Is there an urban health crisis?
An investigation of the slums of Dhaka, Bangladesh

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Abstract

During the last fifty years the rapidly growing cities of the developing world have been characterised by their relatively low mortality levels in comparison to rural areas – in contrast to the situation of nineteenth century European cities. Concerns, however, have risen that this advantage no longer holds especially among the poorer sections of the urban communities. This is a particular worry as the urban population is set to become the majority population in these countries in the next few years. This paper uses data from a new survey of poorer Dhaka, Bangladesh to explore some of the factors that influence health status and health behavior. Dhaka is one of the world's most rapidly growing cities, a growth driven in large part by the influx of the very poor and those most likely to suffer from ill health and to be disadvantaged in gaining access to health services.

Introduction

In the nineteenth century, European cities, especially the new industrial cities, were characterized by mortality levels well above those of the countryside. Over the last half-century this has not been the situation in the developing world even though most of its countries have been undergoing economic transformation akin to that of the West in the past and have witnessed rural populations pouring into the cities to work in the secondary and tertiary sectors of the economy. It had begun to be taken for granted that modern public health and medical technology was so much more easily applied to the concentrated populations of Third World cities, in contrast to the scattered and much less accessible rural populations, that a new and probably long-lasting balance had been achieved whereby mortality rises persistently as the population size of the center of residence falls. This interpretation is now being challenged, especially in an important article by Brockerhoff and Brennan (1998) which examines Demographic and Health Survey data for urban populations by size class covering, during the 1980s and 1990s, 43 developing countries or 63 percent of the urban population of the developing world outside China and India. Employing infant mortality as their criterion, they concluded that "the highly favorable living conditions of big-city residents, as compared with persons residing in smaller localities, have narrowed considerably in several developing regions since the 1970s" (p. 99). Furthermore, in all these regions except Asia, "levels of early mortality... underwent a much slower decline in cities of one million or more residents than in towns and villages" (p. 99).

This paper reports an investigation of the determinants of health in the slums of Dhaka, Bangladesh, to discover the problems that beset big cities in developing countries, especially among their more vulnerable populations. It does this in spite of the fact that Brockerhoff and Brennan (1998) did not discover relative health deterioration in the larger Asian cities, although they suspected that one explanation might be a less representative sample of countries for the

region (p. 90). We have several reasons for choosing Dhaka. The conditions apparent in Latin American and African cities once they experienced slower economic growth, and a resulting decline in rural-urban migration (cf. Brockerhoff 1999: 774-775), may be latent in Dhaka. Bangladesh is one of the three poorest countries in Asia (the others are Nepal and Yemen) and, outside sub-Saharan Africa, in the world (World Bank 1999: 190-191), yet Dhaka, its capital and metropolis, is projected to have reached a population of 11 million in the year 2000, making it the fifteenth-largest city in the world and the ninth largest in Asia (United Nations 1998: 142). Perhaps one-third of this population lives in abject poverty. Finally, Bangladesh has been affected by the changes in international attitudes to poverty and health, first the favoring of primary health care over high-tech medicine, and, more recently the belief that NGOs and other private services should be encouraged to shoulder a greater burden of health care. Indeed, this must be our starting point for examining the influences which have shaped the access to health services in the slums of Dhaka.

Changing interpretations of relative poverty and health service needs

In demographic literature the most instructive starting point is Gwendolyn Johnson's 1964 paper on "Health conditions in rural and urban areas of developing countries". What is perhaps most noteworthy is the poverty of relevant statistics that were available to her at that time – still a decade before the World Fertility Survey (WFS) which, together with the DHS, has transformed our knowledge base. With the data that did exist, Johnson concluded not that the health of developing-country city populations was relatively better than that of rural areas, but merely that the relative situation of urban dwellers was not so stark as it had been in Europe. Indeed, Bombay (now Mumbai) mortality which had greatly exceeded national Indian mortality in 1931/35 had by 1959/60 converged with it. Calcutta and Madras (now Chennai) still exceeded the national figure but the gap was closing. Johnson's explanation for convergence was that, although these cities were still burdened by huge poor populations, in the previous decade or so the application of public health measures had accelerated, and this had disproportionately benefited urban populations (Johnson 1964: 308).

By 1973 Kingsley Davis was confidently proclaiming that in developing countries mortality was lowest in the cities, especially when they had been the seats of government of colonial powers or were the capitals of independent countries. He suspected that mortality had been declining faster in the cities than the countryside since shortly after the First World War, clearly influenced by conclusions about colonial mortality decline drawn at Princeton University's Office of Population Research almost 20 years earlier (cf. *Milbank Memorial Fund Quarterly* 1994a, b; Caldwell and Caldwell 1986: 13-14). Davis (1973: 276) argued that "the cities of the developing countries have been the outposts of the advanced nations" and that they had consequently been given priority in the application of medical technology and public health measures. This view was applied more widely, although with scant mention of health services, three years later by Michael Lipton (1976), who maintained that "The rural sector contains most of the poverty... the urban classes have been able to 'win' most of the rounds with the countryside... the urban sector contains most of the articulateness, organization and power. Resource allocations... reflect urban priorities rather than equity or efficiency" (p. 13). Although Johnson (1964: 303-308) had emphasized the plight of the urban poor, they were

increasingly ignored in the writings of the 1970s and Lipton by this time maintained the clarity of his urban-rural contrast by barely mentioning them.

It was in this atmosphere that WHO and UNICEF organized the 1978 meeting that produced the highly influential Alma-Ata Declaration. That document stressed the need to reduce health inequalities within countries (par. 2) by giving priority in health services to those most in need (par. 7.6). It did not specify that those most in need were only in rural areas, but, given the emphases of the times, this was to be taken very much for granted in the years immediately ahead. Warren (1990: 26) points out that the conference had been preceded by great excitement about the activities of village health workers and barefoot doctors. When the conference identified the chosen mechanism for attaining good health for all by the year 2000 as "primary health care", a concept which seemed to suit village conditions much more easily than city slums, the recommendations were only too likely to be taken as urging that government health efforts should be predominantly in rural areas. This made more sense in 1978 when 72 percent of the population of the developing world lived in rural areas than it does now with the rural proportion down to 60 percent and forecast to fall below 50 percent after 2015 (United Nations 1998: 88-89).

Bangladesh followed this pattern, and the Ministry of Health became largely identified with rural programs, leaving Dhaka and other cities to the private health sector assisted by some government and municipal hospitals. Even before international health attention began to swing back to the cities, three international health initiatives started to mitigate the situation of the city poor in Bangladesh and elsewhere in that they called for national programs aiming at universal coverage. One was the global effort promoted by UNICEF and WHO to maximize immunization coverage with a special focus on children. Another was the creation of national family planning programs which targeted city as well as rural populations and which would eventually provide a vehicle for expanded MCH-FP programs. The third program was the attempt to make oral rehydration solution for combating childhood diarrhea available through health services and commercial outlets, the latter often aided by social marketing programs.

Nevertheless, the 1984 survey by Hobcraft *et al.* of 28 developing countries covered by the World Fertility Survey found only three small Caribbean countries where child mortality was not substantially lower in urban than rural areas. Among the remaining countries, two-thirds exhibited successive rises in mortality from metropolitan populations to other urban and finally to rural populations. One-third, including Bangladesh, were characterized by the contrast between on the one hand similar metropolitan and other urban child mortality and on the other hand higher rural mortality. It was in the context of such evidence that a renewed interest in urban health argued not that cities were underprivileged, but that their heterogeneity had been underestimated and that their slum and squatter populations lacked health services and had exceptionally high mortality.

Farah and Preston (1982), using Changing African Family Project data, had shown marked child mortality differentials by socioeconomic status in Khartoum. Pryer and Crook (1988), argued that developing-country city poor were both poorly provided with health services and often disadvantaged because in their status of recently arrived migrants from rural areas they failed to use what was available; they suffered from high unemployment levels and the fact that everything, even food and often water had to be bought in the city (Pryer and Crook: 2-6). A 1989 WHO report stated that there was an urban health crisis, partly because

the primary health approach had not really been tried in the larger urban centers (Tabibzadeh *et al.* 1989). The World Health Assembly (1993) pointed out to WHO that "there had been an almost exclusive preoccupation with the problems of health in rural areas..." (p. 1) in spite of the fact that "In developing countries, slum and squatter communities make up anything from one-third to half, or more, of a city's population". The new attitudes spread. By 1995 Mutatkar was distinguishing in cities the two ends of Omran's (1971) epidemiologic transition: the rich sectors where deaths are mostly in old age and from degenerative diseases and the poor sectors where many deaths are premature and from infectious disease. In the latter life is brutish and often short because rural-urban migration establishes the conditions for poverty, crime and prostitution (p. 977). Furthermore, in many countries lack of real democracy means that slum dwellers' votes and parliamentary representation are not feared sufficiently to give them some security of tenure and access to services (p. 981). Gupta and Baghel (1999), studying slums in Calcutta and Raipur in eastern India, close to Bangladesh, report large areas of compact slums in which infant mortality rates are high compared with the non-slum parts of the city, and highest in the slums of the largest city, Calcutta, but still below the levels found in rural areas (p. 354).

