HONG KONG : AN EPIDEMIOLOGICAL TRANSITION FROM THIRD TO FIRST WORLD ?

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INTRODUCTION : THE EPIDEMIOLOGICAL TRANSITION

It has long been recognised that societies seem to pass through various changing patterns of morbidity and mortality during the development process, even if not all the stages and sequences are identical in every case. In general, health improves, morbidity and mortality fall and occur because of different causes, and life expectancy increases; this comprises the "epidemiological transition" (Omran, 1971, 1977). These changes generally come with modernisation and appear to be part and parcel of the process. They seem to occur at a different pace in varying countries and, in recent years, these have been to some extent related to the application of modern medical techniques and technology as well as to changing standards of living, nutrition, housing and sanitation.

It is generally accepted that it is not possible to identify precise correlations with many of the changes in mortality and morbidity within the epidemiological transition except in certain specific instances such as vaccination and the eradication of smallpox, although even in this case improved living standards were also important. However, the epidemiological transition is closely related to many changes in the growth of populations. Demographers and, to an extent, historical, population and medical geographers, have for a long time, debated the evolution of fertility patterns, family size and longevity when societies modernise. The general trend is that, from a period of low population growth when deaths and births roughly balanced each other (infant mortality rates are high and life expenctancy low), some sorts of health and social improvements occur which allow more people to survive and, for a while, population growth can be quite rapid and family sizes large. The need for large numbers of children to replace those lost through high infant mortality gradually diminishes and, eventually, the social and economic benefits of having smaller families may be recognised. Family sizes tend to stabilise at a lower number and standards of living rise whilst societies as a whole become more affluent. Eventually, a stable population size may be achieved, and may even show some slight reduction as deaths from natural causes in old age tend to outweigh the number of births.

This is a rather straightforward and perhaps simplistic demographic transition. Whilst most societies today can undoubtedly be observed to be at various stages in the transition, it is subject to many checks and balances. Its rate of occurrence has varied tremendously both internationally and historically and reverses may even occur in some unusual circumstances. The seemingly simple core of the demographic transition theory is that fertility declines appreciably, probably irreversibly, when traditional nonindustrial (usually agrarian) societies are transformed by modernisation or development into bureaucratic urban-oriented societies (Beaver, 1975; Jones, 1981). This statement assumes many things : for one, that a simple industrial-economic modernisation will occur in societies and that it will be accompanied by changes in life styles, living conditions, aspirations and, of course, health levels. There are many reasons such a simple progression may not be followed and, indeed, modernisation theory and the orthodox development orientation it implies are not wholly accepted by many researchers (Kitching, 1982). Nevertheless, there is undoubtedly evidence that many elements of the demographic transition concept can be identified in most societies (Verhasselt, 1985). More interesting to many epidemiologists, health planners and medical geographers is that with "modernisation" and increasing affluence and life expectancy comes a very different disease or ailment profile in most countries from that which previously existed in an underdeveloped or "traditional' state. This has extremely important implications for planning and the allocation of resources and manpower training to meet future needs (Colbourne, 1976a; Phillips, 1981; Joseph and Phillips, 1984).

The changing patterns of morbidity (illness) and mortality (causes of death) with modernisation can also be placed in a perhaps deceptively simple but surprisingly consistent epidemiological transition model which parallels the demographic transition. As with this latter transition, the epidemiological transition assumes or implies a range of changes : in attitudes, education, diet, aspirations, urbanisation, public health and health care and its technology. Basically, it proposes that societies during modernisation will move from a period of high birth and death rates and low life expectancy (of perhaps 40 years expectancy of life at birth or even lower) to a stable period when life expectancy will have increased to around 70 years or longer, and death rates and birth rates will have become much lower, often approximately balancing each other numerically.

