Cities, urbanization and health

David A Leon

Accepted 10 December 2007

It is in cities, and not the countryside, where the human ‘creative flame’ has burnt most brightly. For millennia they have been the centres and drivers of commercial, scientific, political and cultural life, having major influence upon whole countries and regions. The positive and progressive aspects of cities and urban centres recognized by historians, economists and other social scientists contrast with the more pessimistic tone of much of the epidemiological and public health literature on cities and urban life. In part this derives from the iconic place in our discipline of accounts of poor urban health in the 19th century in countries such as Britain. Almost everyone who has taken a course in epidemiology will have come across John Snow’s classic studies of cholera in London in the 1840s, with its attendant images of poor sanitation and contaminated water.

This history finds a resonance in contemporary concerns about the impact of cities and urbanization on health today. First, there are the health and social problems of inner-city areas of high income countries such as drug addiction, violence and HIV/AIDS. Second, there is concern about the health and welfare of the growing number of people in low and middle income countries who are living in urban areas—many of whom are in what are classified as slums. Third, as mentioned by Dr Chan the WHO Director General in the 2007 World Health Report, increasing global urbanization is classed as a threat to ‘Public Health Security’ as the unprecedented level of population agglomeration may facilitate the spread of epidemic diseases. Finally, there is the plausible connection between urbanization and the rising levels of non-communicable diseases in low and middle income countries.

This editorial sets out to challenge the largely negative view of the population health impact of cities and urbanization in the contemporary world. While there are real urban threats to health, on balance cities and urban living today have important health advantages particularly in the developing world. It is desirable that epidemiologists and public health advocates develop a better and more informed understanding of the nature of urbanization and the differences between urban and rural life today. In particular careful study is required of the way in which urban–rural differences in disease risk are heterogeneous and often context-specific.

Understanding urbanization today

A number of striking statistics about urbanization are frequently cited in reports and research papers. It has been estimated by the United Nations that in 2007, for the first time in history, half of the world’s population were living in urban areas. This follows decades of continuous increase in the proportion of the global population living in urban areas. This increase has been particularly in low and middle income countries (Figure 1). In sub-Saharan Africa the proportion of population in urban areas is estimated to have risen from just over 10% in 1950 to over 35% today. Most of the growth in the world’s population over the next 25 years is anticipated to be in the urban populations of low and middle income countries, particularly those in Africa and Asia.

These headline figures are more uncertain and problematic than is usually appreciated. In a comprehensive paper published in 2004, Cohen gives an informative and critical account of our state of knowledge about urbanization. The definitional issue of what constitutes an urban area is his starting point. The UN estimates are necessarily based on data provided by individual countries, despite the reality that there is wide variation between them in the criteria used to define urban and rural. Changes in definitions by individual countries also create problems in interpreting time trends. For example, in the 1980s China changed its criteria that resulted in a substantial jump in the population classified as living in urban areas. Other problems include the absence in many countries of nationwide censuses and the lack of recent data. These data problems, which are often not appreciated by non-specialists, need to be taken more into account when making comparisons across countries and over time. However, Cohen’s
view, is that despite these problems, the broad picture of an increasingly urbanized world, affecting all countries and continents, is correct.

Cohen also takes up several misconceptions about which urban areas are growing fastest and which social processes contribute most to this increase. The rapid pace of global urbanization is sometimes confused with, or reduced to, the growth in the number and size of very large cities (of 10M or more inhabitants). However, most of the growth in urban population observed in the past few decades, and that which is projected to occur up to 2030, has been and will be in small and medium-sized towns and cities of fewer than 1M inhabitants. The image therefore of contemporary urbanization being one of ever expanding megacities and dystopias with sprawling slums is thus misleading and incorrect. In this regard it is interesting to note that the 2007 Millenium Development Goals report\(^8\) presents data showing that the proportion of the urban population in developing countries who are living in slums has in fact fallen since 1990, although some of this reduction may be an artefact due to changes in definition of a slum household.

With regard to the main processes driving urbanization, rural-to-urban migration is typically given the most attention. Among epidemiologists this is arguably because of our interest in the study of the natural experiment created when people born in one setting (e.g. rural village) subsequently move to another (e.g. city). Such migrant studies have been highly informative about the nature and timing of environmental influences on disease risk.\(^9\) However, the single most important driver of urbanization today is in fact natural population growth in existing urban areas. Although difficult to estimate with certainty,\(^10\) there is a consensus among demographers that in developing countries, this accounts for around 60% of the increase in urban populations today. Less than 40% is due to migration from rural areas, the remainder being a result of annexation, whereby an expanding urban area comes to incorporate small towns or villages which had previously been classified as non-urban.\(^11\)

That most urbanization results from natural increase may have important implications for the way in which we think about its attendant health consequences. For example, recently articulated conceptualizations of the developmental origins of adult disease have emphasized the concept of mismatch between fetal forecasts of later nutritional environment and the post-natal reality.\(^12,13\) The hypothesis is that if fetal nutritional experience is one of the constraint, possibly reflecting a history of maternal malnourishment, then the individual will be physiologically maladapted to a post-natal environment of relative plenty. The consequence of this mismatch is hypothesized to be an enhanced risk of the metabolic syndrome and cardiovascular disease. One context in which such a mismatch may occur is in low income countries among people born to mothers living in rural scarcity who then move to live in relative urban plenty as children or adults. However, if much of the growth of the urban population is not the result of migration from rural areas, the extent of such first generation mismatches, and the corresponding adverse health effects, may be less than envisaged by reference to the growth in the urban population per se.

