology and public policy by charting the fruitful middle ground where he is liable to be attacked from all sides.

His argument is sustained by 'comparative studies at increasingly more refined levels of analysis'. A survey which ranges from the Americas through Polynesia to Australia deserves to be reviewed as a whole — but multiple reviews underline the fact that few scholars match Kunitz's range. One specific audience for this book is the (mainly Anglo-Saxon male) community of historians of Pacific Islands, transfixed by epidemics and devastating depopulation in the aftermath of 'contact' with the outside world. The terms of the debate were set by colonial writers who suspected that the population decline might prove inevitable and irreversible, and were inclined to incriminate the victims as well as the infections. On the other hand the 'new Pacific History' has resisted the 'fatal impact' syndrome, arguing with the benefit of hindsight that island societies were highly resilient. A particular argument now rages about the pre-contact population of Hawai'i, estimated variously between 250,000 and at least 800,000 (Stannard 1989). The precise figure is significant because numbers tumbled over the first hundred years of interaction, to a nadir of about 40,000. Innumerable studies have not produced agreement on the scale, timing or causation because

> this demographic collapse...is the most important 'fact' in Hawaiian history. As disease destroyed their numbers, it destroyed the people's confidence and their culture; finally, it was the most important factor in their dispossession: the loss of their land and ultimately their independence (Bushnell 1993: 162).

On these and parallel issues, Kunitz throws clear light. First he shows that depopulation was very uneven among Polynesian societies, despite generic and cultural homogeneity; then he suggests a correlation between the extent of early depopulation and the frequency and intensity of shippings. The most arresting element of the discussion is that the later loss of land was an acute health risk. This analysis neatly reverses the chain of causation proposed above:

> it seems likely that the impoverishment resulting from the destruction of subsistence agriculture would have made people more susceptible to respiratory diseases and gastroenteritis, which flourished under conditions of poverty, crowding, and malnutrition. Moreover, the expropriation of land resulted in removal and very likely in the disruption of social networks which provide both instrumental and emotional support... Observations of epidemics in virgin soil populations, suggest that social disruption is at least as significant in causing high mortality as is the virulence of the infectious agent itself, and many contemporary studies suggest an important role for social support in reducing the risk of death from a wide variety of causes (p. 51).

Kunitz emphasizes long-term population trends, whereas historians who lack knowledge of the natural sciences are drawn to dramatic episodes such as the Fijian measles epidemic of 1875, or West Samoa's exposure to Spanish influenza in 1919, from which societies recovered if other circumstances were favourable. What becomes urgent therefore is to investigate resilience rather than catastrophe. There are, of course, awkward exceptions. Even within Kunitz's sample, the Marquesas demand further explanation to account for their steep collapse and the unusual tardiness of their recovery. Going beyond Polynesia to Micronesia and Melanesia, there are convincing records of depopulation in the Marianas in the seventeenth century and in parts of New Guinea and Vanuatu in the twentieth, often associated with missionization, which involved the concentration of rural societies into villages where they were more accessible to Christianity — and infection. Some nineteenth-century New Caledonians gave the name *christiano* to tuberculosis, acknowledging the source of the problem. Perversely, tuberculosis became a disease of development rather than a disease of poverty. These and similar episodes do not falsify Kunitz's argument. Rather they gain significance from the broad context which he sketches.

Twentieth century demographic evidence often turns conventional wisdom on its head. Historians have usually concentrated on infections or contagions, treating other causes of morbidity and mortality as somehow beyond the realm of social explanation. Kunitz compels us to broaden our vision beyond the natural history of infections to individual (and perhaps collective) patient careers. Again, despite their comprehensive dispossession, Hawaiians enjoy longer lives than other Polynesians, including Maoris, an outcome deeply disconcerting to Maori and *pakeha* self-images. American Samoans live longer than their cousins in independent (and culturally conservative) Western Samoa. When Kunitz places these data together with the evidence for native Americans, they support a strikingly counter-intuitive argument that universal health services may not best serve the needs of 'fourth world' populations. They also underpin the profoundly unsettling thesis that many problems do indeed respond to the therapy of throwing money at them.

This important book bristles with arresting observations which serve as persuasive arguments for blending biomedical and 'social' perceptions. It should be required reading for policy-makers, and social scientists will find it disconcerting and liberating.

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Stephen Kunitz, of the Department of Community and Preventive Medicine, University of Rochester, New York, writes extensively on demography and epidemiology and contributes significantly to the understanding of the health of indigenous people in the United States and Australia (Kunitz 1983, 1986: Kunitz et al. 1994). In the book under review, he has studied an epidemiological and demographic topic that has long awaited attention. Previously, it was assumed that the health patterns of indigenous peoples would reflect those of the general population, that is, they would follow the models described as the demographic and epidemiologic transitions (Omran 1971:533). Populations pass through a number of stages in the decline from high to low mortality: the first stage is that of pestilence and famine; the second, of receding epidemics; and the third is the stage of degenerative and man-made diseases (Hugo 1986:23). Kunitz rejects these models, however, because he believes that

> it is likely to be more useful to understand in detail the myriad ways in which different causes of morbidity and mortality in populations are affected by social processes, rather than to strive to build grand theories (pp.4-5).