Brockerhoff (1990, 1993, 1994, 1995), in a series of papers drew first on data from Senegal and then more widely from DHS to demonstrate that rural-urban migrants reduce their children's mortality by moving to the towns, even though the advantage is usually small during their first period of settling in and their children's mortality always remains higher than that of children whose parents were born in the city. But by 1998 he and Brennan had detected a trend toward the convergence of urban and rural mortality rates, with mortality in large cities sometimes being above that of smaller cities. This suggested that the poor, especially the immigrant poor, of large cities might be relatively worse off than before, possibly because of a tightening labor market. Evidence that rising unemployment among the urban poor was now sufficient to reduce rural-urban migration from previous levels and from anticipated levels was not slow in coming (Chen *et al.* 1998; Bocquier 1999; Brockerhoff 1999). Asia appeared to be less affected than Latin America or sub-Saharan Africa, probably because of higher economic growth during the 1980s and first half of the 1990s. Brockerhoff (1999: 760) showed that United Nations Third World urban population projections for the year 2000 were 223 million lower in the 1996 assessment than they had been in the 1980 assessment. Both unexpectedly steep fertility declines and an unanticipated falling off in rural-urban migration appeared to be the explanations (pp. 774-775). But Dhaka's new projection was, at just under 11 million, 13 percent or 1.25 million higher than the earlier projection. This does not, however, prevent us from using Dhaka to test most of the foregoing hypotheses, epitomized in the following questions. How bad is the health of Dhaka's poor population? What access do they have to adequate health services? Can they afford the services, and what happens when they cannot afford them?

Dhaka and its slums

Although Dhaka was the Mughal capital of Bengal from 1608 to 1704 and the colonial capital of Eastern Bengal and Assam, 1905-12, its population in 1941 was only a little over 200,000, living along the northern bank of the Buriganga River, a channel of the Ganges-Brahmaputra Delta, about 200 kilometers from the Bay of Bengal. The city's population grew after it became

the administrative center for East Pakistan with the 1947 Partition of India, and faster still from the establishment of Bangladesh in 1971. By 1974 it had reached one million inhabitants and estimates of its present size vary in the range 9-11 million. It is the primate city, being almost four times the size of Chittagong and nine times that of Khulna, of a country of 130 million people. It is the main destination for rural-urban migrants and this source of growth continues to outstrip its own natural increase, thus allowing it to sustain an annual growth rate of nearly six percent (Islam 1998: 71). Population growth has been northward from the Old Town along a slight ridge in the deltaic flats which keeps most of the city above flood level. The lower flood-prone land is mostly publicly owned, and it is here, as well as on land controlled by the Port Authority, the Department of Railways, the Department of Works and the Department of Roads and Highways, that many squatter areas are found. Others, perhaps the majority (Arifeen *et al.* 1993: 8), are on small areas of private land between modern buildings or near construction sites.

The diffusion of the slum population into large numbers of small pockets is partly caused by the geographical situation of Dhaka. Nevertheless, it is not unique to Bangladesh because similar patterns are found in Colombo, Jakarta and Hong Kong. Other Asian cities like Calcutta or Mumbai are characterized by massive contiguous poor areas as has been a common pattern in the West. Dhaka's dispersal pattern has three important consequences. First, nearly all slum dwellers are close to richer pockets of housing and to shopping centers; this means that most of the residents are within a short distance of a pharmacy and walking distance from a medical clinic or hospital. Second, because much of the land occupied by squatters is available as it is flood-prone, the poor live in insecurity and are always likely to have their few possessions or their houses damaged by inundation: a major 1991 study of slum dwellers found that in the 1988 floods, two-thirds had been flooded out of their living place (Arifeen *et al.* 1993: 9). Third, the large number of settlements all over the city makes an estimation of their number or population difficult. The 1991 study identified 2,156 slums amounting in total area to just over three square kilometers or 0.2 percent of the city's area with 718,000 inhabitants or 12 percent of Dhaka's population at that time (Arifeen *et al.* 1993: 8-9). Arifeen *et al.* assumed an undercount and suggested that the true number was around one million or one-sixth of the population. Other estimates, using other definitions of poverty, have put the slum population as high as one-third or two-and-a-half million or more (Mookherji *et al.* 1996: 4; Jamil *et al.* 1996:1 fn. 1).

The 1991 study found an astonishingly family-centered population: more than 97 percent lived in households and less than three percent in "messes", structures with a series of small rooms, each for a single person, rather like barracks or boarding houses except with no meals, furniture or bedding supplied (Arifeen *et al.*1993: 11). Of women of reproductive age, 95 percent were currently married, nearly all with husbands present; three percent divorced; and two percent widowed, this small proportion being partly explained by widows returning to their villages of origin.

There are other noteworthy characteristics of the slum population. They are overwhelmingly Muslim in religion: 96 percent in 1991 compared with at that time 88 percent in Bangladesh as a whole. The squatters are mostly rural-urban migrants: 80 percent in 1979 (Mahbub and Khatum 1996: 33). They lack amenities: in 1991 one-third had no electricity and two-thirds no gas, few have any waste disposal; the housing structure is largely mud and thatch

and living is crowded – three or more persons per room and population densities over 750 persons per hectare (Desmet *et al.* 1998: 3). There is work in Dhaka, as all rural-urban migrants aver. Nearly all men and around one-third of women want jobs and most migrants get some money-earning work within two or three days of arrival, often helped by their kinship and village-of-origin social networks (Islam 1998: 72). Many work in the informal sector of the economy, but young women are increasingly employed in the garment industry (Afsar 1994: 233; Amin *et al.* 1998) Most earnings become part of a single family budget, which averaged in 1991 Taka 1,490 per month or US$37, with 84 percent being contributed by adult men, 8 percent by adult women and 8 percent by children (Desmet *et al.* 1998:17).

Dhaka's health services have been shaped by central government activities in the field having been mainly focused on rural areas, by the market in circumstances where new ideas and ideologies stress its efficiency and in a city where nearly all families have some income, and by a range of NGOs in a country which probably leads the world in encouraging their activity. They have also been shaped by the fact that Dhaka is a commercial city where huge numbers of people attempt to sell goods and services and where people expect to pay for nearly everything.

An attempt to make an inventory of health provision in Dhaka in 1995 concluded that about one-third was provided by the commercial sector, one-third by NGOs and one-third by government, the latter subdivided again with half the government services provided by the Dhaka City Corporation, and the other half by either the central government's Directorate of Family Planning or its Directorate of Health Services (Tunon *et al.* 1997: 7). The Dhaka City Corporation provided 75 percent of immunization centers, NGOs 44 percent of dispensaries, NGOs 59 percent and the Ministry of Health and Family Welfare (MOHFW) 41 percent of MCH-FP centers. Of the hospitals, 78 percent were private (often called "clinics" in Bangladesh), 10 percent were MOHFW, 8 percent were run by NGOs (Tunon *et al.* 1997: 7-8). There are also female MCH-FP workers, mostly employed by NGOs and some by the government, who visit women in the home with contraceptive advice and supplies. They are also now supposed to advise on babies' health problems, but reportedly they rarely do so (Thawin and Jahan 1996: 24).

Urban Bangladesh has a private health sector which is, in some of its dimensions, astonishing. Dhaka has one qualified doctor (most have the MBBS degree from Bangladesh universities) for every 2,000 persons and one pharmacy for every 1,000 persons (Mookherji *et al.* 1996: 1). The concentration of doctors in Dhaka compared with a level of one doctor per 5,000 persons for the country as a whole (World Bank 1995: 214) is less because of their earning prospects in the capital than because of its other advantages, for example English-medium private schools for those of their children expected to go overseas for university education. The problem about the Bangladesh health system is not the scarcity of its doctors but, because of attitudes originating in purdah, its scarcity of nurses: its has two doctors for each nurse compared with countries like Sri Lanka or the Philippines with four nurses per doctor (World Bank 1995: 214).