During the early stages of the epidemiological transition infectious, parasitic and nutritional diseases will probably be the cause of the vast bulk of morbidity and mortality. By contrast, in the more advanced societies, such conditions will make up only a trivial amount of real ill-health and little mortality although childish conditions such as measles, chickenpox and the like will of course continue. Often only pneumonias and influenza will be a real cause of danger and then mainly to the older age groups. On the other hand, whilst in the early stages of modernisation, what are essentially chronic degenerative conditions associated mainly with older adulthood such as heart diseases and cancers will be relatively unimportant (but long-standing conditions related to parasitism and malnutrition may be important causes of morbidity). In more modern societies, chronic degenerative conditions rapidly seem to make up the majority of causes of morbidity and mortality. These are often regarded as western diseases but they are becoming increasingly visible in many Third World countries (Trowell and

Burkitt, 1981). Deaths or illness due to injury, accidents and violence tend to make up a small if important proportion of mortality and morbidity and certainly lead to considerable loss of work and reduced quality of life. Unfortunately, accidents often occur to children and young adults and frequently occur at higher rates in the less developed world than in developed countries. The epidemiological transition, as noted earlier, can sometimes be advanced by the concerted application of modern medical knowledge, for example, the eradication of smallpox (Strassburg, 1982). However, most changes seem to be related to much wider developments in living standards and ways of life, of which active medical care, preventive medicine and public health are but a part. The correlation between increased health and more health care is not always direct (Howe and Phillips, 1983). The existence of an epidemiological transition is now generally recognised (see, for example, Hellen, 1983) but there are still relatively few detailed case studies to illustrate the changes within specific countries especially in the less-developed world. General studies at the international scale based on aggregate data have been quite widely reported illustrating, for example, the proportions of morbidity and mortality from various causes at different dates (see, for instance, Pyle, 1979). Third World countries quite consistently appear as still being at the earlier stages of the transition even today. Detailed case studies are much rarer and the current paper builds upon earlier preliminary work (Phillips, 1986a) to show how Hong Kong has emerged during the thirty years or so up to the mid-198Os from having very much a "Third World" epidemiological pattern to a much more modern one. The study may still be felt to be somewhat exploratory as much research remains to be undertaken into the factors underlying the transition although, as noted earlier, unicausal or simplistic explanations are unlikely to be helpful or even to exist with the exception of the eradication of a few very specific diseases. Much more difficult will be the explanation of why death rates from specific types of circulatory diseases or cancers occur and increase with modernisation. Purely associative or correlation studies are unlikely to be successful in pinpointing true causality.

This study illustrates how mortality patterns have changed in the territory of Hong Kong mainly during the past three decades. The changes have been accompanied by extensive urbanisation and the whole territory is today substantially "urban" (see Sit, 1981; Chiu and So, 1983). For a number of reasons, Hong Kong seems to provide a good example of how disease patterns change with modernisation. It is a confined place, with a relatively good early statistical base for a country at the stage of development at which it found itself in the early 195Os. There are also good accounts of the territory's history and the evolution of its health services (see, for example, Sayer, 1937; Endacott, 1958, 1973; Endacott and Hinton, 1962; Li, 1964; Choa, 1981). With certain limitations discussed below, the recording of vital statistics and health data has been fairly reliable. The pace of modernisation and urbanisation has been remarkable, and medical services have also improved very markedly in the last twenty years. It seems even at a cursory glance that an impressive epidemiological transition has taken place and, therefore, it may be possible to see evidence of how this associates with modernisation. All in all, it makes a very fitting case study which may be of relevance to other countries which experience a similar path of development.

1841 - 1941 - A hundred years of infectious disease in Hong Kong ?

The background to Hong Kong's early growth as a British Crown Colony since 1841 may be found in a number of good historical references. The colony received areal additions in 1860 of Kowloon, and the New Territories in 1898 leased for ninety-nine years (Sayer, 1937; Endacott, 1958; Endacott and Hinton, 1962). Today, Hong Kong is highly urbanised and prosperous, but its initial growth was not promising. Unruly elements were attracted; typhoons and fever threatened property and life. There was, nevertheless, high in-migration from China and a population of some 33.000 in 1851 grew to 879.000 by 1931. Hong Kong became a centre of Chinese trade under a liberal British rule with its harbour the focus of major trading activity. The administration followed the normal patterns for British overseas territories with a governor appointed by London and nominated (then unelected) Executive and Legislative Councils. It is only in the 1980s that many significant changes in representation and administration have come to the fore (Phillips, 1986b).