Kunitz develops his own theory to explain changes in indigenous people's epidemiological and demographic patterns over time.

Disease and Social Diversity explores the impact of European contact on the health of the indigenous peoples of North America, the Pacific and Australia. Kunitz theorizes that disease patterns in populations may be understood by recognizing not only the social, political and cultural contexts but also the biology of the diseases in the peoples studied. In rejecting heuristic models Kunitz focuses on local-historical knowledge of time and place, claiming them to be crucial in understanding the morbidity and mortality of particular groups and diseases.

The book is designed to study the importance of federal structures (both macro- and micro-social structures) balanced against a set of criteria. Kunitz's major contribution to an understanding of indigenous health is that European impact on the health of the indigenous peoples in America, Polynesia and Australia varies widely. I look at how he constructs his theory by examining briefly the presentation of material on the United States, Polynesia and Australia.

Data used by Kunitz from the United States reveal that early records are sparse. The paucity of records meant that he resorts to archaeological evidence as a means of establishing the ethnological past. Demographic assumptions, likewise, are used to bridge the lack of written documentary sources. Elements of the pre-contact social structures, such as habitat size and location features, are adopted as a way of explaining group partnership pairing, kinship arrangements, modes of producing group livelihood and, finally, group mobility.

Kunitz compares the Navajo and Hopi peoples, two groups that were in contact with each other for two or three centuries before the mass European immigration of the eighteenth and nineteenth centuries. In comparing the two indigenous groups the author shows that the Navajo are special because they

> exemplify the fact that disease did not afflict all populations in the same fashion or to the same degree and that to invoke disease as the cause of the universal decline of New World populations in the absence of other factors is to oversimplify (p.142).

In various Hopi and Navajo groups Kunitz searches for diversity. Using comparative methods, he focuses on indigenous culture and group health, but '...holding constant the

political, economic and physical environment and...differences in culture [between the two groups]'(p. 120). Now living on Indian reservations in Arizona and Utah, the Hopi population increased from 2,500 in the mid-nineteenth century to 3,000 in 1930. (Kunitz re-employs this feature when observing the resurgence of the Queensland Aborigines from the 1820s to 1950s.) No movement off the reservations occurred until after World War II, and 6,601 Hopi Indians were counted in the United States census of 1980 (p.127). By 1990, 7,061 Indians were enumerated on the Hopi land. The author declares that

> despite the difficulties of enumeration and definition, the pattern of population growth over... 150 years is reasonably clear: stagnation and even decline through the second half of the 19th century followed by a fivefold increase from about 1900 to 1990 (p.127).

Kunitz dismisses fertility decline as both a route to nineteenth century stagnation and the cause for population decline (p. 142).

The Navajo, Kunitz explains, have a different past from the Hopi. For example, in the late nineteenth century, an estimated 10,000 Navajo remained free. In 1930, the population had doubled and by 1960 had further increased to 90,000. In 1990 the total was 215,000, showing that they differed in their demographic history from all other Indian groups; there is no evidence that the Navajo ever suffered the population decline of other Indians. The reasons include stable food supplies, early cessation of hostilities from other Americans, geographical dispersion and, finally, social stability related to their return to homelands as early as the 1860s (Johnston 1966, cited in Kunitz, p. 129). This form of diversity can be shown in other aspects of Hopi and Navajo social structures over time.

The Navajo and Hopi exhibit different patterns of fertility, morbidity and chronic disease. For example, the Navajo increased tenfold while the Hopi increased fivefold in the past century. In addition, although Hopi fertility in the nineteenth century was higher, child-survival rates were lower: infertility and subfertility can be dismissed as a factor in population decline (p.132). Similarly these two groups were affected differently by epidemics, at least in the late nineteenth century (pp. 132-134, Tables 5-3 and 5-4).

Moreover, differences in habits associated with human waste and hygiene practices meant that

> Different living conditions accounted for the differences in mortality from both epidemic and endemic infectious diseases...patterns of child mortality and fertility varied in ways...associated with ecological adaptations ...
>
> The fertility differences do not accord with the high levels of sterility suggested as being among the major determinants of population decline, for the population that was declining had a higher fertility rate than the one that was increasing (pp.134-135).

Cultural factors, old and modern, influenced fertility. Traditional contraception was not a factor in itself, but with modern contraception, and the number of mothers reaching higher levels of school, effected fertility decline, in particular after the Second World War.

Following the Second World War, mortality declined markedly in Hopi and Navajo groups, so that '...noninfectious and man-made conditions... [came] to dominate the epidemiological regimes of each population' (pp. 136-137). In addition, infant mortality dropped dramatically. For example, the Hopi infant mortality rate had declined significantly to 11.4 per 1,000 live births by 1968-69 and the Navajo rate was 31.5 per 1,000 live births.

At the same time accidents accounted for half of all deaths in each population, perhaps half of these being motor vehicle related. And liver diseases caused by alcohol consumption played an important role. Kunitz discusses the complications of cirrhosis and epilepsy by alcohol addiction (pp.137 - 141). The Hopi and the Navajo themselves present different ideological explanations for these chronic conditions.