The really extraordinary aspect of Dhaka (and Bangladesh) is the great number of pharmacies. How this is possible, and how the system works was revealed in a 1994 study of one district of Dhaka (Mookherji *et al.* 1996). Fewer than 40 percent of those providing services have any pharmaceutical or other health training and there is no legislation mandating the necessity for such qualifications. But 13 percent have university degrees, mostly in Arts,

and 39 percent have completed the full 12 years of schooling. Nearly all have functional spoken and reading English, and most are conversant with the instructions and warnings that come with their pharmaceutical products. Our impression from interviewing them is that most provide fairly sound advice and overmedicate to no greater extent than the physicians. Most have a curtained room behind their shops, where physicians practice during specified hours (often moonlighting from salaried positions which they leave early). Most of the poor seek free advice only from the pharmacist rather than charged-for instructions from the doctor. There is little evidence of the doctors providing further training for the pharmacists or continuing advice. Even those among the latter who have been trained have had courses with a median length of only six months. In the 1980s the Social Marketing Company (USAID funded through Johns Hopkins University) enlisted pharmacies to sell subsidized contraceptive pills, condoms and oral rehydration solution. This firm provides pharmacists with short courses on family planning and oral rehydration. The 1994 study found that 42 percent of oral contraceptives and 40 percent of condoms used in Dhaka are bought from pharmacies (Mookherji *et al.* 1996: 11). More than one-third of families seeking treatment for their children's diarrhea go first to the pharmacist. Because of restrictions on women's public activities most of these visits are made by men; even 88 percent of oral contraceptives are purchased by them (p. 13).

Thwin and Jahan (1996: 2-3) have summarized the reports on slum ill-health as mostly identifying diarrhea, respiratory tract infections, scabies, helminthiasis, fever, typhoid, whooping cough and eye diseases, many having an environmental component. Treatment varies according to gender. For persistent illnesses, Ahsan and Ahmad (1991: 17) found that doctors were eventually consulted by 60 percent of males and 22 percent of females. Uzma *et al.* (1994: 316-317), revisiting women six weeks after they had given birth, found that 79 percent had been persistently sick. They report of the sick women that 29 percent had sought no treatment, six percent had gone only to a doctor, 23 percent had sought successively traditional treatment and then help from a doctor, and 42 percent had traditional treatment only. These figures are difficult to interpret because the researchers included among traditional practitioners unqualified pharmacists, whose provision of modern drugs must dominate this category. Hussain *et al.* (1999) examined the treatment given during sickness to Dhaka slum children who subsequently died, dividing the analysis into infants and children, 1-9 years of age. They found that around 40 percent had been at some stage before death to a modern doctor, clinic or hospital, 50 percent had been treated only by other healers (presumably mostly pharmacists), while just under 10 percent had seen no healer. Only infant girls were discriminated against; once females passed infancy they, like male infants and children, had a similar chance of receiving modern treatment, just under 50 percent. Discrimination against female infants was greatest where the family was very poor and the mother was illiterate.

The very poor, like others, can seek free treatment at public health facilities such as hospitals. Most do not do so even when a child is likely to die. The reasons are that expensive medicines are usually prescribed, the waiting time for attention is always hours and can be days, they are treated with little respect, and, when they do see a doctor, the visit can be very brief and peremptory (Fariduddin and Khan 1996: 47). On the other hand, private doctors and clinics can be expensive. Nevertheless, it has been reported that Dhaka slum dwellers do not place health expenditures low on their consumption priorities, and will stint themselves in terms of

other needed expenditure and will seek loans to meet medical costs (Thwin and Jahan 1996: x, 26).

Few blame living conditions other than lack of money for sickness. In terms of noise and air pollution this has been pointed out by Thwin and Jahan (1996: ix, 17). We found that this generalization could be extended to water quality, fecal pollution of the mud underfoot, and bathing in polluted ponds. All these conditions were regarded as unpleasant but the link with sickness was rarely made.

In contrast, the message about the need for child immunization has been heard. Around five-sixths of infants in Dhaka have BCG immunization and start DPT and polio immunization courses although less than two-thirds completed the courses. The measles coverage is about 70 percent. Levels are slightly lower for girls than boys and somewhat lower when the mothers are illiterate, but the slum dwellers do not seem to perform much below average. Among new mothers under 35 years of age in Dhaka, almost 80 percent receive at least one tetanus toxoid vaccination and around 60 percent two or more. Among illiterate mothers the levels are about ten percentage points lower, but no great gulf separates the slums from the rest of society (Mitra *et al.* 1997: 112-114, 116-120). The situation has been explored in a number of papers by Perry *et al.* (1996, 1998a, 1986b). Almost all children are immunized in government or NGO clinics or health centers, but six percent of slum mothers and 21 percent of non-slum mothers receive tetanus toxoid from private doctors or clinics. The most marked difference between Dhaka's slum and non-slum population is in ensuring the full course for all children's immunizations: only 42 percent as many slum as non-slum families achieve this (Perry *et al.* 1998b: 568). We found a smaller gap, possibly because the situation is improving or possibly because of our city-wide slum sample.

Bangladesh's most conspicuous health failure is in the area of pregnancy and birth. Only 4.1 percent of births in the whole country but 23 percent in urban areas take place in a health facility. The proportion falls to 1.2 percent among illiterate women. Only 8.0 percent of all births but 24 percent of those in urban areas are attended by a doctor, nurse or trained midwife (Mitra *et al.* 1997: 114-115). In the slums, as elsewhere, most of the rest are delivered by the old women who are the traditional midwives, but one-fifth are delivered by relatives (most commonly the mother's mother) and friends, while a small number are delivered by the mother herself (Hoque and Selwyn 1996: 50). Almost 70 percent had received no antenatal care at all. Probably half the rural-urban migrant women in the slums return to their female relatives in their villages of origin to give birth. Thwin and Jahan (1996: 25) concluded that slum women do not regard antenatal check-ups or specialized birth care as very important. That conclusion may underestimate the shortage of alternatives and the costs involved. Nahar and Costello (1998) studied the situation in 1995 in four government hospitals where the medical services are free. Nevertheless, the real costs for a normal delivery averaged Taka 1,275 (US$32 at that time or a month's income for poor slum families) and Taka 4,703 (US$118 or four month's income) for a Caesarian section. The major item in the costs was prescribed medicine. After the birth and when all new mothers were back in the Dhaka slums, Salway *et al.* (1996a, b) found that, in the absence of a network of female relatives who make most decisions in rural areas, this role is taken over by husbands who talk to chemists and doctors more and are much more likely to hear advertisements on radio or see them on television. They

are often convinced by advertisements for baby formulas and bring home feeding bottles and formulas they have purchased.

The 1996-1997 Demographic and Health Survey showed a national decline in infant mortality between the mid-1980s and the mid-1990s of 30 percent from 117 to 82, of child mortality ($_4q_1$) of 42 percent from 63 to 37, and of under-5 mortality ($_5q_o$) of 33 percent from 173 to 116 (Mitra *et al.* 1997: 100). In urban areas in the mid-1990s infant mortality was 73, child mortality 25, and under-five mortality 96. Life tables constructed for 1998 show Lalbargh, Dhaka and rural surveillance areas in Bangladesh with almost identical life expectancies at birth around 61 years, with females in Dhaka exceeding males by about one year (Operations Research Project 1999: 31ff.).

Dhaka, with its vast middle class and its equally vast slum population, seems more socially heterogeneous than the rural areas. Given that its affluent classes have ample access to modern medicine, and given that the selected rural population's mortality levels equal Dhaka's, a plausible hypothesis would seem to be that the city's poor have higher mortality than that of rural areas. ICDDR,B's urban surveillance system in Lalbagh, Dhaka appears to provide evidence for this. Among the 26 percent of the population with the fewest possessions (roughly the proportion found in the slums), 51 percent of all deaths under-five years of age took place, and among the 29 percent with the lowest family incomes 40 percent of under-five deaths occurred (Perry *et al.* 1997: 17). By the possessions measure, the poor have three times the child mortality that is exhibited by the rest of the community, and by the possibly less satisfactory income measure 60 percent higher mortality. These differences translate, when model life tables are applied, into about 15 years and 6 years differences in life expectancies. The contrasts are probably not as great as this because there were no mortality differentials among the population over five years of age. As 83 percent of the deaths under five years of age were to infants less than six months old, the obvious conclusion is that the slums pose great dangers to infants when first born and for the next few months. The researchers drew the conclusion that the effort to improve slum health should concentrate on "severely impoverished pregnant women and their infants, particularly during the first six months of life" (Perry *et al.* 1997: 33). Infant mortality was significantly higher by all measures of poverty (household income, number of possessions, father's occupation, and mother works for money), by mother's education, and among mothers under 20 years of age (p. 21).

