Child mortality in new industrial localities and opportunities for change: a survey in an Indian steel town*

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Abstract

As Asia becomes increasingly urbanized the effect of new industrial development on child mortality becomes of increasing interest. In India, considerable investment has been made in the social infrastructure of industrial new towns. This survey of Durgapur steel town in West Bengal shows that although the average level of child mortality in the working class population is favourable in comparison with other Indian cities, considerable differentials, that can be related to social, economic and environmental differences within the population, have arisen since the creation of the city in the late 1950s. The paper argues that the undertaking of selective sanitary interventions to improve access to drinking water (in particular) would be administratively feasible in these industrial new towns, of immediate impact, and indeed necessary if the differentials in mortality are to be eliminated.

Introduction and objectives of the study

As Asia becomes increasingly urbanized, demographers and social scientists interested in policy need to focus their attention on the mortality characteristics of populations living in towns and cities, and the impact of the latter on their citizens' health. Although some studies have been undertaken on health and mortality in the metropolitan cities in the region, such as Hongkong (Goldman 1980), Shanghai (Jiang and Karkal 1981), Manila (Basta 1982) and Bombay (Ramasubban and Crook 1985), very little work has been done on the towns and cities of the next rank in population size, say between 100,000 and 1,000,000. Yet since the 1950s there has been a very substantial growth of new industrial complexes often located outside the metropolitan regions, giving rise to rapidly growing and by now very large urban settlements, sometimes styled 'new-towns'.

An example of such growth can be seen in the 'steel-towns' of India, three of which date from the late 1950s when the country was embarking on a strategy of establishing heavy industry largely sponsored by the public sector. These towns are Bhilai in Madhya Pradesh, Raurkela in Orissa, and Durgapur in West Bengal; the last is the subject of this paper. All three were new-towns, built on green-field sites, and have now experienced about 35 years of growth, some of which has been very rapid. Durgapur, the least of the three in size, had a population of 415,986 at the last Census count in 1991. Elsewhere in the developing world similar cities have mushroomed from the establishment of a single heavy industry, where, as in the case of steel, plant size is subject to huge economies of scale; the steel-towns of Maanshan in China (Qichang n.d.) and Chimbote in Peru (Pryer and Crook 1988) are examples geographically far apart, but sharing certain demographic characteristics, such as a period of initially very rapid demographic growth and a concentration of young adults in their populations, most of whom are migrants. In India the creation of new industrial towns is still taking place: the port and steel-city of Vizakhapatnam in Andhra Pradesh is the most recent example, with a 1991 population of 1,051,915. It is an appropriate time to ask certain demographic questions regarding industrial cities of this kind. Is fertility falling faster here than in other cities? Is health improving more rapidly? Are the differentials in fertility and mortality lower than elsewhere? Are the social and physical environments of industrial new-towns associated with better health and lower fertility than in other towns, or not?[1]

This paper will focus on aspects of mortality. We take as a working hypothesis that the state is able to intervene to lower mortality levels in cities in that the provision of clean water and good sanitation can help towards that end; so can clean air and adequate shelter. In theory the State can have considerable control over the supply of these amenities, but not, of course, without cost. In mature urban environments much of the population is usually without such amenities: 30 to 40 per cent of the population in India's metropolitan cities is designated as living in slums on this account. This is because in the past the State was either not willing to meet the cost, or not able to keep up with the increasing need, or a combination of both. To make up the backlog today in the older metropolitan cities is obviously a mammoth task which would use a prohibitive quantity of resources if attempted in a short space of time. But in newly built urban environments a more successful attempt could have been made to keep up with the need for the provision of amenities, especially when much land had been obtained in advance, as in the Indian steel towns. Insofar as mortality differentials depend on differential access to these amenities, it should have been possible to achieve relatively low mortality differentials in these towns. One aim of this study is to see whether this has indeed been the case. Another is to ascertain the potential for this to be achieved in the future.