According to Kunitz, this is where cultural factors that influence disease ideologies take on a life of their own:

> The contrasting historical and contemporary experiences of these two neighboring peoples therefore indicate that in regard to both acute infectious diseases and chronic diseases, the concept of 'natural history of disease' may be misleading. The epidemiology of acute infectious diseases, whether epidemic or endemic, and chronic diseases, whether infectious (tuberculosis) or noninfectious (epilepsy) all are shaped in important...ways by the social context in which they occur. It is only by understanding this context that one can understand morbidity and mortality in their full complexity (pp. 143-144).

I now turn to the Pacific to see whether, in the face of European contact, epidemiologic and demographic structures influenced Polynesian peoples as they did the Hopi and Navajo.

There is little doubt that European contact had some immediate impact on the population, but there is evidence that the population decline was under way before European contact. In any event,

> For more than a century there has been a conviction that the peoples of the Pacific have experienced major losses at least since the time of first European contact [or] ...even before contact...Explanations have varied. Epidemics introduced into virgin-soil populations by European explorers and colonists are common to virtually all of them. Declining fertility as a result of declining...[social morale due to] disruption of traditional social organization and culture, or as a result of venereal diseases...(p.44).

Here the author covers the contradictions inherent in the historic models of traditionalism and modernism (such as the Mead and Freeman debate); the different experiences of the Maoris and native Hawaiians which affected mortality and, finally, the differences in social and economic arrangements leading to similar health outcomes.

Similarly, Kunitz combines Tongan, Samoan, Maori, Hawaiian, Tahitian and Marquesan population trends as a way of comparing total populations over time. The demographic trends indicate that population decline was not universal. There is wide agreement that the large decline in the Hawaiian population took place after 1780. The estimates are disputable, the contact population being placed somewhere between 250,000 and 1 million. Kunitz errs on the side of conservatism and prefers the lower figure. Whereas warfare, epidemics, and subfecundity due to venereal diseases are blamed for the decline of populations, he asks how the demographic patterns from 1790 to the 1980s can best be explained and favours an explanation that earlier population declines are not supported by evidence. ‘ The Hawaiian, Maori, and Marquesan populations dropped , and the Samoan, Tongan, and Tahitian populations stagnated but did not fall substantially if at all’ (p.49).

Further distinctions are that the European and American settlers ‘dispossessed and demographically overwhelmed’ the indigenes of both Hawaii and New Zealand, while Samoa, Tonga and Tahiti were colonial outposts only, with larger indigenous than European

populations (p.49). Settler capitalism[1] epitomized New Zealand and Hawaiian settlements, which began as garrison outposts of Europe. Also, neither had a dependable product with which to exploit indigenous labour. Incidentally, these two indigenous groups found it impossible to prevent settlement occurring, for with the settlers came pastoralism followed by power over land and an administration that protected the new *status quo*. Prosperity for both settlers and their administration was greater than expected and was supported by a market based in Europe. In additions, plantations and sheep grazing standardized production with imperial control dominated by class structures, and production that engendered dependence on imperialism. And, finally, they both expanded their colonies to cash cropping and agriculture, thereby creating new forms of peasantry (pp. 49-50).

Migration of Europeans and Asians triggered a catastrophic population decline by introducing exotic diseases such as influenza, measles and tuberculosis, and creating new epidemic infectious pools where none previously existed. These two models combined to change social conditions that affected Polynesian population and, coupled with the loss of land, directly affected women's fertility and fecundity. What were the consequences of these historical population and health patterns for traditional and modern life?

Kunitz rejects, to some degree, the Toennies sociological model which explains the transformation from *Gemeinschaft*, typified by face-to-face relationships, to *Gesellschaft* or impersonal mass society, typified by bureaucracy, standardization and mass political structures (Nisbet 1967; Grew 1977). He is concerned that the indigenous island groups he deals with suffer from the problem that the model presented does not account for the lack of transformation. For example,

> The problem is that the communities that are said to be traditional do in fact depend heavily on subsistence activities similar to those practiced in past times, but the whole context in which these activities occur is so changed that to describe the villages as traditional may be misleading (p.56.).

These perspectives, he declares, are underpinned by social evolutionist assumptions.

The difficulty of using the dialectical model of modern and traditional occurs because '... what we may be seeing instead is two different patterns of adaptation to two different forms of colonialism and social and economic change'(p.61). Kunitz then looks at what he calls 'distinctions in the Fourth World' where he highlights sub-differences between Hawaiians, Maori and other Polynesian experiences with settler capitalists, health and emergent dependence resulting from incorporation into the 'Welfare State'. In concluding, he focuses on theories of biological, social and economic determinism.

In doing so, Kunitz rejects William McNeill's claim that '...the impact of European contact on the peoples of the Americas and Oceania was uniformly cataclysmic in regard to population size' (pp.72-73). Similarly, he points out the unreasonableness of leading his readers to conclude that contact with Europeans did not lead to widespread population decline (p. 73). He then turns to an analysis of 'settler capitalism' in Australia and its impact on indigenous health in three periods, 1820 to 1900, 1900 to 1967 and finally, from 1967 to 1989.