The ICDDR, B expanded urban surveillance system in the slums of five thanas (districts) of Dhaka showed in 1991-92 that women with low education living in the poorest households were significantly shorter and lighter in weight and that these two anthropometric characteristics were associated with higher child mortality (Baqui *et al.* 1994: 350).

Information on mortality levels among children is better than that on causes of death. A nation-wide verbal autopsy study of deaths under five years of age in the early 1990s was satisfied as to the cause for 49 percent of deaths, and made a speculative assessment for a further 35 percent. Combining these two categories, death was attributed to acute respiratory infection (ARI) in 30 percent of cases, to early perinatal causes in 20 percent, to diarrhea and dysentery in 15 percent, to accidents in 10 percent, to both ARI and diarrhea in 8 percent, to malnutrition in 7 percent, to neonatal tetanus in 6 percent, and to measles in 3 percent (Baqui *et al.* 1997: 12). Clearly a further reduction in childhood mortality depends on success in improving obstetric and perinatal conditions and reducing diarrheal and ARI deaths, especially

among infants. The Dhaka slums may have been behind the country as a whole in the success of immunization programs: Baqui *et al.* (1993: 2) report that surveillance showed 19 percent of infant deaths in the slums still to be caused by neonatal tetanus and another five percent by measles, while 16 percent of deaths to children 1-4 years of age were attributable to measles. As the immunization programs move toward full coverage, greater attention will have to be given to the conditions of birth and to ARI and diarrhea. The latter aim is difficult because the conditions are so closely associated with the appalling environment of the poor. In the Karachi slums the factors significantly associated with childhood diarrhea were found to be unclean sewers, inappropriate water storage, and cooking inside a one-room house. ARI was associated with small and crowded houses, cooking in one-room houses, and the humidity level (D'Souza 1997).

Investigating the Dhaka slums

The 1999-2000 project, *Access to Health and Reproductive Health Services in the Dhaka Slums*, built on this body of knowledge[1]. Its aim was to use survey and anthropological-demographic approaches to ascertain whether there was a slum health crisis and its causes. Within the framework provided by survey information, families were identified where there had been health crises, whether resulting in death or not, and the circumstances and outcomes were explored. The survey was held in the last months of 1999 and the anthropological follow-up was undertaken in the first months of 2000. The survey was carried out in collaboration with Bangladesh's leading demographic survey organization, responsible for all the Demographic and Health Surveys[2]. The anthropological demography researchers were trained intensively and some of those employed were persons involved with the principal investigators in earlier work of this type[3]. They studied samples of households identified in the survey.

The surveying organization first compiled two lists of areas, covering together about one-third of the city's population. One covered the shantytowns or *bosties* (*basties* in Hindi-speaking areas of India) where the population are squatters with no rights to the land and few rights to city services. The other covered poor areas, little different in income, but where there are legal rights to residence and to city services[4]. The poor areas tend to be in older settled areas and beyond the range of floods, while the *bosties* are often flood-prone and may be in areas peripheral to the older settled areas. The interviewing unit was the household and the persons in it. This is because they make up 98 percent of the population and all the families. Separate studies were carried out of the "messes" and pavement dwellers. The sample yielded interviews with 911 *bostie* households and 914 poor households, totaling 1,828 slum households and 8,429 persons, giving an average of 4.6 persons per household. Some of the contrasts between *bosties* and poor areas are shown in Table 1. The division is not clear-cut: one poor area has changed its status from a *bostie*, by the government granting the land to the residents, who, nevertheless, retain many of their former characteristics.

Table 1
Measures of Deprivation

Slum Households, Dhaka, 1999
(percentage distributions)

Characteristic		All slums	Bosties	Poor Areas
Liable to eviction, removal[a]		29	47	11
Migrant family to Dhaka		61	72	50
House constructed of mud and bamboo:	walls	49	72	26
	floors	51	71	30
No *almirah* (wardrobe)		63	83	42
No piped water to house		49	72	26
No electricity to house		15	28	2
Not functionally literate[b]:	males 12+ years	59	74	47
	females 12+ years	67	81	55
No watch or clock		42	58	48
No radio		67	78	57
No television		68	88	49

Notes: [a] Opinion of household head of risk of removal by government or landlord.
[b] Cannot easily read and write.
Source: Access to Health and Reproductive Health Services Survey.

All the poor are deprived. Two-thirds of households do not even own a clothes cupboard, which is widely regarded as a basic necessity in Bangladesh. Almost three-fifths own nothing for telling the time. But *bostie* households are clearly worse off and this is almost certainly related to their being largely composed of rural-urban migrants. Half feel their home site is not secure. Related to this, almost three-quarters of the houses are made of temporary materials and have no piped water, and over three-quarters of the residents over 12 years of age are functionally illiterate. The great majority have no radio or television, even though a surprising proportion have some connection to the electricity supply (which is easily connected and disconnected).

The slum economy is shown in Table 2.

Table 2
Employment and Earnings, Slum Households, Dhaka, 1999

		Slum Households, Dhaka, 1999 (percentage distributions)		
		All slums	Bosties	Poor Area
Employment over 12 years of age: **Males**				
	Service[a]	23	16	28
	Business	21	17	24
	Rickshaw driving	15	25	7
	Day laboring	14	21	8
	Other paid work	15	10	20
	Student	7	3	11
	Not working	5	8	2
	Females			
	Household tasks	60	5	66
	Garment worker	14	1	10
	Day laboring	3	6	0
	Other paid work	16	21	13
	Student	7	2	11
Females working for non-family persons		28	40	18
Medium monthly incomes (in Taka/US dollars in parentheses)[b]				
Household	all males	2,400 (48)	2,200 (44)	2,600 (52
	all females	1,000 (20)	930 (19)	1,150 (23
	all persons	3,400 (68)	3,130 (63)	3,750 (75

Notes: [a] Bangladesh term meaning employment by government or private firms for specified or indefinite terms (i.e. not day labor).
[b] Both informal and formal sectors.
Source: Access to Health and Reproductive Health Services Survey.

In the *bosties* almost half of male work is rickshaw driving and day laboring on housing or other construction projects. The proportion is even higher among recently arrived rural-urban migrants. Almost two-fifths of female work is in the garment industry, allowing females to contribute almost 30 percent of the household income. The *bosti* income difficulties are at least partly solved by 40 percent of all females not only working but doing so for non-relatives, an extraordinary situation given the traditional restrictions placed on Bangladeshi women. The mean slum family income is around US$68 per month or under US$150 per capita per annum, about half the Bangladesh per capita income, at the end of 1999 (estimated by projecting incomes from World Bank 1999: 190) but higher than nearly all the immigrants were able to earn in the countryside. In the slums there is little complaint of unemployment or that they had been misled on this matter before they migrated. There is complaint of lack of money and the fact that everything has to be paid for (there are not even household vegetable plots).

Table 3 compares estimates of child mortality derived from the 1999 survey with estimates obtained from the 1996-97 Bangladesh DHS.

Table 3
Estimates of Child Mortality ($_5q_0$), Bangladesh, Late 1990s
(deaths per thousand births before 5 years of age)

Source	Population	Child mortality	Equivalent e^o_0
1999 Survey[a]	All slums	135	55
	Bosties	165	52
	Poor areas	115	58
1996-97 BDHS[b]	National	128	56
	No education (women)	145	54
	Urban	96	61
	Rural	131	56

Sources: [a] Access to Health and Reproductive Health Services Survey, 1999.
[b] Mutra *et al.* 1997: 102
[c] Coale and Demney 1968: West Model

Just over one-eighth of Bangladeshi babies die in the first five years of their lives. The child mortality level in the slums is a little above the national level and marginally above that of the rural population. The child mortality level in the slums is well above that of the urban population as a whole, underlining the extremes of living conditions in urban areas. There is a major difference between the *bosties* and the poor areas, a reflection of the different levels of deprivation recorded in Table 1. The equivalent life expectancies at birth are provided only as an index but they do suggest overall slum life expectancies similar to rural areas, but perhaps six years below the urban average and a dozen years or more below the urban elites.

Perhaps the most important question is whether child deaths are clustered among sub-groups within the slums. The high levels in the *bosties* suggest that they are. This is examined in Table 4.

Table 4
Relative Levels of Child Deaths among Disadvantaged Groups of Dhaka slums
(controlled for mother's age)

Characteristic or disadvantage	Odds Ratio of disadvantaged group's child deaths to those with less disadvantage
1. Illiteracy (females 12+ years)	1.6
2. Living in a *bostie* (instead of a poor area)	1.5
3. No radio	1.5
4. No television	1.5
5. No *almirah* (closet)	1.4
6. No table	1.4
7. No watch	1.4
8. House roof thatch or bamboo	1.4
9. Group of possessions	1.3
10. No sanitation	1.3
11. Household earnings less than Taka 3,000 (US$60) per month	1.2
12. Migrant family to Dhaka	1.2
13. Liable to eviction, removal	1.2
14. House floor mud or bamboo	1.2
15. House walls mud or bamboo	1.2
16. No piped water to house	1.1
17. No electricity in house	1.1

Source: Access to Health and Health Services Survey 1999.