India's crude death rate was estimated at 7.7 per thousand in the urban areas for 1980-1982 (Government of India 1988b). The corresponding infant mortality rate (IMR) was 64 per thousand live births. In the State of West Bengal, where Durgapur is situated, mortality is believed to be rather lower than the national average, with a crude urban death rate of 6.7 for 1980–1982, and infant mortality rate of 48 for 1983, the closest available date to the 1981 Census. There are a few estimates for some of the metropolitan cities alone in India, for

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[1] One of the authors has examined various other demographic characteristics of such towns from census materials (Crook 1992).

instance Bombay, where the registered crude death rate was 8.6 (IMR of 61) in 1981, and Calcutta, where an infant mortality rate of 52 was estimated from mortality questions asked at the 1981 Census (Government of India 1988a); the latter is probably an underestimate, resulting from the use of an inappropriate model life-table.[2]

One of our objectives in this study is to provide an estimate of mortality for a non-metropolitan city with a heavy industrial economic base, so that we may begin to obtain a picture of mortality differences in Asia across urban areas of differing economic character.[3] A second and more important objective is to indicate the differences in mortality that exist within such cities, and their social or environmental determinants, to add to the still modest literature on intra-urban mortality differences in developing countries: for example, Behm (1980); Tekce and Shorter (1984); Bisharat and Tewfik (1985); de Lima Guimaraes and Fischmann (1985); and Basu and Basu (1991). For the determinants we are particularly concerned to obtain and use measures of physical environmental quality (as indicated in access to sanitary facilities, for example), as well as household socioeconomic measures, and, insofar as sample size allows, to model their independent effects on child survival. It will be particularly important to see how far differentials of this kind have been contained in cities that were planned from scratch, so to speak, with large investment outlays on infrastructure and housing. It has been documented that such new-towns have accumulated a substantially 'unplanned' population over time, partly because the local resources expected to be generated for ongoing social infrastructural development failed to materialize, and partly because the speed of demographic growth was grossly underestimated (Sivaramakrishnan 1982; Jagannathan 1987; Crook 1992). Nonetheless, such cities are still sometimes regarded as being economically privileged, as indeed they once were, and most development aid is still focused on the older metropolitan areas ostensibly because their need is greater.

In this study we seek to establish whether or not there are mortality differences that can be attributed to the unequal provision of social infrastructure for different social strata in new-towns, despite the initial commitment to social equality in this respect.

Our survey design

For the purposes of this study we sampled 1,500 households in Durgapur. Our universe consisted of those households living in 'working-class housing' in the area of the city that included the steel works and their environs, the official Steel Township, and the area in between, totalling about two-thirds of the geographical area of the city (see Figure 1). Our sample was stratified into two equal parts: those dwelling in official low-grade housing in the built-up Steel Township area, which we will call simply 'the township', numbering 750 households; and those living in the spontaneous housing areas of hutment type, known locally as *bustees*, a term we adopt in this paper, also numbering 750 households. The stratification was disproportionate, as the true ratio between the sectors is believed to be