The urban pace of development was relatively rapid, and focused on the settlements of Victoria on Hong Kong Island and the Kowloon Peninsula. Substantial areas of rural land still remained in the New Territories and on the islands in Hong Kong waters where agricultural life continued. Public health emerged as a serious problem in the nineteenth century in virtually all parts of the colony. Successive colonial surgeons (notably Murray) severely criticised sanitary conditions but there were great difficulties not only involving a lack of will and finance to improve conditions on the part of the administration but also involving Chinese customs and practices. Overcrowding and lack of sanitation became major problems during the 1860s, and in 1870, much fever (malaria) was reported by Dr. Murray. The gross overcrowding and insanitary conditions of life for most of the population were re-emphasised by his successor in 1873, Dr. P. Ayres, although again little was done to improve conditions.

Public health degenerated to such an extent that in 1882 a full report was made on the sanitary conditions in Hong Kong by an engineer, Osbert Chadwick. Following this, the Sanitary Board was created (1883). This was later to become the Urban Council which would oversee urban services in the 1930s. Towards the end of the nineteenth century, reforms were proposed but the legislative and practical activity that resulted was limited. In particular, regulations relating to overcrowding and sanitation were weakened because of landlord opposition. However, major water supply and other public works schemes were put in hand which were to have long-term benefits to standards of health in the territory.

Nevertheless, the failure to implement fully the Chadwick Report undoubtedly contributed to the plague of 1894 and heavy mortality developed, although the exact extent of deaths from plague is not clear because there was at the time no legal necessity to register deaths among the Chinese inhabitants. Treatment and prevention were difficult not only because of the sanitary problems but also because of the prejudice against Western medicine by many of the inhabitants (Endacott, 1958). Plague continued for most years to the end of the century. A conflict between China and Western medicine

developed for some time and it was not until the 192Os that plague was removed from the colony. Plague did have important social and educational repercussions and a Medical Officer of Health was appointed but, nevertheless, many basic problems of sanitation and overcrowding remained essentially until the postwar period.

Various hospitals were established in the late nineteenth century ; and the College of Medicine for the Chinese, founded in 1887, which developed into the University of Hong Kong in 1911, offered medical degree among other courses. Medical services and health did improve to an extent after the turn of the century although the assessment that «Hong Kong has now outlived its old, evil reputation as an exceedingly unhealthy place» (Mill, 1911, p. 537) is hardly matched by the facts. The population at the time was barely 45O.OOO and malaria, cholera and smallpox were much in evidence. It was not until the 193Os that malaria was really under control but the influx of refugees beginning in 1937 brought more infections, with serious outbreaks of cholera and smallpox in 1937 and 1938. In particular, crowding never really eased and the colony was never really kept free from infection in the period before 194O. The steady if slow expansion of medical facilities and public health was interrupted by the war and Japanese occupation 1941-45. With an initial influx of population pre-1941 and the severe privations of the war years, many health problems worsered. Tuberculosis spread rapidly whilst deficiency diseases (notably beri-beri) became quite common again.

This was the situation when the account of Hong Kong's true "epidemiological transition" can begin. The postwar medical profession was assisted by great advances in knowledge, particularly in antibiotic therapy, but in Hong Kong their implementation was hindered by great population pressure and overcrowding. Plague had disappeared and malaria had been virtually eradicated but tuberculosis and many infections remained widespread. In many ways, the health situation immediately postwar was worse than in the late 193Os and Hong Kong still had very much a Third World health profile.

The epidemiological transition in Hong Kong

Hong Kong is a particularly apposite example of how societies may change their epidemiological profiles in a relatively rapid timespan, in this case largely during the thirty years or so following the early 195Os. Hong Kong is unique in many respects but it does also provide something of an exemplar among the loosely-defined group of countries known as the Newly Industrialising Countries (NICs). East and Southeast Asia has a number of members of this groups, including Singapore, Taiwan and Korea (Crow and Thomas, 1983). Malaysia and Indonesia may also be moving into this category. Most of these countries derive important elements of their Gross National Product from industrial and "modern" economic sectors. They are to a large extent divorced from the rest of the Third World and, like the oil-exporting high income countries, many can afford progressive social policy and infrastructural provision, including education and health care.