Disadvantaged groups experience higher child mortality, but the differences are not enormous. This is evidence that most slum dwellers probably manage to get some assistance from health services for serious illness. The greatest disadvantage a child can face is to have an uneducated mother, a situation mirrored around the world. Poverty, poor environment, insecurity and rural-urban migration all add some danger to a child. These factors, explain the relative disadvantage of the *bosties* where 60 percent of the slum child deaths occur. The margin is not quite as great as Perry *et al.* (1997: 16) found. By a household index of possessions, Perry *et al.*, found those with the least had 88 percent higher mortality than the others; we found a level only 30 percent higher. When maternal age, maternal education and household income are all put into the model, maternal education is found to be the dominant factor in explaining child death. Indeed, among mothers under 35 years of age, household income had no separate explanatory power.

There was some evidence that girls were suffering excess mortality. Although in most societies girls suffer lower infant and child mortality than boys due to a biological advantage this is not true in South Asia. In this survey 47 percent of all child deaths under the age of five concerned girls and 53 percent boys – proportions roughly equal to their numbers at birth.

Excluding deaths in the first month where biological factors dominate girls constituted 52 percent of deaths, a slight majority.

The key question, then, is the cause of adverse health outcomes including death among the disadvantaged. In particular, why are the disadvantaged more likely to suffer illness, and, critically, why do they find it harder to obtain effective health services and harder to keep their children alive, and why do girls suffer disproportionately.

Crises in the slums

In the remainder of this paper we will explore these issues by looking at reported illness, examining how families seek health care for themselves and their children, and in particular what they did in the treatment of children who subsequently died. We will also look at immunisation rates.

Household heads were asked whether a member of the household had suffered from an illness in the previous two weeks. Sixty-one per cent responded that one or more had. In 32% per cent of cases the sufferer was the household head, in 21% the spouse, in 40% a son or daughter, and in the remaining 7% another household member. There were no significant differences by socioeconomic characteristic of the household head (bostie dweller 61%, poor area 61%; some schooling 61%, no schooling 61%), but in part this reflects a smaller household size in bosties which have on average 4.4 members as compared to poor area households with 4.9 members. This results from the small size of bostie housing and their impermanency as well as a lager proportion of young families and a high proportion of migrant households who have left family members behind in the villages. Nevertheless, even controlling for this, the differences were minor, for example 27% of bostie household heads had suffered an illness in the two weeks as against 24% of poor area household heads.

Key child illnesses: respiratory illness and diarrhea

When mothers with young children were asked about coughs and diarrhea more marked socioeconomic differentials showed up. Forty-one per cent of under five children were reported to have been ill with a cough in the previous two months. Sixteen percent (38% of those with coughs) were reported to be suffering from short rapid breaths. The likelihood of a child suffering from a cough was most strongly affected by locality with weaker effects by literacy and household earnings. Forty-four percent of children in bosties were reported as having had a cough in the previous two months as compared to 37% in poor areas; 44 percent of children of illiterate mothers as compared to 40 percent for children with literate mothers. Forty-four percent of children in households earning less than 3,000 taka had experienced a cough as against 39 % in households earning 3,000 taka or more. The locality effect presumably reflects the crowdedness of bosties and their general poor environment as well as poor housing conditions. However, when coughs were restricted to ones that had fast breathing accompanied by short rapid breaths and, controlling for age of child, a statistically significant relationship was found only with mother's literacy (illiterate mother – 18 %; literate mother – 12 %) and mother's number of births. The association with literacy may indicate that such mothers seek appropriate treatment for a cough before more serious symptoms develop.

Eighteen percent of children were reported to have had diarrhea in the previous two months. The toilet facility available to the household in contrast had only a weak effect (no

facility/ open latrine 19%; modern or pit latrine 18%). This, however, was because in many cases the 'household' toilet was little used. Significantly, there was a much stronger association with the type of toilet facility used by the household's children (no facility/open facility 21%; modern or pit 11%). Many very poor families have access to modern or pit toilets only on a shared basis, often with up to a dozen or more other families. These are often filthy and children rarely use them. Other significant factors were locality (bosties 20%; poor areas 15%), household possessions (very poor- 24%; other poor 17%) and household income (less than 3,000 taka per month 21%; 3,000 taka plus 14%) – all factors that may be associated with household and neighbourhood environment. In contrast to coughs, there was no significant association with maternal education (uneducated mother – 18%; educated mother – 17%).

Bloody stools were reported for just fewer than four percent of the total or around 20 per cent of those with diarrhea. There were statistically significant effects with mother's literacy (illiterate 5.1%; literate 1.3%), mother's education (uneducated mother 4.1%, educated mother 2.7%), locality (B 5.0%;PA 1.8%), toilet facility (open/none 5.7%; modern/pit 2.5%), and toilet facility used by children (open/none 4.6%; modern/pit/other 1.6%). There is some interaction here. Literate mothers and living in a bostie are both associated with toilet facility used by child.

Children are clearly highly susceptible to illnesses associated with poor living conditions and crowdedness. There are also hints that parental response to illness here conditioned or proxied by mother's education, does make a contribution to reducing childhood illness. The influence of maternal education and other factors influencing parental behavior make a particularly important contribution to reducing illness for diseases for which there is childhood immunisation.

The higher mortality rate for girls was not reflected in the prevalence rates of respiratory and diarrheal illnesses, which were slightly lower than for boys but the differences were not significant.

Child health: Immunisation

The provision of immunisation in Bangladesh is regarded as one of the successes of the public health program. As can be seen in Table 5 immunisation levels for high profile vaccines such as polio were in the survey high irrespective of parental education, income and location. Ninety-six per cent of respondents with children aged one to four years reported that their children had been immunised for polio. For children whose mothers had no education, the figure was 95 per cent; for those whose mothers had been to school, the figure was 97 per cent. Similarly, the figure for the slums, 96%, was only marginally below that of other poor areas, 98%. These data indicate the success of this politically driven and externally funded program in reaching the poor and disadvantaged. Participation rates, however, are lower for other vaccinations. BCG (first shot) rates were 87 percent and DPT (first shot) 82 percent. The measles immunisation rate was only 71 percent, despite evidence that it can significantly reduce child death. Only 45 percent of children one to four years had been 'fully immunised' having received the full immunisation schedule of BCG, measles and three doses of polio and DPT.

Table 5
Percentage of children one to four years immunised against selected diseases by household characteristics

	Location Bostie	Poor area	Difference
Polio	95.3	97.3	2.0
Polio x 3	71.7	82.4	10.7
BCG	83.1	92.9	9.8
DPT	77.5	88.5	11.0
DPT x 3 doses	46.4	58.0	11.6
Measles	63.3	80.3	17.0
Full schedule	39.4	52.1	12.7
	Mother' schooling No	Yes	Difference
Polio	95.0	97.2	2.2
Polio x 3 doses	72.1	81.0	8.9
BCG	82.0	92.9	10.9
DPT	74.3	90.2	15.9
DPT x 3doses	44.0	59.2	15.2
Measles	61.9	80.3	18.4
Full schedule	36.7	53.9	17.2
	Income Under 3,000 taka	3,000+ taka	
Polio	95.5	95.9	0.4
Polio x 3doses	73.6	77.6	4.0
BCG	85.6	88.6	3.0
DPT	80.5	84.8	3.7
DPT x 3 doses	50.3	53.1	2.8
Measles	64.9	77.6	12.7
Full schedule	43.5	48.6	5.1

In general, mother's education is the most powerful predictor of immunisation rates. Ninety per cent of children whose mothers had been to school had been immunised for DPT as against 74 per cent for children whose mothers had not. That is children whose mothers are not educated are two-and-a-half times as likely not to be immunised for DPT. Most strikingly 54% of the children whose mothers whose children had been to school were fully immunized as against 37% where the mother had not. Location was also an important factor in immunisation rates and had an effect independent of education. Fifty-two percent of those living in other poor areas had been fully immunised as against 39% of those who lived in bosties. Household

possessions had a strong association with immunisation, 54% of children in better off households having been immunised against 38% in poorer households. Income had a weaker small association with immunisation – except for measles, and even this association may be explained largely through its association with mother's education and location. Forty-nine percent of children in households earning more than 3,000 taka were fully immunised as against 43 percent in households earning less.