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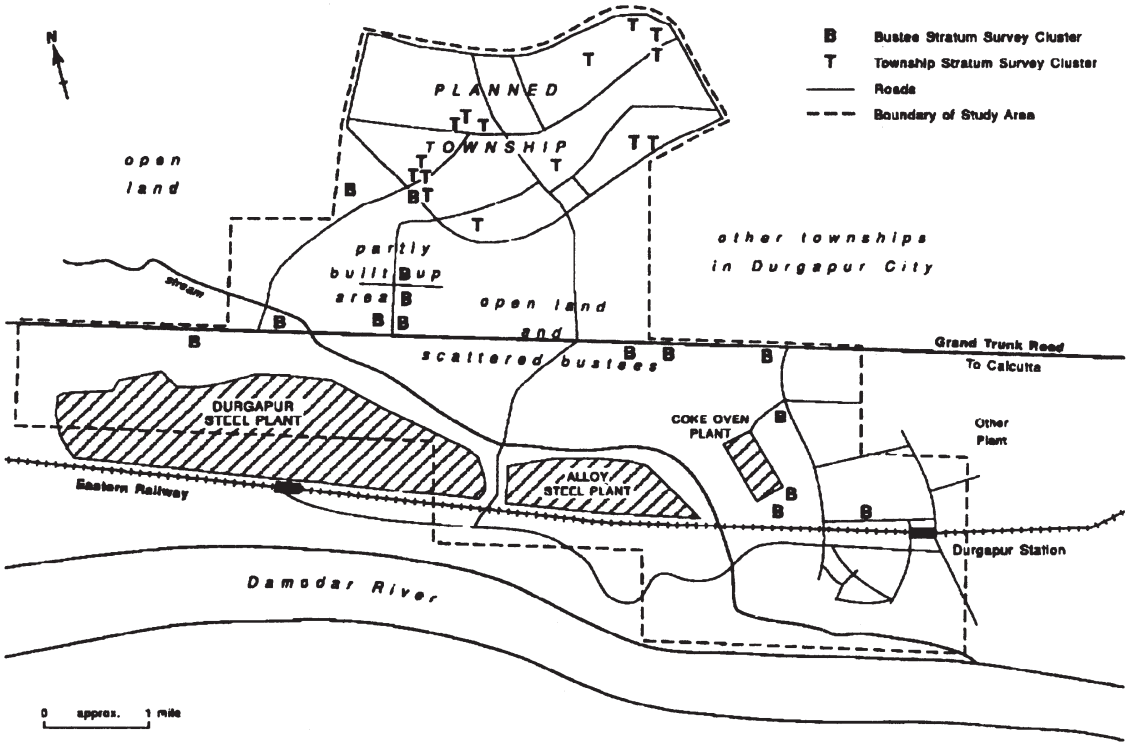
2 This critical observation was made to us by Tim Dyson. It should be noted, for example, that the estimated infant mortality from this source for Bombay is about 15 per cent lower than the registered rate, itself likely to be an undercount.

3 The authors have attempted a similar exercise for the State of West Bengal using the widowhood data from the 1981 Census to provide an indication of adult mortality differentials across the urban areas of the state (Malaker and Crook 1989).

closer to 2:1 than 1:1 respectively. Sampling units were clusters of 50 contiguous households, the units being drawn randomly from a cartographic sampling frame that we created ourselves, by covering the 30 square miles of our universe on foot.

It is important to appreciate the 'flavour' of an industrial new-town of this kind. The planned township consists of a mixture of tiny semi-detached bungalows and of flats in two or three-storey blocks for the occupational groups included in our study, which range from shop-floor supervisors to sweepers. Each household has its own private toilet and water tap, regardless of the occupational group for which it is intended. The township is built to high standards of space and environmental quality, with broad tree-lined roadways, green areas for recreation and good drainage and lighting; it is in a slightly elevated location two to three miles distant from the steel plant, though it is frequently down-wind of the smoke stacks (see Figure 1). The *bustees* on the other hand are scattered over much of the remaining area and consist of large groups of huts that range from the occasionally well-built brick building to tent-like structures of bamboo mats and thatch. Households have mainly shared access to water (taps and wells) and to makeshift toilets outside their dwelling areas, in each case only about 25 per cent of households having their own facility within their own compound. The *bustees* are separated by substantial tracts of open space, some of which is used for rough grazing, the lower-lying areas containing ponds and streams (see Figure 1). The relative spaciousness is typical of new-town areas where much land was acquired for developments that never followed. The *bustees* are on the whole closer to the source of industrial air pollution, and in this region of India generate their own pollution through the domestic burning of soft coal.

Figure 1
Sketch map indicating localities surveyed in Durgapur



The questionnaire we administered after a ten per cent pre-test was kept short and simple. We obtained detailed information on the occupational structure of the household, which we take on the whole to be an index of potential income. For the determinants of mortality analysis that follows we found it useful to use two broad categories of occupation: first, skilled labour and supervisory positions, and secondly, unskilled production and service-sector occupations, which we refer to as higher and lower respectively. When analysing the households in the *bustees* alone, we divided occupations into production labour and supervisory positions, and unskilled service and trades occupations. We recorded the physical characteristics of the house, and the household's access to water and toilet facilities.

In the analysis that follows, the most frequent distinction was made between having access to facilities in the immediate surroundings or compound belonging to the household, and having to go further afield, to a community well or latrine or into the open land beyond the settlement. We also enquired of the levels of maternal education. The mortality estimates were derived from the 'Brass questions' on how many children were born and how many are still alive, along with information on age of mother and marital duration, classified in five-year groups in each case. Birth histories were also collected which enabled a consistency check with the replies to the Brass questions to be carried out on the spot.