Abandoning the comparative model, Kunitz maintains his particularism toward Aborigines in Queensland (pp. 82-120). He investigates first, the idea that it was not disease acting alone that reduced the population but conscious genocide, destruction of indigenous mainlanders' habitats, starvation as well as disease; and secondly, that life expectancy and health failed to follow Amerindian and Maori trends because of Australian colonies'

[1] For the term 'settler capitalism' Kunitz acknowledges Denoon 1983: 217-224.

monopoly over the lives of Aborigines. After 1901 the member states of the federation maintained that monopoly. Kunitz provides evidence of environmental destruction and genocide caused by starvation and introduced diseases (pp. 82-114).

This is an important book because it brings indigenous people into the debate about colonialism, imperialism and historiography. In this regard Kunitz opts for a perspective from which indigenous people are seen as more self-contained than in other models or previous sociological accounts. He attempts to explain, through the examples of health, what happened to indigenous people as Europeans came to dominate their worlds; and he rejects large models which, he argues, fail to account in a standardized way for the differences in culture and geography that safeguarded populations against epidemics and decline. There are problems in the way in which the author has rejected certain established paradigms that have previously been used to explain social processes. Nevertheless, this should provide for lively exchanges between scholars who, in the Kuhnian sense, maintain them as the accepted paradigms (Kuhn 1970). The book has scholarly footnotes, appendices and an index; it would be ideal as a university text for students studying history, anthropology, demography or epidemiology.

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Health Care for the Poor and Uninsured: Strategies that Work. Edited by P.Tate and Kevin Kavanagh. Binghamton, NY: The Haworth Press, 1992. 98pp. Hardcover US$24.95.

Health Policy and the Disadvantaged. Edited by Lawrence D. Brown. Durham: Duke University Press, 1991. 212pp. Paperback US$12.95.

Health Care for the Poor and Uninsured is based on papers prepared for the Second Annual Conference on Health Care for the Poor and Uninsured in the United States and originally published in the J*ournal of Health and Social Policy*, Volume 3, Number 4. It is a very slim monograph but, nonetheless, an important one which focuses on the promotion, co-ordination, and financing of health care services for poor and uninsured people. It provides information on strategies and programs that really work, and describes techniques to promote access to health services, innovative approaches to public-private collaboration in the delivery of services, financial strategies of health maintenance organizations, and the formation of foundations to fund health-care delivery. The concentration is primarily on successful programs for pregnant women, infants, and children.

This is a successful monograph on many levels. However, the one that appeals to me most is its open and frank discussion of the lessons learnt from programs and strategies developed to alleviate somewhat the problems of health care accessibility and affordability. This is refreshing and makes a significant contribution both to the literature and to current debate on those issues in the United States, as opposed to simply providing further diagnoses of the problem of the lack of health care for the poor and uninsured.

Some of the topics addressed in the monograph include the effective use of nurse-practitioners and midwives to provide prenatal care, referral systems which promote the co-ordination of public and private-sector service delivery, hospital financial support of State screening programs, aggressive outreach programs to reach special populations, factors influencing family selection of a health care provider, new approaches to funding long-term care, and the use of outreach clinics and a co-ordinated referral system.

This is a solid monograph and I highly recommend it as required reading to all policy-makers and professionals interested in developing effective programs to help alleviate the health-care problems in the United States, particularly by implementing strategies for delivery of health care services to the poor and uninsured.

The text of *Health Policy and the Disadvantaged* was originally published in a slightly different form as Volume 15, Number 2 of the *Journal of Health Politics, Policy and Law*. The text is a series of essays on the soft underbelly of the American health system, the treatment of that country's disadvantaged. These essays examine public responses to health crises and they attempt to chart the immobility of United States health policy in the recent past and point to its disastrous consequences for the 1990s. The essays focus on particular needs of some of the disadvantaged groups in American society: the elderly, children, people with AIDS, the mentally ill, the chemically dependent, the homeless, the hungry and the medically uninsured.

Taken as a whole the book boldly points out the serious problems related to health care for the disadvantaged in American society and the inadequacies of the American health care system that contribute to a continuously worsening situation in the delivery of health care to disadvantaged groups. It is a depressing story, but nonetheless a compelling one that provides, in a single place, solid analyses of the direct correlation between low socio-economic status and lack of political influence on the one hand and health care access on the other.

This book is essential reading for all parties interested and concerned about health care delivery and policy in the United States, particularly as it relates to the disadvantaged. Perhaps the only shortcoming of the text is its lack of specific recognition of the issue of race, although race is indeed the hidden story in the text. However, some attempt is made to deal with this shortcoming through the book's epilogue which states, among other things, that:

> In every chapter, the data create the same portrait: there is deprivation in many quarters, but 'minorities' suffer a disproportionate share. Here is a potent

> American dilemma which is often obscured (as it is here) by the functional categories of our policy discourse. Whether the topic is poverty among the aged, the risk of homelessness among children, the incidence of drug abuse, or the raw statistical probability of ending up in jail (now approaching 3 percent for males), the portrait of black America that leaks out of collections such as this is extraordinarily grim (p. 194).

This accurately captures both the book's contents and the issues related to health policy and the disadvantaged in American society.

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Knowledge, Power and Practice: The Anthropology of Medicine in Everyday Life. Edited by Shirley Lindenbaum and Margaret Lock. Berkeley: University of California Press, 1993. xv + 428pp., plates, index. [awaiting price info from publishers.]