Immunisation rates were lower for girls than for boys. For example, 38 percent of girls were fully immunized for the complete EPI schedule as against 46 percent of boys. A larger family size is also associated with lower levels of immunization (1-2 children 49 percent, 3+ children 41 percent). Women headed households were slightly less likely to immunize their children (36 percent versus 43 percent).

The relationship between whether fully immunized and socioeconomic and demographic variables were explored using logistic regression analysis. The only significant factors were mother's attendance at school, mother's number of births, location and whether the mother lived previously in a village. These data suggest that educated parents are more aware of the value of immunisation and that educated mothers are more inclined to take children for treatment. The significance of location suggests that immunisation may be more convenient for poor area dwellers. Its association with household wealth may be a factor. Mother's number of births is consistent with a greater concern for children's individual welfare where households have few children or just that it is more difficult to cope with larger numbers. The lower likelihood of migrant women having their children immunised may suggest that such women are more traditional, but immunisation rates are only marginally lower than the rates reported on here. Migrant women may be less integrated into the health system in Dhaka, or indeed that they have less support from other family members inside the household, and outside who can provide assistance in taking a child to a clinic or in looking after other children.

Household treatment of illness

Household heads were asked about general treatment in the household and mothers were asked about the specific treatment of their children. Most households reported seeking treatment but there was considerable variation in the nature of the treatment sought, and the expenditure involved. When asked how they responded to the last illness experienced by a household member, the great majority of household heads, 91 per cent, said some form of treatment had been sought, with only minor differences by socioeconomic characteristic (bostie 89%, PA 92%; household head not educated 90%, educated 92%; income under 3,000 taka 89%, income 3,000 taka+ 93%). Twelve per cent had received treatment from a government hospital or institution, 40 per cent from a private doctor or clinic, 46 per cent from a pharmacist, 4 per cent from an NGO clinic or doctor, 3 per cent from a homoeopath, 6 per cent with herbs, and 2 per cent from a traditional doctor (multiple responses were allowed). The majority of treatment was provided by trained health providers but a sizeable minority of treatment was provided by pharmacies or shops whose proprietors generally had no or minimal training. Most treatment by trained providers and all treatment by untrained providers was provided by the private sector.

The major socioeconomic difference in seeking treatment was in the type of treatment sought. The poor, bostie households, the uneducated and migrants were much less likely to use

trained health providers (households with few possessions 45%, others 63%; rural migrant 48%, non-migrant 64%; bostie dwellers 47%, poor area 61%; household head educated 57%, uneducated 50%). Regression analysis indicated that the major associations were with household possessions and migrant status. The household possessions index is a good indicator of wealth and especially of the ability of a household to raise money quickly in times of need. Migrant status is not only associated with other factors such as poverty and limited education that influence health behaviour but may also be indicative of a traditional mentality with a preference for 'untrained' traditional health providers. Migrants also have generally left family members and ties behind and have less support both financially and in terms of helping out for example by child-minding while a family member goes to a health provider.

The major explanation for the lesser use of the trained providers by the more disadvantaged communities was a much lower use of private doctors and clinics (Bostie 32%, PA 49%; H.H.Head Not ed. 37%, Ed. 43%), and a greater use of pharmacies (B 49%, PA 39%). Usage of public hospital was similar by the main socio-economic characteristics (used government hospital: Bostie 12%, PA 12%; H.H.Head not ed. 10%, ed. 13%). There was substantial variation by the individual areas reflecting variations in access to institutions, particularly the location of large hospitals, and clinics.

To understand why particular health providers were used the respondents were asked about the advantages and disadvantages of particular types of health provider and why they had specifically used the particular provider used last. Multiple answers were allowed. The major advantage given for private clinics and doctors was their high degree of 'competence' (private doctors 77%, private clinics 69%) while their major disadvantage was their high cost (private clinics 60%, private doctors 54%). Convenient access was also important for private doctors (52%) but was cited to a much greater degree in poor areas (64%) than in bosties (31%). Government hospitals and NGO clinics scored well on low cost (government hospitals 63%, NGO clinics 61%) and competence (government hospitals 49%, NGO clinics 61%) but poorly on another aspect of quality of care, long waiting times (government hospitals 37%, NGO clinics 33%). Government hospitals also scored poorly on inadequate consultation time (25%) and unfriendly of staff (15%). The major factor favoring the use of pharmacies was proximity to home (80%), with low cost as a secondary factor.

The most interesting contrast between socioeconomic groups was that bostie dwellers were much less likely than poor area dwellers to cite convenience as a reason for using a private doctor. In contrast, there was no major differential between bostie dwellers and poor area households concerning cost – both sides equally regarded cost as a major disadvantage of private doctors. The implication that access was a factor preventing bostie dwellers from seeking assistance from private doctors was supported by a question on how the health provider used for the last treatment received was chosen.

The key reasons given concerned access - as represented by proximity (73%) and convenient travel (43%) (multiple answers allowed), and quality of care issues - competence and friendliness of the provider (54%) and adequate time/attention given by the provider (11%). Access issues were particularly important for respondents who used private doctors and clinics, pharmacies, homeopaths and traditional healers. Quality of care issues were more important for respondents using public hospitals. Cost was barely noted even by those who used government hospitals or pharmacists presumably because cost is primarily a negative factor explaining the

failure to use particular types of provider rather than a positive factor explaining the use of a particular provider. People will use the most accessible provider they can afford. Bosties dwellers were less likely to cite accessibility as a reason for using private doctors and clinics presumably because there were fewer private doctors and clinics living near to bosties, and possibly also because bostie dwellers had less access to transport.

Median expenditure on treatment was 200 taka (US$3.70). Thirty percent of treatment cost less than 100 taka, 51% 100 to 999 taka and 19% over 1000 taka. Although cost was given as the major advantage of using government hospitals over private clinics and hospitals, treatment in this sector provides a disproportionate share of very expensive care. Fifty-seven percent of hospital care cost over 1,000 taka as compared to 25% of care provided by private doctors and 4% by pharmacies. This is due the role of hospitals in providing care to the very ill. When asked what the household would do in the case of a serious illness - a majority of respondents said that they would go to a hospital (53%) as compared to 12% who were treated in a hospital for the last household illness. It was clear from comments made by many respondents that much of the cost of hospital treatment was not the direct hospital charges for staying in a ward, but ancillary charges such as for tests and medicines. An important cost for many families is that of looking after patients. In many hospitals the family is expected to attend the patient and to provide food. This can be a significant cost especially as it may involve at least temporarily giving up work to do so.

Children's health care

Mothers were asked about treatment for two key types of childhood illness – respiratory and diarrheal illnesses. Seventy-nine percent of respondents whose child had a cough in the previous two months reported they had sought treatment. Bostie children were much more likely to have been denied treatment – 25% were not treated as against 14% of poor area children. When treated, bostie children were much less likely to have been treated by a trained provider, with the difference being explained by their much lower use of private doctors (bostie 29%, poor area 61%) and much more likely to be treated by an untrained provider especially a pharmacist (bostie 37%, poor area 21%). Girls were more likely to have been denied treatment (22 percent of girls were not treated as against 17 percent of boys – the difference was significant at 0.05 percent. For the more serious cases where the cough was accompanied by fast breathing with short rapid breaths the difference in treatment by sex was even starker – 16 percent of girls were not treated as compared to 8 percent of boys – significant at 0.05 percent.

Eighty-one percent of mothers with children experiencing diarrhea gave the child khabar saline (oral rehydration fluid). There was a significant difference between boys and girls with 82 percent of boys receiving khabar saline but only 73 percent of girls. Children in poor areas (86%) were more likely than bostie children (79%) to receive khabar saline. Sixty-six percent of children were likely to receive further treatment. Follow-up treatment was less likely in bosties (poor areas 74%, bosties 66%), and more likely to be given to boys (boys 88%, girls 66% and to children in small families (1-2 children 76%, 3+ children 65%).

Mothers were also asked about the most recent treatment provided for children less than five years of age. As with general health treatment, most treatment was provided by the modern sector, the dominant providers being government hospitals, private doctors/clinics and pharmacies. Private doctors and clinics provided forty per cent of treatment, pharmacists 31%

and the public sector 14% (of which public hospitals provided nine percent). In addition NGO clinics provided seven percent and homoeopaths eight per cent. As compared to adults, children were more likely to be treated by trained providers – particularly Government hospitals and NGO clinics, and less likely by pharmacists. This is partly influenced by the fact that many NGO clinics have a specific concern with children's health. In total 61 percent of children who received any treatment were treated at some stage by a trained provider. As with adults, location was the most important variable in treatment. Bostie children were less likely to have received such treatment (56%) than children from poor areas (68%). Similar differentials were found by maternal education (no education 57%, education 65%), household possessions (very poor 57%, other 66%) and household income (less than 3,000 taka 58%, 3,000+ taka 64%). The largest differential was by whether the mother was a migrant (lived in a village before marriage 54%, other 67%). There was no significant difference by sex of child or number of children.