Mortality estimates and differentials

We use the data derived from the Brass questions to estimate q(2), q(3) and q(5) and thence to obtain estimates of infant mortality classified by the stratified localities and the risk factors described above. In most cases q(3) and q(5) were the most consistent estimators and we use the West model life-table in the Coale-Demeny series to obtain the life-table measures reported here. We are aware that fertility and mortality have probably been declining in this population; the former effect we cannot counter, the latter is allowed for by taking our estimates to refer to a period a few years before the survey, which was carried out late in 1988.

For the township stratum we obtain an estimate for the infant mortality rate (IMR) of 46; for the *bustee* stratum the IMR is 79 (Table 1). If we were to combine the strata with weights thought to be appropriate to the household residential distribution within the city we would obtain an IMR estimate of 54 for the 'working-class' population as a whole, which is not much higher than that obtained for Calcutta at the 1981 Census (IMR=52), the latter, however, representing the whole occupational spectrum. It is clear that the workforce living in the township sector is to some extent 'privileged' among the Indian working class. But there is also a considerable differential between those in the 'planned' and those in the 'unplanned' residential sectors.

The largest difference occurs between the two broad occupational groups, with infant mortality in the higher at 30 and 83 in the lower (see Table 1). Next in importance are mortality differences according to an index of adult female education, with an IMR of 83 for the children with illiterate or barely literate mothers in the household, and 43 for the rest. Access to toilet and to drinking water also correlate with mortality differentials, although of a smaller magnitude, close access to toilet giving an IMR of 68 versus 96 with less close access, and for drinking water 61 versus 88.

Table 1
Estimates of infant mortality according to selected social and environmental characteristics of the sample households

Characteristic		IMR	Difference in IMR between each level of characteristic
Locality:	Township	46.2	–
	Bustee	79.4	33.2
Occupation of head:	Higher (skilled and above)	30.4	–
	Lower	83.2	52.8
Access to drinking water:	Inside	60.8	–
	Outside	87.9	27.1
Access to toilet:	Inside	67.5	–
	Outside	96.5	29.0
Construction of dwelling:	Substantial (brick wall)	72.9	–
	Insubstantial	83.2	10.3
Education of mother:	Higher (completed primary)	43.1	–
	Lower	83.2	40.1
Duration of residence:	Up to 15 years	64.0	–
	15 and up to 25	60.8	3.2
	25 and over	56.5	4.3

Access is not the only desirable consideration in the provision of drinking water. Our preliminary analysis distinguished between tap water (from mains supply) to which 54 per cent of *bustee* households have access, and all other sources, consisting chiefly of well water only some of which is tube-well. We found very little difference in our mortality estimates in this analysis; in fact tap water was coincident with slightly higher mortality. Clearly tap water is only as good as the purification system that supplies it, and we were told informally by a local health statistician (before we made the analysis) that in Durgapur this left something to be desired. We also attempted to find mortality differentials according to the quality of the construction of the individual dwellings, distinguishing those that were brick-built, about 40 per cent of *bustee* dwellings, from those of less durable construction: here the difference in mortality was small (IMR of 73 and 83 respectively), a finding consistent with work done by one of the authors in Pune (Bapat, Crook and Malaker 1988). The general quality of the environment within the dwelling is probably best measured by the dampness of the dwelling, and the quality of construction of the floor, that is, whether paved or not, is probably a better indicator of this: a point we had not appreciated at the time of designing this study, but which we now think is worth further research. It should be remembered that the quality of the floor may have a direct impact on the health of young children as they are often left to crawl upon it (see also Al-Mazrou and Farid 1991).

One has to be careful with the interpretation of economic and environmental risk factors when dealing with a rapidly growing urban population. Most of this population will have migrated to the locality at some time in their lives, changing their occupation and

physical environment thereby. However, the migration rate during the 1980s had become quite low, and only four per cent of our sample households had arrived within the five years preceding the survey. Hence virtually all the experience of the children we study had occurred within the city.