This book of essays is edited by two anthropologists whose writings have made a major contribution to integrating the subdisciplinary area of 'medical anthropology' with theoretical developments in the discipline as a whole. *Knowledge, Power and Practice* is based on papers presented at a 1988 symposium sponsored by the Wenner-Gren Foundation for Anthropological Research, the aims of which were to evaluate the development of medical anthropology and to explore the possibilities of using health-related research to link 'three domains of anthropological inquiry which are often treated separately: human biology, the cultural construction of knowledge, and relations of power' (p.ix). In their preface, the editors suggest that medical anthropology has not fulfilled its theoretical promise because practitioners have been uncritically wedded to biomedical categories of thought. This volume endeavours to define medical anthropology in a way that places it in the mainstream of contemporary social science and cultural studies. Thus the subject matter of medical anthropology is restated as 'a study of the creation, representation, legitimization, and application of knowledge about the body in both health and illness' (p.x).

The book is organized in five parts which encompass this scope of interest. In the first part, 'The Cultural Construction of Childbirth', cultural constructionist approaches are broadened to include discussion of contested notions of risk in childbirth and of the power relations in which childbirth practices are embedded. The papers focus on Northern Indian village midwives (Jeffery and Jeffery), isolated Inuit communities in the Canadian Northwest (Kaufert and O'Neil) and a New York prenatal diagnosis laboratory (Rapp).

Part 2 is an exploration of 'The Production of Medical Knowledge', with papers that well exemplify the power of ethnographic methodology to penetrate the micro-worlds of medical school (Good and Good), post-traumatic stress disorder clinic (Young) and emergency psychiatric unit (Rhodes), and engage with knowledge production as practical understanding in these 'fields of power' (p.80).

In Part 3, 'Contested Knowledge and Modes of Understanding', the emergent themes of difference and contestation in medical knowledge become a primary focus. In two papers which substantively deal with widely differing contexts of action, psychiatrist as expert witness, and researcher in a New Guinea village, the physician-anthropologists Fabrega and Lewis discuss the contradictions of medical objectivizing and cultural relativizing engendered

by their different sets of professional practices. The chapter by Frankenberg throws another light on these contradictions by reflecting on the differences between epidemiological and anthropological approaches to health and illness, and the possibility of a common ground between them. Pearce's chapter, which could have more effectively concluded this section than begun it, provides a foil to the 'difference and contestation' scenario by describing the Yoruba (Nigeria) situation where lay medical knowledge is creatively reworked through networks and groups which may at various junctures include specialists who do not have radically different frameworks of understanding from their clients (p.157).

Certain theoretical traditions in medical anthropology have long been concerned with the experience of illness in relation to medical categories, and the two papers which constitute Part 4, 'Constructing the Illness Experience', take up this problem with quite different material. Estroff argues for the 'fusion of identity with diagnosis' (p.245) that constitutes chronicity, and the implications for the social identity of the patient when intersecting with institutional health and welfare arrangements. Briceno-Leon describes a community-based intervention for Chagas disease that is based on residents' understanding of their problems rather than disease categories.

The last part of the book, 'Body Politics - Past and Present' provides the most thorough engagement with post-modernist thought, which surprisingly is somewhat neglected in earlier chapters. The essays on colonial medicine in nineteenth-century South Africa (Comaroff), ideologies of the menopause in North America and Japan (Lock), and recent scientific discourses about body, self and the immune system (Haraway), all provide compelling arguments for ways in which the body is contested in medical practice, as well as for the cultural construction of the 'biological facticity' of the body.

While there is some unevenness in the various authors' execution of their original brief to theoretically integrate biology, culture and power, this is only to be expected in a volume of this type. All the papers are interesting and of high quality, and the volume is well edited with succinct introductions to each section. The extent to which some of the papers were able to bring an anthropological understanding to biological knowledge was impressive. As the editors point out, this proved the most difficult achievement for the authors (p.303), a not uncommon problem in medical anthropology generally. The discussion of power relations from various theoretical perspectives was another significant contribution, redressing the inadequacies of much of the earlier work in this field. This volume fulfils its aim of furthering research on health, illness and the body which is at the forefront of critical thought in the discipline of anthropology.

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Sexual Behaviour and Networking: Anthropological and Socio-Cultural Studies on the Transmission of HIV. Edited by Tim Dyson. Li• ge: Derouaux-Ordina, 1992. 385pp. Paperback US$70.00

A reviewer concerned with the policy implications of social science research on sexual behaviour inevitably views a collection of papers by demographers and anthropologists with priorities and biases different from those of the authors' disciplinary peers. Thus, where demographers are particularly concerned with numbers of sexual partners and anthropologists with the cultural shaping of sexual behaviour, someone asking about the policy significance of their work may come armed with a critique based on other concerns.

The 18 papers published here are a selection of those presented to a seminar in November 1990 organized by the Committee on Anthropological Demography of the International Union for the Scientific Study of Population. This was apparently the first gathering of demographers concerned with the study of sexual behaviour related to HIV, though it was merely one of many on the same subject which have brought together anthropologists (e.g., those edited by Ralph Bolton and by Gil Herdt and Shirley Lindenbaum) and wider groups of social scientists (e.g., the series edited by Peter Aggleton).