**Cities and health—the historical record**

Living conditions in cities in pre-modern times, going back to antiquity, would have been squalid and unsanitary for the vast majority of urban dwellers. Woods has characterized towns in medieval and early-modern Europe as unhealthy places, bedevilled by epidemics and with mortality rates higher than in the surrounding countryside.\(^14\) Indeed, he suggests that in many situations, cities would have only been able to survive by virtue of a constant influx of migrants to replace those who have died. However, it is only when one gets to the late 18th century that the evidence base appears that enables the move from informed speculation to more firmly based conclusions.

The health of cities in the 19th century has been at the heart of the ‘standard of living’ debate. This concerns the effects of industrialization and urbanization on the economic, social and health status of Britain and other populations that underwent these momentous changes in the 19th century. Much has been written about the reasons for the modest increase in life expectancy seen in Britain at this time.\(^15\) In the first half of the century life expectancy at birth for England and Wales remained almost static at about 40–41 years.\(^16\) However, between 1850 and
1900 it increased by around 6 years. In contrast, the urbanization of the British population occurred continuously across the whole of the 19th century. In the 1800s one quarter of the population of England and Wales were living in towns and cities. This steadily increased to over two thirds by the start of the 20th century.  

A key issue that has been examined in considerable depth is the extent to which urbanization and the rapid growth of cities in the middle of the 19th century resulted in an ‘urban penalty’. There is now good evidence that in the middle of the 19th century mortality rates in large cities appear to have been higher than the national average, often considerably so. This has been primarily attributed to the higher levels of overcrowding, poor sanitation and lack of access to clean water found in cities and towns compared with rural areas.

The 19th century record also shows that the effects of urban living on mortality in Britain were heterogeneous. First, mortality rates within cities were lower in the outer lying districts compared with the inner-city for much of the period. Secondly, the mortality rates of a city were directly related to size and population density. This led Woods to conclude that the simple dichotomy between urban and rural obscures the more complex and continuous relationship between the varied urban environment and health. These features have parallels when we come to consider the health impact of urbanization today.

Before leaving the historical record, it is worth considering the parallels and contrasts between urbanization during 19th century industrialization and that seen in the world today. While contemporary urbanization is on a far greater absolute scale than in the 19th century, the rate of increase in the urban population in less-developed countries in the past 50 years is surprisingly similar to that seen in Europe and North America in the period 1875–1925. The emergence of megacities in the recent past, with their unique problems of scale and infrastructure, is nevertheless historically unprecedented. Finally, it should be noted that urbanization today in sub-Saharan Africa is in some ways unique. It is occurring without the corresponding growth in national per capita wealth that has characterized almost all other examples of urbanization whether in the 19th or 20th centuries. It has been suggested that this may put a brake on the continued urbanization of the continent.

The major epidemiological contrast between these epochs concerns the overall levels of mortality and health in the urbanizing populations and in the associated disease profiles. Life expectancy at birth in England and Wales during the 19th century increased from less than 40 to 46 years. In 2005, India and China, which are both undergoing very rapid urbanization, have far higher life expectancies of 63 and 72 years, respectively. In contrast, average life expectancy in sub-Saharan African countries that are also urbanizing at a considerable rate are similar to those of 19th century Europe.

Are urban children disadvantaged today?

Recent decades have seen not only increasing urbanization but also considerable improvements in child and infant survival worldwide, including in sub-Saharan Africa. This is rather striking given the fact that in 19th-century Britain under-5 mortality appears to have been an important aspect of the urban penalty. Given the poor and sometimes slum conditions in which many urban children are living in low and middle income countries, is there any indication that they are nevertheless worse off than children living in non-urban settings? Reliable and comprehensive data on the health of urban and rural populations is relatively sparse. Nevertheless, that which does exist suggests that in most instances child health is better, and mortality lower, in urban than in rural areas.