Hong Kong, as the regional co-leader of the NIC group with Singapore, may indicate the epidemiological path which the others will follow. Its current mortality profile may

be viewed in a comparative world regional context by reference to recent research by Hakulinen et al (1986). However, it is not the intention of this paper to develop a full comparative study of the epidemiological transition amongst NICs. It is important to recognise that Hong Kong and Singapore are both essentially city states, with clearly defined, relatively small populations, largely living in modern urban settings in relatively easy reach of high quality modern medical care, supplemented by some inhabitants with traditional medical systems. These two city states have also experienced enviable rates of economic growth and have had administrations clearly concerned with welfare, housing and social programmes including health (see, for example, Kwan and Chan, 1986; Phillips and Yeh, 1987).

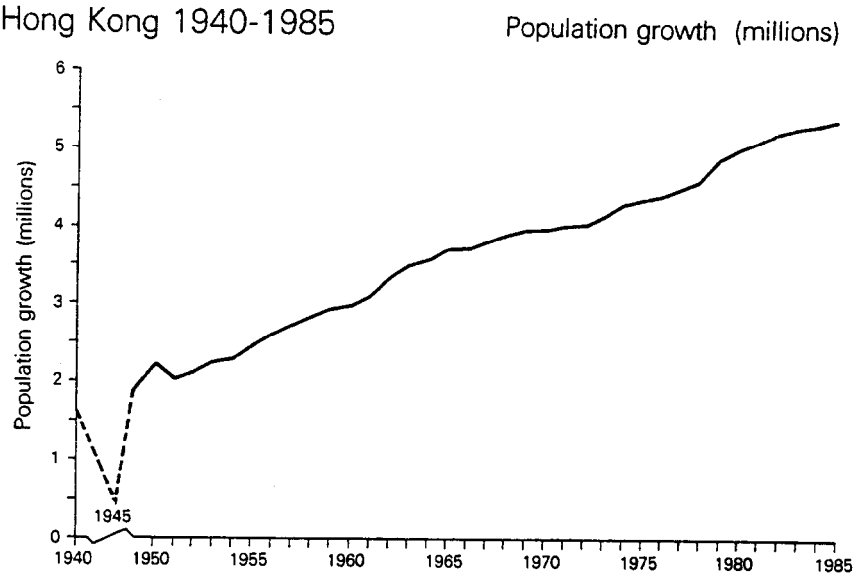
Hong Kong's health since 1945

In the years immediately following 1945, infrastructural damage, lack of investment and population change meant that the territory's health profile was, if anything, worse than it had been in the late 1930s from the point of view of infectious illnesses and public health problems. Colbourne (1976a, 1976b) points out that it was not until about 1948 that control was re-established over smallpox, malaria and the deficiency disease beriberi. Infections, especially those of infancy, remained the leading causes of death and ill-defined causes were also high as on the list, perhaps indicating continued weakness in health services.

Until about the early 1950s, Hong Kong could still be said to have had a more or less "Third World" epidemiological profile. By 1951, the population had grown to some 2 million persons from a war-years "low" of about half a million (Figure 1). The population had been swollen in the late 1940s by refugees from the Chinese communist revolution and the turmoil between Chinese factions which was spreading southwards through the mainland. Refugees often arrived in a poor physical condition and brought with them a variety of infectious, parasitic and deficiency diseases as well as often being near starvation. They arrived to find unsatisfactory housing and added to the huge growth in squatter settlements on the hillsides, giving Hong Kong a renewed poor reputation in housing. As noted below, it was not until the very end of 1953 that events caused the government to begin a campaign of public housing provision which, perhaps more than anything else, has helped to improve Hong Kong's standards of living.

The territory's economy was also beginning to undergo important changes at the time. Between 1945 and 1955, it was changing from an entrepot to an industrial manufacturing economy (Szczepanik, 1958). Hong Kong was about to become an important manufacturing centre in its own right, which it has continued to be today, whilst it has during the 1970s acquired increased international financial and additional trade functions. In the 1950s, however, the population needed to live near to their work, given the congested roads and insufficient housing. The provision of public housing became not so much a matter of a welfare orientation in these early days but one of economic necessity (Drakakis-Smith, 1979).