The papers vary widely in their focus. One deals with epidemic modelling and another with historical comparisons of stigma attaching to previous epidemics of STDs. Three are broad 'situation reports' on India, Sudan and Uganda. The other 15 are concerned with varying mixes of quantitative and qualitative data on sexual networking, ranging from shallow KABP surveys to studies with considerable ethnographic, historical or analytical depth.

Tim Dyson's introduction provides brief summaries of the papers and draws out five common points. He argues the need for 'broad country situation assessment studies', but those presented here are based on generalizations and assumptions which offer only a very superficial foundation for policy prescriptions. Second, he signals the presence of significant methodological contributions in the quantitative material, but these are not specified. Third, he states the need for marrying quantitative and qualitative approaches, and fourth, the need for focusing on communities as well as individuals. Finally he notes the tendency to increased linkages between research and policy and program development.

Dyson also discerns in several of the papers evidence of a global trend in the last 40 years towards greater coital frequency and more lifetime sexual partners, and speculates on the impact of increased human mobility, urbanization, the decline of customary restraints and 'the rapid and sustained communication of new ideas on what constitutes acceptable patterns of sexual behaviour'. All of these speculations deserve further attention.

Roy Anderson's paper sets out a model of the transmission dynamics of STDs with an assertion of the responsibility of social scientists to gather quantitative behavioural data to fit the models of epidemiologists. In relation to HIV, epidemiologists have made signal contributions to understanding the history of transmission, but have not provided useful guidelines for anticipating future developments. Some of the assumptions built into Anderson's model, about the static nature of sexual behaviour within any given population and the 'extremes' within which behaviour might vary, raise doubts whether social research is best guided by epidemiologists.

Many of the other papers by demographers are largely concerned with quantitative presentations of sexual networking, defined by I.O. Orubuloye and Jack and Pat Caldwell as 'the number of different sexual partners of each individual'. Where, as in their paper, there is a historical dimension available, there is evidence of the rapid change in behaviour in recent years which is only surmised in other studies. Where there is merely counting of behavioural instances without an underlying body of theorized cultural and historical understanding, as in the WHO/GPA surveys, there is little useful information and only paltry conclusions to be drawn despite a very considerable investment of resources.

Those studies which are informed by substantial ethnographic research are of greater interest since they invoke the cultural contexts within which sexual activity takes place, and the changing meanings of sexual relations. Here the papers on homosexual men in urban Brazil (Parker) and Chicago (Herdt and Boxer) are particularly informative, because of the cultural analysis on which they are based and their awareness of policy implications. They also have the advantage of drawing on a theoretically informed discourse which has developed among social scientists concerned with both homosexuality and HIV. These are presented in the publications of the annual conferences on Social Aspects of AIDS in London

and the widely circulated monographs of the Social Aspects of the Prevention of AIDS project and its successors at Macquarie University in Sydney, which have set new standards for research into sexual behaviour, standards now being applied in the later series of WHO/GPA studies being co-ordinated by Aggleton.

The broad approach taken by some anthropologists concerning sexual transmission of HIV is best represented in this collection by Brooke Grundfest Schoepf, who reports on the work of a team of medical anthropologists, CONAISSIDA, in examining the sociocultural, economic, political and cognitive aspects of gender and sexual relations in two cities in Zaire. Her review of the literature on sex in Africa provides a lucid critique of the predominant single-discipline approaches and the superficiality of many assumptions and inferences. Her discussion of the complex meanings of commoditized sex in Zaire is particularly useful in displaying the limitations of simple quantitative surveys of 'prostitutes' in African cities. Her paper, placed at the end of this collection, may provide an appropriate introduction to the next generation of studies sponsored by WHO/GPA and reported by IUSSP's Committee on Demographic Anthropology.

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Caring for Health: History and Diversity. Edited by Charles Webster. Buckingham: Open University Press, revised edition, 1993. iii + 224 pp. Paperback A$39.95.

This collection of essays forms the sixth book in a set of eight serving an Open University course on the history of health and ill-health. It covers the period 1500 to the 1990s, with about three-fifths of the contents weighted towards the twentieth century. English experience predominates, but there are useful discussions of health problems in central Africa and India.

The essays are contributed by experts in their fields: the information and interpretations are crisply presented and up-to-date. The coverage is remarkably extensive, given the small size of the volume: voluntary hospitals, domestic treatments, sickness insurance, pharmacy, infant mortality, smallpox, salmonella. Only two issues seem to be underplayed: one is the role of basic demographic factors, particularly in the chapter on the Industrial Revolution; and occasionally authors have yielded to the weight of evidence and say more about doctors and sanitary officials than about patients.

Readers of this journal will be struck by the many contrasts the authors note between health policies in different nations over time. The tables in Chapter 9 are especially instructive; not least that at page 179 showing Australia way above its OECD partners in the proportions of appendicectomies performed in 1980.

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Gender, Sickness, and Healing in Rural Egypt: Ethnography in Historical Context. By Soheir A. Morsy. Boulder: Westview Press, 1993. xiv+237pp. Hardcover US $49.50.

In terms of this journal, this book is both exciting and frustrating. Its interest derives from its thorough exploration of traditional interpretations of health and illness in rural Egypt and its demonstration that these explanations are still believed by most people. Clearly, they must militate against the effective use of modern medicine.