Social and environmental factors in child mortality

We now investigate the independent contribution of some of the factors described above toward child survival in Durgapur, using a small number of linear models, estimated by ordinary least-squares regression (Table 2). We use as the dependent variable the ratio of observed to expected proportion of children dying from children ever-born to mothers classified by duration of marriage. The model is described in Farah and Preston (1982). In our presentation in Table 2 we take as the 'base value' the estimated children dying from children ever-born (to women of all durations of marriage up to 20 years) given the lowest or most adverse category of the social and environmental variables taken together, for instance, outside water supply, unskilled parental occupation and no maternal education. Raising the level of one particular variable, for instance, from outside to inside water supply, while keeping the others controlled at their lowest level, is expected to reduce the proportion of children dying by a certain proportion. For ease of interpretation these proportions are presented in the tables, having been calculated from the original regressions in which the dependent variable was the ratio of observed to expected as described in the text above.

The first two models use data from the combined sample of township and *bustee* (Table 2), that is for 2045 births. The dominating effect of occupation is clear and significant, reducing the proportions dead by about four per cent from a base value of 13 per cent.[4] Occupation is closely allied to income (which in itself is often difficult to measure accurately), and hence determines purchasing power over food and medical supplies; in the context of an industrial city it may also determine access to medical care, the industrial workers at the steel plant having their own hospital in the township and a medical insurance scheme. The second model explores the proposition that factory employment may itself confer benefits of this kind, which are not adequately picked up by the category of occupation since this does not distinguish between self-employment, small-workshop employment, and employment in major industrial plant. This is an important distinction in new industrial towns where large-scale factory employment is a major characteristic such as in the Durgapur Steel Plant; 60 per cent of the workers in our sample were employed in factories, and even in the *bustee* households about one third of the workers were factory workers. The estimated independent effect of the industrial category is small but statistically significant, and its value may be understated owing to collinearity with occupation.

The effect of the broader environment as indicated by locality of residence (township or *bustee*), which probably encapsulates a combination of sanitary facilities, drainage, and also air quality, has an unexpected sign and is insignificant. There is a problem in that it

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[4] Although we will report significance levels at the familiar five per cent cut-off, we are aware that any cluster-sampling design is likely to vitiate to some extent the principles of pure random sampling. However, from personal observation during the pilot stage we doubt whether the heterogeneity within most of the 50 clusters was much less than in the relevant stratum as a whole.

correlates with access to drinking water since all the township houses have inside supplies, and it was subsequently dropped from the analysis. However, taken by itself, the close access to drinking water, whether from tap or well, is important, reducing the proportions dying by three to four per cent, a significant contribution. Generally speaking a similar picture emerges if we restrict our analysis to the *bustee* stratum only, about two-thirds of the total births, as in the third model illustrated. The independent effect of occupation is maintained, indeed enlarged. In the *bustees*, access to drinking water still contributes about four per cent to the reduction in mortality, still a significant effect; access to toilet however contributes very little, about one per cent.

Table 2
Models showing estimated social and environmental effects on child mortality

Model	Base value of percentage dead	Decrease in mortality due to change in value of categorical variable from 0 to 1				
Total sample						
		LOC	**OCC**	**ED**	**DW**	**TOI**
1	13.46	+2.06	-4.03*	-3.40*	-4.27*	-1.18
		FAC	**OCC**	**ED**	**DW**	
2	13.70	-0.55*	-3.80*	-3.09*	-3.40*	
Bustee sample						
			OCC	**ED**	**DW**	**TOI**
3	13.70		-4.91*	-4.12*	-4.20*	-0.71

Note: * significant at 5 per cent or below. LOC: location in *bustee* (0) or township (1). OCC: main occupation in household; lower skill (0), higher skill (1). ED: education of mother; lower (0), higher (1). DW: access to drinking water; further away (0), nearby (1). TOI: access to toilet; further away (0), nearby (1). FAC: industrial category of occupation; non-factory (0), factory (1). All variables are explained more fully in the text.