Figure 1



The epidemiological transition to 1960

In 1948, Hong Kong was a noted subject to a host of infectious diseases. Pneumonias, tuberculosis and enteritis and diarrhoea were the three most important groups of diseases in terms of mortality. Malaria and beri-beri were also of significance but it seems that certain chronic diseases were beginning to emerge as important causes of death, notably diseases of the heart and cancers. Whilst it is recognised that data for morbidity might be more important than crude death rates to the tracing of epidemiological changes (Ashley and McLachlan, 1985), such information is not readily available for this period. In addition, it is not easy to discern the full spectrum of epidemiological changes at this time. For instance, whilst government reports of the period discuss the incidence of infectious diseases in great detail, relatively little attention is paid to morbidity and mortality from other causes so it is difficult to make definite statements about such conditions. One is left to infer what these were. Accounts are abundant of public health problems and the means of dealing with them; it is possible to read of the hundreds of thousands of people living in squatter shacks and in insanitary congested tenements with up to eighty persons sharing a kitchen, with piped water being provided for only two and a half hours per day, and often with no flushing latrines (Colonial Office, 1956). Nevertheless, even in 1955, great efforts were being made to implement public health measures which, in Asian terms, were helping community health to improve rapidly during subsequent years.

The epidemiological transition since 1960

Data begin to become more reliable after the 1950s and, since 1971 in particular, great care has been taken to produce mortality data in a comparable and accurate format (see, for example, Census and Statistics Department, 1983). However, even in the early 1960s, figures are not readily available for deaths from causes other than infectious diseases and these statistics have to be obtained from various sources (Table 1a and 1b). Since 1970, figures for all causes of death have been routinely published in the summary annual reports of Hong Kong Governement.

The balance of infections to degenerative diseases has over the past twenty-five years shifted as shown in Table 2. These figures show the current importance as causes of death of neoplasms, heart disease and cerebrovascular diseases.

Table 1a - Summary of causes of death in Hong Kong in 1948

	N°	%
Pneumonia (all forms)	3150	23.46
Tuberculosis	1962	14.61
Enteritis & Diarrhoea	1764	13.14
Premature births, diseases of early infancy	1206	8.98
Ill-defined causes	810	6.03
Accidents, violence	774	5.77
Heart diseases	576	4.29
Bronchitis	414	3.08
Cancers	396	2.95
Genito-urinary diseases	342	2.55
Digestive system	324	2.41
Intracranial vascular lesions	270	2.01
Malaria	198	1.47
Beri-beri	140	1.04
Other ailments	1102	8.21
	13428	100.00

Source : After Colbourne (1976a)

Table 1b - Hong-Kong : mortality by disease group 1961, 1974 and 1985

Disease Group	Detailed List n° 9th Revis.	1961(1)	1974(2)	1985
Infective and parasitic	001 - 139	16.2	5.8	3.1
Neoplasms	140 - 239	12.3	21.4	29.4
Endocrine,nutritional metabolic, immunity disorders and blood	240 - 289	0.9	1.2	1.2
Nervous system,sense organs and mental disorders	290 - 389	0.8*	0.9	0.7
Circulatory system	390 - 459	18.2	25.4	29.2
Respiratory system	460 - 519	16.3	17.2	16.4
Digestive system	520 - 579	7.7	5.1	4.2
Genitourinary system	580 - 629	2.0	2.7	4.4
Pregnancy,childbirth and puerperium	630 - 676	0.3	0.1	+
Skin,subcutaneous tissue and musculo-skeletal system	680 - 739	0.2	0.3	0.2
Congenital anomalies and conditions originating in the perinatal period	740 - 779	8.8	4.3	2.1
Symptoms,signs and ill- defined conditions	780 - 799	10.4	7.7	2.7
Injury and poisoning	800 - 999	5.9	7.9	6.4
All causes	001 - 999	100.0	100.0	100.0

** Excluding Cerebrovascular Disease (formerly Vascular Lesion)Affecting Central Nervous System under the Nervous System and Sense Organs) : 7,5% in 1961*
(1) Data regrouped according to I.C.D. 8th Revision (1965)
(2) Data regrouped according to I.C.D. 9th Revision (1975)

Source : Department of Medical and Health Services 1984-1985 Departemental Report and Hong-Kong Government Hong Kong 1986

Table 2 - Percentage of all deaths from the following causes

Year	Infect. and parasitic condit. (excl. pneumon.	Neo-plasms	Heart disease	Cerebro-vascular disease	Diseases of diges tive sys tem	Resp syst
1951*	23.6	4.2	5.5		15.0	27.4
1961*	16.2	12.1	9.9	7.5	7.7	14.8
1970*	7.9	19.1	15.0	8.7	5.3	15.0
1975	4.0	24.2	15.6	11.0	4.6	15.8
1980	3.1	24.8	15.3	13.2	4.3	15.3
1985	3.1	29.4	16.5	11.8	4.2	16.4