The frustration comes from Soheir Morsy's failure to devote much attention to modern medicine. There is a brief mention of modern private doctors and a government clinic in a large village only three kilometres away, and nothing more until modern medical services are briefly discussed on pp. 173-176. Yet the Egyptian infant mortality rate has dropped from 200 to 65 per thousand births over the last 40 years while expectation of life at birth has climbed from 42 years to 59 years. It might be assumed that modern medical services (called 'cosmopolitan medicine' in the book) had something to do with it. Indeed, we are suddenly told on p. 176 that modern medical services are the first choice, following home treatment, in three-quarters of the cases of sickness. The villagers choose it because they believe that it is the most effective and they manage to reconcile the way they think it works with their old belief system. One would like to know if these ancient explanations for disease slowed down the seeking of treatment or made its use less effective. If Morsy's villagers had fully concurred with the biomedical explanation of disease and sought modern medical treatment at once, would they now have a life expectancy ten years greater, and half the mortality rate? The vaccination of children is apparently almost universal, but the explanation for its acceptance is inadequate.

The treatment of traditional health beliefs and behaviour is extremely good and entertaining. Of particular interest is how ancient beliefs were said to have support from the Koran, and how 1,400 years later they were similarly reconciled with the modern world. The treatment of gender is particularly good, and there are fascinating accounts of how the powerless improve their position by becoming possessed by certain forms of ill-health. A contemporary parallel to this is women rejecting the national family-planning program by forgetting to take the pill, for they know that the only way they can establish a nucleus of power is through motherhood. Interestingly, both the circumcision of boys and the clitoridectomy of girls is referred to in Arabic as 'purification'. Although the author refers to clitoridectomy as a way of controlling female sexuality, it is not clear from her own evidence that this is quite the way the villagers see it.

Egyptian females are certainly disadvantaged. The author attempts to provide quantitative proofs of this by demonstrating an infant mortality rate for females 18 per cent above that of males. This is achieved by showing that during the year eleven more girl infants died than boy infants, but the proof depends on our acceptance that 48 fewer boys were born during the year than girls. One wonders whether there was greater shame in admitting the birth of a baby whom they failed to keep alive in the case of males. For anyone who has carried out field work in Sub-Saharan Africa and south Asia, there are haunting similarities in explanations of ill-health, even in such specific matters as the 'evil eye'. One is left wondering whether such explanations are the obvious ones in a non-scientific culture, or whether there was an ancient system of beliefs that encompassed much of the Old World.

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Reaching Health for All. By Jon Rohde, Meera Chatterjee and David Morley. Delhi: Oxford University Press, 1993. xv + 524pp. Paperback 150 Rupees

This is a fascinating book which should be compulsory reading for everyone engaged in the effort to reduce Third World mortality levels. It is written with an identification with the kind of health activities which are likely to be most effective in reducing mortality levels in poor countries, namely grass-roots-level, free or cheap, community-based and democratic health services often described as primary health care. It is edited by three of the great figures in the field: Jon Rohde of UNICEF, known for his work in Bangladesh, Indonesia, Haiti and India; Meera Chatterjee with her interests in women and health in India; and David Morley, with a long subsequent career, but remembered in Nigeria and elsewhere for his under-seven child health clinics in Ilesha. They are joined by 25 other authors who form the backbone of the attempt to achieve good health for all by 2000 or whenever. The book is full of prescriptions for what will probably work, and honest, ruthless analyses of why they did not work better.

Yet, for a social scientist and an editor of this journal devoted to examining the social and behavioural contribution to health, the book is fascinating too for its assumptions and omissions. It is written, perhaps understandably in view of an authorship which is almost entirely medical, from a medical viewpoint. Good health is to be attained by better medical, hygiene and sanitation programs, usually designed elsewhere even if the collaboration of the community is earnestly sought. The approach is largely top-down, even if disguised by the fist being in a kindly, caring and co-operating glove. Cultures are not treated as being significantly different. Traditional medicine is rarely mentioned. The kind of thing dealt with in *Health Transition Review* and in the Forum in this issue does not appear. Little appears about individuals' behaviour, motivation and health philosophy, and nothing on the locus of responsibility, even if there is much about co-operation, collaboration and the galvanizing of community effort. Education is treated as children's right but usually not as something that will produce a different sort of adult with major implications for the health — even in the absence of health services — of themselves and their children. Cultural change is rarely seen as going beyond participating in health provision, digging wells and disposing of waste and not as a process — for good or ill — of Westernizing the world. Some of the more radical authors deal with change or desired change, but their interests are confined largely to the revolutionary political changes that will share wealth and opportunity. The major theme of the book, and not one to be undervalued, is how to have the people with us rather than against us or indifferent.

For the health transitionist, the most interesting part of the book is the first section, a quarter of the book, on community health and development. Anthony Klouda, drawing on his experience in Tanzania and Malawi, maintains in the first chapter that 'Prevention is still more costly than cure'. This may well be so, but prevention in his terms is removing the risk-creating conditions of poverty, landlessness and unemployment. These are ultimate aims to which most of us could subscribe, but he has no half-way house and offers an analysis which would have forbidden Sri Lanka or Kerala to achieve the low mortality they now enjoy. Being a humane person, he points out that growth surveillance programs embarrass families by singling out those who have children with unsatisfactory growth (pp. 17-18), but little attention is given to the fact that this embarrassment may be the key factor in reversing the situation. Admittedly, the author later argues that it is usually impossible to reverse the situation, because the family is so poor that the extra food cannot be afforded or the mother cannot spend time at home with the children, and hence the programs are useless (pp. 24-26).