There is clearly more to be learnt here that only an in-depth observation of household behaviour could adequately reveal. Does closeness of access to water improve quantity available, for instance? Does it reduce the risk of contamination through long periods of storage or distance of transportation? There may be a seasonal dimension to this argument as in some *bustees* water supply runs dry at certain times of the year, and these may be those where water points are provided less frequently.[5] We feel this variable is describing availability rather than quality. In the Durgapur *bustees* the coincidence of access to toilets and to water is not particularly high at the household level: one-third of households have close access to one facility but not to the other. The independent contribution of sanitary facilities to child survival in urban areas has not been investigated in much empirical research elsewhere. An important exception is the study of squatter settlements in Jordan by Tekce and Shorter (1984), where the quality of construction of the individual dwelling was believed to be a good proxy for the sanitary facilities provided (*inter alia*). This is not the case in Durgapur where 25 per cent of the *bustee* dwellings were of substantial construction

[5] This observation was made to us by Jaysari Raychaudhuri from her own research experience in Durgapur.

but had poor access to water, and 17 per cent were of poor construction but had good access to water. In both studies the relevant variable has been shown to be independent of variables representing income and occupation in its contribution to survival.

The education of adult women in the household (to primary level and above) is also relatively important in both the total and *bustee* samples subtracting three to four per cent from the proportions dead. Much empirical work has still to be done to disentangle the various implications of this variable, which may include improved female status and bargaining power over household resources, enhanced awareness of potential control over life and death, explicit knowledge of hygiene, and the interaction of any of these. It should be noted, however, that our models indicate that maternal education is not sufficient to ensure high survival levels of children so long as serious economic and environmental constraints exist. For if it were sufficient, the effect of the access to water and sanitation would disappear once we had controlled for maternal education effects; but it does not.

Combining the three dimensions among the factors determining child survival, namely occupation, sanitation, and education, we are able to detect three important and statistically independent effects in the best model our data can support after eliminating all insignificant variables (Table 2, model 2). The main household occupation, usually the father's, together with the industrial classification of that occupation, closeness of access to drinking water, and maternal education are all significant in the explanation of child mortality. Essentially the same model results hold in the *bustee* sector taken separately also. We were not able to detect any significant interactions between these variables.

Table 3
Observed and estimated values of child mortality (per thousand births) according to principal occupation, education of mother and access to drinking water in the household (controlling for duration of marriage)

Occupation	Higher education		Lower education	
	Inside access	Outside access	Inside access	Outside access
Higher				
Observed	29	64	26	21
Estimated	24	60	58	94
	(579)	(78)	(77)	(48)
Lower				
Observed	53	95	96	129
Estimated	61	97	95	131
	(209)	(201)	(260)	(583)

Note: number of births in brackets

How well do these rather simple models characterize the conditions that determine child mortality in a new industrial city in a developing country? We leave the reader to judge by indicating, as an example, in Table 3 the observed and the modelled values in a three-variable model presented for the whole sample. This way one can see precisely where the model is least successful. Our feeling is that the overall fit is rather satisfactory, the model being useful enough, that is to say, for informing policy discussion. The worst predictions occur for the high occupational groups with low female education in the household, which come from two of the three estimates based on less than 100 births. As

these are relatively small proportions of the population, and relatively privileged in some respects already, the policy implications are arguably less important anyway.

Discussion and conclusions

This study confirms that the average level of child mortality may be quite low in a modern industrial city in a developing country, even among the working-class population, if a substantial proportion has been well-housed in planned townships. In terms of life expectancy this steel town's working population could be expected to live 63 years in the early 1980s. The infant mortality rate compares favourably with that for the whole population in the metropolitan city of Bombay, and was lower than that in some of the working-class wards of that city (Ramasubban and Crook 1985). To that extent we may support the proposition that new industrial towns are advantaged over old industrial and commercial urban localities. This conclusion compares well with that of another study undertaken by the authors which provided estimates of mortality from widowhood data for each district in the state of West Bengal (Malaker and Crook 1989). When those districts were ranked according to mortality in their urban sectors only, we found that Barddhaman District where Durgapur is situated, constituting about one-third of the district's urban population, had the lowest child mortality. Exactly the same was shown by the estimates made by the Office of the Registrar General from the questions on children ever-born and surviving asked at the 1981 Census (Government of India 1988a). In both studies metropolitan Calcutta and its contiguous districts had higher mortality than the urban areas of Barddhaman.