In a comprehensive review, Harpham et al. concluded that ‘there is no clear and compelling evidence of an emerging urban health penalty that puts urban children at greater risk than rural children’. This included their own analysis of Demographic and Health Survey (DHS) data, looking at height for weight, weight for height and infant and under-5 childhood mortality. Similarly, based on data from the decade 1988–99, Alderman found that in 9 out of 11 developing countries, under-5 mortality was higher in rural than urban areas even when restricted to populations living on $1 per day or less. More recent analyses confirm that in sub-Saharan Africa the prevalence of child growth stunting is lower in urban compared with rural areas. The absence of an urban penalty in child health in low and middle income countries today is the result of a combination of factors. First, in these countries absolute poverty and malnutrition are mainly rural phenomena. As malnutrition is an important risk factor for death from common childhood infections of diarrhoeal and respiratory disease urban environments will tend to be better off. Secondly, urban populations tend to have higher vaccination coverage rates than their rural counterparts. Thirdly, dissemination and uptake of effective interventions such as oral rehydration therapy are likely to be more effective in an urban setting.

The child health advantage of urban areas is not a reason for complacency. Children’s living conditions, health and survival in urban areas in most low and middle income countries are poor compared with those in high income countries. Moreover, as is often highlighted, there are big inequalities in child health and mortality within cities—between the poor and the affluent.
Urbanization, non-communicable diseases and adult mortality

The rise of non-communicable diseases in low and middle income countries is being driven by enormous social and economic changes, of which urbanization is one dimension.

Urbanization is associated with profound changes in diet and in exercise that in turn increase the prevalence of obesity, with attendant increases in risk of type II diabetes and cardiovascular disease. It is interesting to note that recent Global Burden of Disease Projections up to 2030 chose not to take urbanization into account. However, urbanization was incorporated into projections of global diabetes prevalence made by Wild et al. Their conclusion was that along with population ageing, the anticipated increase in the world’s urban population from 2000 to 2030 would be a key driver of their projected rise in global diabetes prevalence from 2.8% to 4.4%.

A recent review of hypertension in sub-Saharan Africa brought together the relatively few studies that have compared urban and rural areas and found that rates were consistently higher in urban compared with rural areas. Similar results have been reported for India. In China, however, there is some evidence that the excess rates in urban areas that were apparent in the 1980s are disappearing as the prevalence of hypertension has been rising rapidly in rural areas. Other cardiovascular risk factors such as obesity and adverse lipid profiles have also been associated with urban populations in comparison with rural ones, although again there is evidence of convergence in China. Urban–rural convergence is also discussed in a recent review of the global nutritional transition which suggests that there are rising rates of over weight and obesity in many rural populations, particularly in countries with growing economies.

Smoking, one of the most preventable and important causes of cardiovascular disease and cancer, is rising in prevalence in low and middle income countries. However, it is very striking that in India and China there is evidence that smoking prevalence is now higher in rural than urban populations. The reasons for this have not been fully explored, although it is possible that the higher educational level of urban dwellers in these countries is an important factor.

Data on urban–rural differences in adult mortality in low and middle income countries is relatively sparse, certainly by cause of death. Analyses of the 1998–1999 Indian National Family Health Survey suggests that there is little difference in total adult mortality between villages, towns and large cities, except in old age where there was a suggestion that those living in large cities had a small advantage.

The bigger picture

In the developing world, people living in towns and cities today have advantages that are not shared by many rural dwellers. The greater wealth and economic vitality of cities compared with the countryside is one of the primary reasons why people come to and stay in urban areas. The possibilities of employment to meet basic needs are often greater than in rural areas.

For governments and other agencies it is easier and cheaper per head to provide services (however limited) to people living in cities than to the rural poor who are often dispersed over vast geographic areas. What is particularly important, is that some of the services and interventions that are thus more readily available to the urban population are truly effective in reducing morbidity and mortality—in childhood in particular. It could be argued that the growth of urban populations over the past few decades has had a multiplier effect upon the impact of immunization and oral rehydration therapy, by increasing the proportion of children who are readily accessible because they live in towns and cities.

The growing problem of non-communicable diseases is a particular problem for the urban areas of low and middle income countries. Nevertheless, this is generally occurring against a background of increasing life expectancy as populations move through the epidemiologic transition with a declining relative burden of deaths from infection, especially in infancy and childhood. As illustrated by higher rates of smoking in rural compared with urban areas in China and India, not all risk factors for non-communicable diseases are higher in cities than in the countryside. The reasons for this particular reversal of the expected pattern deserves further study. The apparent urban–rural convergence in other cardiovascular risk factors in some countries, driven by rising risk levels in rural areas, is a reflection of the truly global nature of changes affecting most, if not all, societies. Such convergence may be slowest in the poorest regions such as sub-Saharan Africa.

Acknowledgements

I would like to thank Anna Goodman, Rosemary Davies, Lydia Leon and George Davey Smith for helpful comments on a draft of this editorial, and Zhengming Chen for input on urban–rural differences in China.

References


23 Fotso JC. Child health inequities in developing countries: differences across urban and rural areas. *Int J Equity Health* 2006;5:9.