Many of the self-help community projects concentrate on matters that produce better environments. Mary Johnson's chapter on Indonesia is of a directed-democracy program

typical of that country, although in this case the work of a non-government organization which encouraged 'self-introspection'. Toilets were dug, fences erected, fruit trees planted and roofs repaired. At least from the author's — and the reviewer's — perspective the village became a pleasanter place to live in and probably a healthier one. One wishes that figures would substantiate the last assumption. Patricia Nickson's description of community development in Zaire is not dissimilar.

Edgar Mohs's record of Costa Rica's achievements over the last 80 years is accompanied by figures. Costa Rica's achievements in education, economic development and health have been impressive. It is difficult to disentangle these three elements, but clearly a democratic efficient health system has been an essential part, but so, as he points out, has been social development which he identifies with peace and democratic stability and programs of social aids (p. 385), but which may well have had increasing education levels as its most health-effective force.

A fascinating bonus, only partly linked to the main theme, is Alfred Sommer's account of the battle against professional conservatism and the bureaucratic timidity of WHO, reluctant to bring recognition for the research showing the full role played by vitamin A and hence the possibility of intervention programs where many suffered from its deficiency.

This is, in terms of the establishing of grass-roots, caring, effective Third World health programs, a splendid book. The authors are interested in specific programs of induced social change, but surprisingly uninterested in the broader currents of cultural and social change as we move inevitably towards a global society, and extraordinarily uninterested in the spread of schooling and its implications for health.

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The Health of Women. A Global Perspective. Edited by Marge Koblinsky, Judith Timyan and Jill Gay. Boulder: Westview Press 1993. viii+291pp. Hardcover US $49.95. Paperback US $16.95

This edited volume is the tangible outcome of a conference on women's health that was organised by the National Council for International Health in 1991. Chapters deal consecutively with health and poverty, health and women's roles, nutrition, infection, family planning, abortion, mortality, violence, mental health, access to care and quality of care. A concluding chapter discusses how to learn from women themselves. The emphasis is largely on poor countries, where women's health is worst. Many useful references are given and the subject index is comprehensive. Too many references, however, are unpublished conference papers.

The full catalogue of horrors is here laid out: dowry deaths in India; female genital mutilation in parts of Africa; unsafe abortion everywhere. Yet to conclude, as the book does, that an answer lies in (to use the current jargon) 'bottom-up' rather than 'top-down' programming, is to ignore many uncomfortable realities. Female genital mutilation, for example, is portrayed as a male plot which African women themselves have begun to organise themselves to oppose. Yet, this ignores the fact that women themselves contribute to the practice's continuation, fearing that otherwise they will not be able to marry off their daughters and granddaughters. If one asked ordinary women themselves, this is part of what they would say; and would one then decide to leave this difficult topic alone?

The weakness of the book's conclusion results in part from its structure as a compendium of behaviour or experiences that Western or Western-educated women find shocking. Thus, the short account of female circumcision appears in the chapter on violence against women, sandwiched between sections on violence against refugee women and discrimination against girl children. This mode of organization has rhetorical power, but leads nowhere but to calls for action, for further research, and for listening to the women involved. It does not enhance our understanding of the social and cultural environments that support or promote such diverse acts of 'violence'.

The collection has another basic flaw, which is that it describes a world populated only by women. Men, where they are mentioned at all, are agents; otherwise, they are largely invisible. Presumably, the logic of their omission is that the topic was the health of women, not men. Yet, there are at least three problems with ignoring men completely. The first is that, even in the poorest countries, it is getting harder to find any instances where age-specific mortality rates are higher for women than men. Women do generally live longer than men; and to counter this observation by describing the often unenviable plight of, say, the Bangladeshi widow, ignores the basic fact that she is alive and her husband is dead. Secondly, we cannot understand the world by focusing our attention on the unpleasant experiences of only half its inhabitants. Thirdly, men have a pretty tough time too. This fact is most irritatingly ignored in the first chapter whose logic seems to be that, since ill-health is an outcome of poverty, and women are commonly assessed as poorer than men, then poverty is a specifically female disease.

This ideological stance, although by no means unique to this compendium, is scientifically unhelpful. The reality is that, in many countries and even for the most abused wives and daughters, widowhood and orphanhood are likely to be catastrophes. Deploring these facts will not make them go away, nor will writing about health as though it were salient only to half the population. The end result is the sort of lobbying that now occurs in the rich countries, with interest groups declaring that breast-cancer research, for example, is poorly funded in comparison with AIDS research; or that men's health has been ignored while health centres have been established specifically for women. Such divisiveness is unproductive, and it would be a pity to export it to the Third World.

In search of solutions we need to focus not on common outcomes, as this book does, but on common causes and precursors. This we cannot do unless we try to understand why certain modes of action make sense to the principals involved. We need to study not just women but societies. A volume such as this one needed the contributions of a few more social anthropologists.

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