However, the differences in mortality between the planned and unplanned sectors of the city are such as to make the summary description of new industrial towns as 'privileged', or at the forefront of a new health era, somewhat inappropriate. The infant mortality rate is nearly doubled as one moves from the planned township area to the spontaneous *bustees*, going from 46 to 79 per thousand; as we pointed out above the population in the *bustees* constitutes about one-third of the total in Durgapur. This is a gap comparable with metropolitan Bombay's, where infant mortality varied from 46 to 87 per thousand between the best and the worst wards at about the same date. Clearly the advantage of being able to plan the city from scratch in the post-Independence era has not been sufficient to contain the spread of the mortality differentials.

These mortality differentials can be attributed both to the different socioeconomic characteristics of households and to the different level of amenities provided for them in this steel town. The effects of these characteristics have been shown to be largely independent. This is a useful finding in the context of a new industrial city over which the State has substantial control and where land is still quite readily available since it implies that immediate and practical interventions in specific directions might be effective in closing the mortality gap. There are other factors, however, where the State's involvement is likely to occur only over the long run and with less specific targeting: we refer to policies that will ultimately raise incomes and educational levels. Occupational structure in an Indian city is not within the State's control, nor under the control of the local development authority. The rise in overall incomes in the steel industry will only be gradual as productivity increase is slow (though the plant at Durgapur itself is due to be modernized shortly), and the market for steel is not buoyant. It appears that the State cannot do much immediately to bring about reduced mortality differentials by raising the social and economic status of households.

However, the health authorities could be encouraged to establish a system of readily available subsidized medical care in the *bustees*, given that access to the hospital provided for the steel workers is denied. An increasing trend in public-health strategy has been to establish decentralized public-health centres in rural areas of developing countries, staffed by paramedics. Progress in a similar provision for the shanty-town areas of industrial cities has been lagging behind in India; the result has been that slum-dwelling households have resorted to relatively expensive private medicine, sometimes compromising nutritional standards to do so (Pryer and Crook 1988). Although our evidence is not conclusive here, it does suggest that some of the advantages from employment in the large-scale industry, housing and incomes apart, are beneficial to children's health.

What is brought out more clearly by our analysis here is that the public authorities could intervene immediately and directly in the improvement of amenities, and to some effect. Our study seems to show that a ready supply of water to every household could make a substantial improvement in life chances; regarding toilets alone the statistical evidence is less clear, though the deprivation is clearly documented in our study and undoubtedly welfare, if not mortality, would be substantially increased if similar provision were made of accessible toilets.[6] Controlled for occupational structure and maternal education in the household, our model suggests that providing ready access to water in the *bustees* could reduce child mortality by one-third; and the additional provision of toilets might reduce it still further. The authorities responsible for Durgapur, as in so many cities of the developing world, were eager to extend the coverage of the planned township to incorporate all the population, but the resources have not been forthcoming locally for such an investment. Such major infrastructural works, which include multi-storey concrete flats, wide tarmac roads, and extensive use of space for vegetation, public recreation, and shopping centres, are in any case very costly and our study gives no reason to believe their effect on child mortality would be any greater than the effect of selective improvements within the *bustees*; in fact in our study, location within the township itself contributed nothing *per se* to mortality reduction. Unfortunately, our study could not easily be designed to determine the independent effect of air pollution on child mortality; and any intervention would have to relate to the pricing of domestic fuels in this part of India, as well as introduce stricter controls over industrial emissions. These would require economic policy measures with political implications beyond the purview of the local authority.

To sum up, the path of selective interventions including better access to good drinking water in the unplanned areas appears to be far more cost-effective than trying to extend the coverage of the planned township in seeking to improve the prospects for child survival. Furthermore, the potential improvement in mortality following from such limited but practical interventions could be substantial. On the other hand, while both income and educational improvements would also contribute to reducing child mortality, they would not of themselves eliminate the effects of a deleterious physical environment. Not only must the latter also be tackled, therefore, but there is reason to argue that such interventions would be easier to target and more politically feasible for immediate action, especially in new industrial towns where land availability is still less of a problem than elsewhere. In that

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[6] Improved access to, and hence increased use of water necessitates improved drainage as well, a fact overlooked in the earlier sanitary reforms in some of the metropoligan cities.

sense there is some potential for such 'new' towns to have a more favourable impact on child mortality than other urban areas of the developing world.

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