** data regrouped according to different versions of I.C.D.*

Source : compiled from various official sources and Kwan (1986)

Together, these today account for about 58% of all deaths, as compared with some 29.6% in 1961. This indicates a rough doubling in percentage point terms of the contribution of these conditions to the overall death pattern in the period 1961-1985. By contrast, deaths from infectious and parasitic diseases have fallen proportionately over five-fold, being responsible for only 3% of total deaths in the mid-198Os. This does, however, exclude important proportions of deaths from pneumonias (about 6.7% of the total), presumably mainly occurring among the elderly. 29% of mortality today is caused by digestive system and genito-urinary system disorders and ailments of the respiratory system (including pneumonia). Many of these conditions could also be regarded as chronic or degenerative.

Infant and neo-natal mortality

One of the major features which appears to mark the epidemiological and demographic transitions is a marked improvement in infant and neo-natal mortality. Infants and neonates are the most vulnerable in the population to infectious diseases and poor feeding. If these can be dealt with by public health reforms, immunisation and nutrition programmes and what are usually referred to as "maternal and child health" packages, then this can often initiate movement away from a Third World mortality pattern. The reduction in infant mortality (deaths of children under one year of age) and neonatal mortality (deaths within four weeks of birth) in Hong Kong is perhaps the single most impressive trend. Figure 2 illustrates the excellent reductions in infant and neonatal mortality since the 195Os. Infant mortality rates of over 4O per thousand and up to almost 1O% were seen during the 195Os. Today, rates are still falling, from 1O.1 per thousand in 1983 to 7.6 per thousand in 1985. With Japan, contemporary Hong Kong has one of the lowest rate of infant mortality in the world, comparing very favourably with virtually all developed nations. Hong Kong is justifiably proud of this feature.

Figure 2

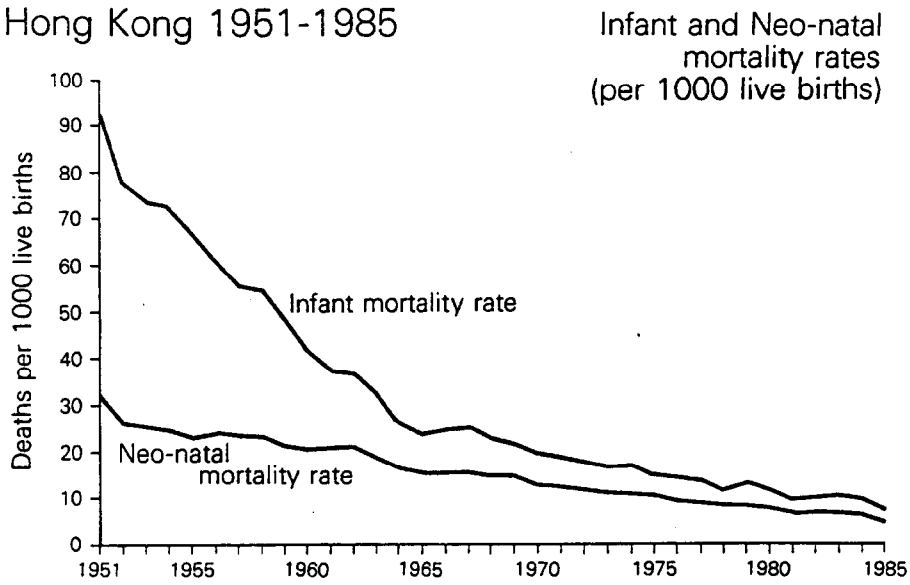
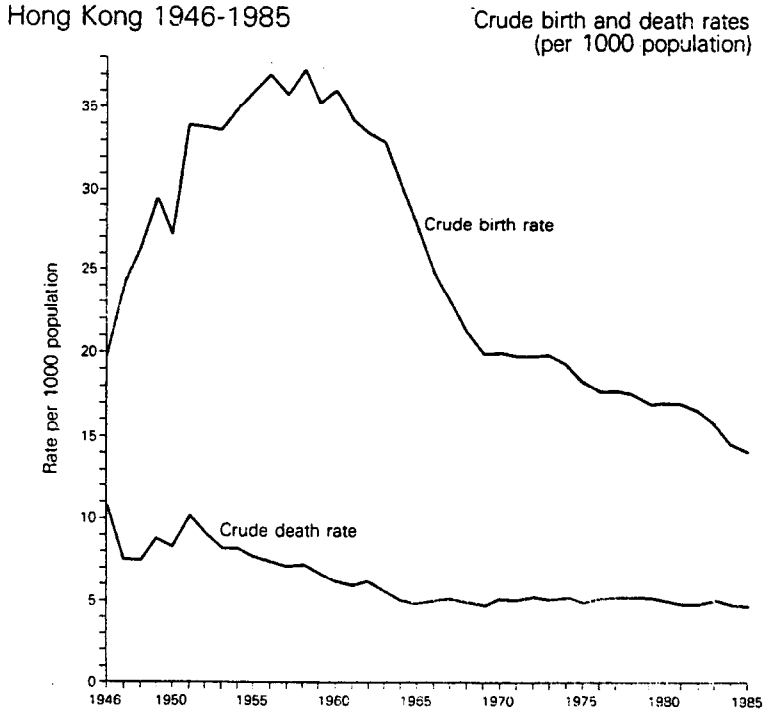