Bostie children were less likely to have been treated by trained providers especially private doctors/clinics (28% v 49%). Some of the difference was accounted for by the greater likelihood of a bostie child attending a public facility than a poor area child (18% v. 9%). There was little difference by attendance at an NGO clinic (7% v 6%). They were more likely to have been treated by a homeopath (9% v 6%) and by medicine obtained from a pharmacy than children living in poor areas (33% v 28%). Differentials by other socioeconomic characteristics were smaller especially in the use of a private doctor. For example, 32 percent of children whose mothers were uneducated were treated by a private doctor as against 43 percent where the mother was educated. Thirty-four percent of children in households with an income less than 3,000 taka per month went to a private doctor compared to 42 percent in household with an income of 3,000 taka or more. There were no significant differences in health provider by sex of child or birth order. Regression analysis indicated that house quality (a composite index of the quality of materials of the roof, walls and floor), whether the respondent lived in a village before marriage, household possessions and location all had significant independent effects on the use of a trained provider. House quality and possessions are both indicators of the household's ability to pay for treatment, possessions indicating in particular the ability to raise money quickly. House quality may also be associated with the number of household members and the ability to take a child to treatment. In poorer households children are sometimes looked after by junior family members who lack the authority to seek treatment. As noted with immunisation, migrant households are less accustomed to using trained providers and again may lack nearby family members who may in an emergency provide financial support and other assistance. The independent association of location with the use of a trained provider indicates the importance of access in the treatment of children. This is particularly so when the mother or junior family member is home by themselves with a sick child.

Mothers were asked about the cost of the child's treatment and how it was paid for. The median payment was 80 taka – as compared to 200 taka for last sick person of any age in the household. In four percent of cases the treatment cost nothing, in 49 percent it cost 1 to 99 taka, in 42 percent it cost 100 to 999 taka and in four percent it cost 1,000 taka or more. Government hospitals were marked by a wide range of costs with roughly 40% of patients paying less than 100 taka but nearly one-fourth paying over 500 taka. Hospitals provide both high levels of free and relatively inexpensive treatment for outpatients for less serious cases and

much more expensive treatment for the seriously ill. Where payment was involved the great majority of respondents, 91%, said the household bore the main expense as distinct from loans from money lenders, assistance from relatives living outside the household, and from less often from non-relatives. Expenditure was much lower for bostie households with 65% spending less than 100 taka as against 38% of poor area households). This was true to a lesser extent where the mother was not educated (not educated 63%, educated 44%), households with few possessions (very poor 63%, other 43%) and households with low earnings (less than 3,000 taka 61%, 3,000+ taka 47%). Education of the household head had a relatively small effect (educated 58%, not educated 49%). Expenditure was lower for girls than boys. Family size had a larger effect – 1-3 children 45 percent less than 100 taka, 3+ children 61 percent less than 100 taka.

Child's deaths

Specific questions were asked about deaths of children under five years of age. Clearly, illness cases resulting in death are distinguished by the severity of the preceding illness, the need for treatment often on an urgent basis, and by the fact that death may have resulted before treatment finished, and in some cases before it began. Five hundred and sixty-eight women out of 1,825 reported having a child die aged less than five years – a total of 929 children. Seventy percent of mothers reported having sought treatment for the child. The figure was much lower for children who died in the two weeks following birth, evidence both of the quickness of death and the continuing weakness of mothers. There was no difference between bosties and poor areas or by education. The very poor in household possessions and household income were less likely to have sought treatment but the differences were minor – few possessions 67%, more possessions 74 %; <3,000taka 67%, 3,000+ taka 72%. The most striking differential concerned cases where a respondent had more than one child who had died – in such a situation it was much less likely that treatment had been sought (more than one death 59%; one death 71%). This suggests death clustering.

Trained medical attention was less likely to have been sought by bostie households (bostie 55%, poor area 70%), migrants (mother from a village 55%, other 68%), poorer possessions, (poor 55%, other 67%), and less educated households (mother not educated 62%, educated 66%). Household income was not significant. Households from outside Dhaka were less likely to use a trained provider even if the woman had lived in Dhaka since marriage. Regression analysis suggested that the primary influences on the use of a trained provider were household possessions and household origin. Both indicators reflect in part the ability of household to raise money quickly. A better-off household is in a better position to raise money quickly and hence shows a greater willingness to provide assistance from a government hospital (bostie 30%, poor area 37%), private clinic (bostie 24%, poor area 31%) or NGO clinic (bostie 4%, poor area 9%). Bostie households were more likely to have relied on pharmacists (bostie 19%, poor area 6%). Even more than the poor area household's greater use of trained providers is their much greater likelihood of using several providers, both trained and untrained.

Very young children (less than one month) in the bosties were less likely to get trained medical attention. This may reflect an inability to obtain medical attention quickly, perhaps because of a paucity of such providers living and working nearby and a difficulty in getting transport. It may also indicate reluctance by poorer households to seek treatment unless it is

clearly necessary. In a number of households wives apparently waited for the husband to return from work for him to seek a health provider or simply to decide that treatment was necessary. There may also be more fatalistic attitude with regard to young babies as to what costly treatment will achieve. In-depth interviews indicated that some women reported such child deaths to be due to an illness caused by a bad spirit. These women generally had little or no education. Several reported being influenced in their views by neighbors.

Compared to last illness of living children, treatment for children who died was more likely to have been sought from a public institution and much less likely to be sought only from a pharmacy. Treatment was much more expensive on average with median expenditure close to 500 taka. Whereas for ordinary illness private doctors were the most expensive providers of treatment, for children who died hospitals were the most expensive providers of treatment reflecting their status as the health providers of last resort.

The data on the treatment of girls compared to boys is ambiguous. Surprisingly girls were reported as being more likely to have received treatment than boys (girls 75%, boys 64%). However, expenditure per episode was lower for girls - in 42% of girls expenditure exceeded 500 rupees, in 53% of cases of boys it did so. This reflected a slightly greater likelihood of girls being treated by untrained providers particularly pharmacists and boys by hospitals.

Discussion

In this paper we have been concerned with the determinants of health in a rapidly growing Asian metropolis, Dhaka in Bangladesh. Data has been drawn from a survey of four bosties (urban slums) and four relatively better-off 'poor areas' of Dhaka. Dhaka is a classic example of the rapidly growing Third-world metropolises that have become an increasing concern for policy makers and researchers in terms of how to address their needs for urban infrastructure and to deal with increasing urban squalor. Dhaka has grown from what was a provincial town, the capital of a province of Pakistan before 1971 with a population of less than half a million to a city of over 10 million in 2000. Millions of its new inhabitants moved to it because they were impoverished in their own villages, being without property or prospects. For these people Dhaka offered a future, but one for which many were unprepared and had few skills. Life in Dhaka meant living on the margins, a few on the streets but more often in the urban slums, or bosties built usually illegally on government land, sometimes on private land. What the public and private slums have in common is their generally deplorable living conditions, an insecurity of tenure, and the almost complete absence of government services.

Dhaka differs, however, from cities in Africa and Latin America in the 1980s and East Asia in the late 1990s in that it has not been subject to a major economic crisis, and therefore has continued to be relatively prosperous in comparison to elsewhere in the country.

Nevertheless, even though Dhaka remains the health center of the country, with a concentration of government specialist hospitals, and private clinics and doctors, its morbidity and mortality levels are remarkably poor. The reasons are two-fold: Dhaka suffers from disadvantages that the rural areas do not have in terms of its environment and to a much lesser extent in a lack of available care within the household; and secondarily its advantages are less than they seem because the services are expensive and not equally available to all the population.

When rural migrants (ever married women) were asked whether they believed they were better off or worse off than before migrating two-thirds (67%) said they were better off citing the greater availability of services (82%), more opportunities (56%) and the husband having secured a job (30%) – multiple answers allowed. More surprisingly almost as many claimed to be better off in terms of health (64%) citing the availability of good doctors (67%) and health facilities (63%). Bostie dwellers, however, were less likely to claim to have improved their lives (bostie 64%, poor area 72%) or their health (bostie 59%, poor area 69%). The main disadvantages given by respondents who thought they were worse off in health were poor environmental conditions (88%) and the lack of family members to care for the sick (11%).

Clearly the appalling environmental conditions in which much of Dhaka's population lives is a key part of the explanation for Dhaka's disappointing health performance especially amongst children. The bosties in particular are located in areas, which are subject to flooding annually during the monsoon, and on occasion may require total evacuation. They lack sewerage and proper roads. Even during the dry season children run barefoot through filth. Housing is rudimentary and crowded, and very inadequate during the wet season. This shows up in high reported levels of respiratory illness and diarrhea amongst children.

Moreover, while slum dwelling and others in Dhaka may be economically better off than they were in their native villages, life in the city varies in a number of ways that may contribute to poor health. Most importantly, everything in the city must be paid for. In particular this applies to food. One of the main factors suggested by respondents for poor health was the lack of nutritious food. Food in the city is expensive, and many respondents complained that at times they and their families were short of nutritious food or even had to go without food.

Given a context in which the underlying disease rate is higher than in rural areas factors that control disease take on an increased importance. Among such factors are appropriate preventative behavior, immunization and health treatment behavior. Qualitative interviewing indicated that households were generally aware of the dangers provided by their environment and the need for appropriate preventative health behaviour especially in terms of hygiene. However, effective health prevention is extremely difficult in the bosties especially with the resource constraints that face many families. For example, as noted, child diarrhea in the survey was closely connected to the child's use of a latrine. This reflects whether a household has sole access to a latrine or whether it shares it with a large number of households, how clean the latrine is kept, and the motivation of the parents in encouraging the child to use the latrine. In qualitative interviews respondents living in compounds where a household shared a toilet facility commented that at certain times of the day it was very hard to get access to the toilets and even when one was available it was often unclean. In such circumstances individual motivation, and for children pressure from parents, to use latrines - and to maintain them is vital. Such motivation is likely to be connected to parental education, as are hand-washing practices, both important in reducing diarrheal disease.

Also important for reducing the natural disadvantage of the cities in health is the immunization against childhood diseases. Bangladesh's immunization rate exceeds the levels in richer India and Pakistan. Urban coverage rates are higher on average than rural rates but the data reported here indicate coverage in the urban slums similar to that of rural areas. The risks

of not having a high level of coverage are likely to be greater because of crowding and the adverse environmental conditions, notably for such illnesses as measles. It is of particular concern that levels of immunisation are lower for girls and for larger families.

The association of immunisation coverage with maternal education is significant. Immunisation is generally provided free of charge. The likelihood of a child being immunised will therefore reflect the carers' awareness of the availability of the vaccine and motivation in having the child receive the vaccine. This is closely associated with the carer's education. The very low levels of education in the bosties mean that it will also be associated with locality.

The most important factor in preventing illness episodes from translating into a higher death rate is appropriate health care and treatment. The much greater availability of trained health providers in Dhaka and the other urban centers than in rural Bangladesh means that urban Bangladeshis are much more likely to use a trained health care provider for an illness episode. However, many continue not to do so, particularly in the bosties, using instead pharmacies and other sources of untrained health care. The major explanations given as to why a particular provider was used were convenient access and confidence in the provider. Access as an explanation is likely to be particularly important in terms of the provider first approached for treatment and in emergencies. Bostie households, in particular, lack convenient access to trained health providers of any type. In other neighborhoods, including the poor areas described in this paper, private doctors, who provide most of the trained health care in the city, are easily accessible – often to be found in the backroom of a pharmacy. In the small pharmacies to be found in bostie neighborhoods this is not the case - probably chiefly because of the lack of suitable quarters, and perhaps also because of a lack of well-off clients. In such circumstances many people will get the medicine from the pharmacist instead of looking for a doctor at a more distant pharmacy or other lodging. In general people go to a government hospital only in case of serious need as they are generally far away, are inconvenient and involve a long waiting time and are not client friendly.

Cost was clearly an important concern for many households, but its impact on the provider used was unclear. Many households were reluctant in such circumstances to seek expensive health treatment unless it was clearly necessary. Some households had borrowed money from relatives or money-lenders, and others unable to do so had sold possessions for this purpose. Answers to questions on who it was most important to treat suggested that there was a bias towards treating adults, especially if they were economically important to the household. In the survey average expenditure on children's care was much less than on adults' care. This was especially marked for daughters. Nevertheless, while cost was cited as a major concern few cited it as the main reason for not using particular providers. Locality had a larger impact on use of trained health providers than income or household wealth.

Problems with treatment are exacerbated by the lack of carers in migrant household especially in the bosties. In rural Bangladesh home care is provided by mothers and female relatives, who live and work around the homestead (*bari*). Household size is smaller in the bosties, because family members have stayed behind, and because the small size of the housing makes it impossible to accommodate many family members. Moreover, a high proportion of adults, male and female, is away during the day working.

Dhaka's current health situation raises the question as to what extent this situation existed some decades ago. At that time the urban population was predominantly a small and largely educated elite with a comparatively small servant class. By bringing millions of poor and often uneducated and unskilled laborers and farmers to the city the period of rapid growth following independence in 1971 has changed this. Not only has the composition of the city's population been changed but also a huge strain has been imposed on the urban infrastructure, and particularly the government health services, which were not designed for this purpose. Private practitioners have taken up the slack but these primarily serve the better-off population, and are not to be found in the poorer neighborhoods. The changing composition of the city has also resulted in a larger social and economic gulf between the health professionals and their poorer and less educated clients often resulting in misunderstandings and poor treatment. This means that one of the major problems of health systems in the rural areas has been replicated in the city.

The problems of the urban poor population are complex and intertwined. Their poverty and their relative isolation from health services reduce their access to private health services. Their predominantly migrant status means that many lack the support structures that can be important in providing financial support and care in times of crises. Their limited education makes it harder to interact with health care providers from higher social classes, and reduces the access they have to information – for example in regard to immunisation, and reduces their ability to seek appropriate health treatment. In addition to being poor many are from migrant families with little support structure in the city, poor living conditions, and a lack of knowledge or self-confidence about how to handle urban conditions.

The future

What does this mean in terms of Dhaka's future health needs? Dhaka's health problems are deep and entrenched, and are unlikely to improve quickly. Relative economic prosperity has resulted in one of the fastest growing urban populations in the world. This growth is likely to continue at least in absolute numbers in the absence of any alternative economic pole. This will mean the continuing existence of an impoverished population with inadequate access to the existing predominantly private health services, and increasingly stretched government health system.

In recognition of the problems of the health systems of urban Bangladesh the Asian Development Bank is funding a project to provide basic curative and preventative health services to the four main cities of Bangladesh including Dhaka. Under the project the various city corporations will enter into contracts with private and NGO organisations and individuals to establish and operate clinics. For the project to achieve its potential it will be essential to ensure that the clinics are conveniently located, are affordable and are client focussed. It will be particularly important to convince potential clients of the value of the services.

Improvements in health will depend heavily on the successful promotion of immunization. While certain vaccines such as polio already have a very high coverage there is considerable room for improvement in vaccines such as that for measles as well as in the second and third shots of BCG and DPT. ADB clinics and NGOs will have an important role here.

Health problems are worse among girls. It will be important to ensure that they are appropriately targeted in immunisation programs. It will be more difficult to ensure that girls

receive proper and timely health treatment. The ADB project may have an important role here. If overall treatment rates can be raised this should benefit girls, but special programs oriented to girls may be necessary.

There is an urgent but potentially very expensive need for better urban infrastructure. The environmental problems of Dhaka's slums have been noted. Bosties in particular are often sited in flood areas, and, as illegal settlements, they lack appropriate infrastructure such as sewerage and drainage. It will be especially difficult for them to pay for such services and they are likely to require substantial subsidy in a very poor country. Potentially less expensive but still difficult will be providing some degree of security of tenure to encourage the inhabitant to improve their own housing. Currently, problems of ownership mean that there is no incentive for bostie-dwellers to invest in better housing or even simple latrines.

In the long run, while heavy migration is likely to continue, the proportion of native born and those with most of their families in Dhaka is likely to increase and hence a greater fraction of the population will have an effective kin network to draw upon in times of need. This, combined with greater experience and perhaps with greater prosperity as people become more adjusted to urban life, should mean a greater proportion of the population will be more able to deal with health crises. Nevertheless, substantial numbers of migrants and the more marginal are likely to face continuing problems in this regard.

All of these problems could worsen in the advent of an economic crisis of the kind that recently affected East Asia. Life in the bosties and elsewhere in Dhaka is often marginal. Some more recent migrants who still have strong ties to the country may be able to go back to the villages. Many, however, left the villages precisely because of their lack of resources there, and others will have lost any resources they once may have had.

Notes:

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2. Mitra and Associates.
3. J. Caldwell *et al.* 1999; B. Caldwell *et al.* 1999; B. Caldwell and Pieris 1999.
4. Water, electricity, gas, garbage services provided by Dhaka City Corporation.

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