Figure 3



Equally impressive is the evolution of the crude birth rates and death rates (Figure 3). Crude death rates have for a number of years been relatively stable at about five per thousand (4.7 per thousand in 1985, having fallen from over ten per thousand at the start of the period). The crude birth rate is now only about fourteen per thousand (1985). Family planning campaigns and improving standards of living and economic aspirations seem to have been responsible for bringing about a rapid fall in crude birth rates from over thirty-five per thousand in the 1960s to the current relatively low level. The much increased survival rate of the newly born and infants discussed above is also of course strongly associated with this trend. Numbers of children born have almost everywhere (although not universally) been found to decline as the survival rates of children improve. Decline in marital fertility is now very marked in Hong Kong although there are other important social changes such as postponement or avoidance of marriage (Kwan, 1986). However, as fairly large numbers are now in the 15 - 30 "reproductive" age group, it may be that the current low levels of fertility will increase slightly in the near future.

Population ageing, epidemiological changes and service provision

These very clear changes in the pattern of deaths in Hong Kong of course both underlie and reflect the ageing population which now no longer has the very youthful profile it previously had. That more and more people are surviving into old age and late old age is itself indicative of the epidemiological transition. Table 3 shows that even within the short period from 1971 to 1984, life expectancy at birth for males has increased by five years and for females by over four years (the gap between female and male longevity is narrowing). The life expectancy at birth of Hong Kong residents now compares very favourably with virtually all developed countries and, with the exception of Japan, it is now the longest in Asia (see, for instance, United Nations, 1985).

The "ageing" of the population, part of the demographic transition but equally related to the epidemiological change, is a significant feature in Hong Kong. The age distribution has changed significantly in the territory over the past decade or so. In 1970, 37.1% of the population was under fifteen years of age; by 1980 this had fallen to 25.3% and, in 1985, this was only 23.2%. The proportion of working age has increased and the dependency ration (the ratio of the young and the aged to those in the 15-64 age group) has dropped from 700 per thousand in 1970, to 582 per thousand in 1975 and 448 per thousand in 1985 (Hong Kong Government, 1980, 1986). This implies yet greater economic development is possible, but the relative ageing of the population has important medium and long-term implications for the provision of health and social welfare services (Joseph and Phillips, 1984; Kwan and Chan, 1986).

Table 3 - Life Expectancy at Birth

Year	Male	Female	Difference
1971	68.0	75.6	7.6
1972	68.1	75.6	7.5
1973	68.7	75.9	7.2
1974	69.1	76.0	6.9
1975	70.0	76.5	6.5
1976	69.7	76.5	6.8
1977	70.1	76.6	6.5
1978	70.6	76.7	6.1
1979	70.7	77.1	6.4
1980	71.7	77.5	5.8
1981	72.4	78.1	5.7
1982	72.7	78.3	5.6
1983	72.5	78.4	5.9
1984	73.2	79.0	5.8

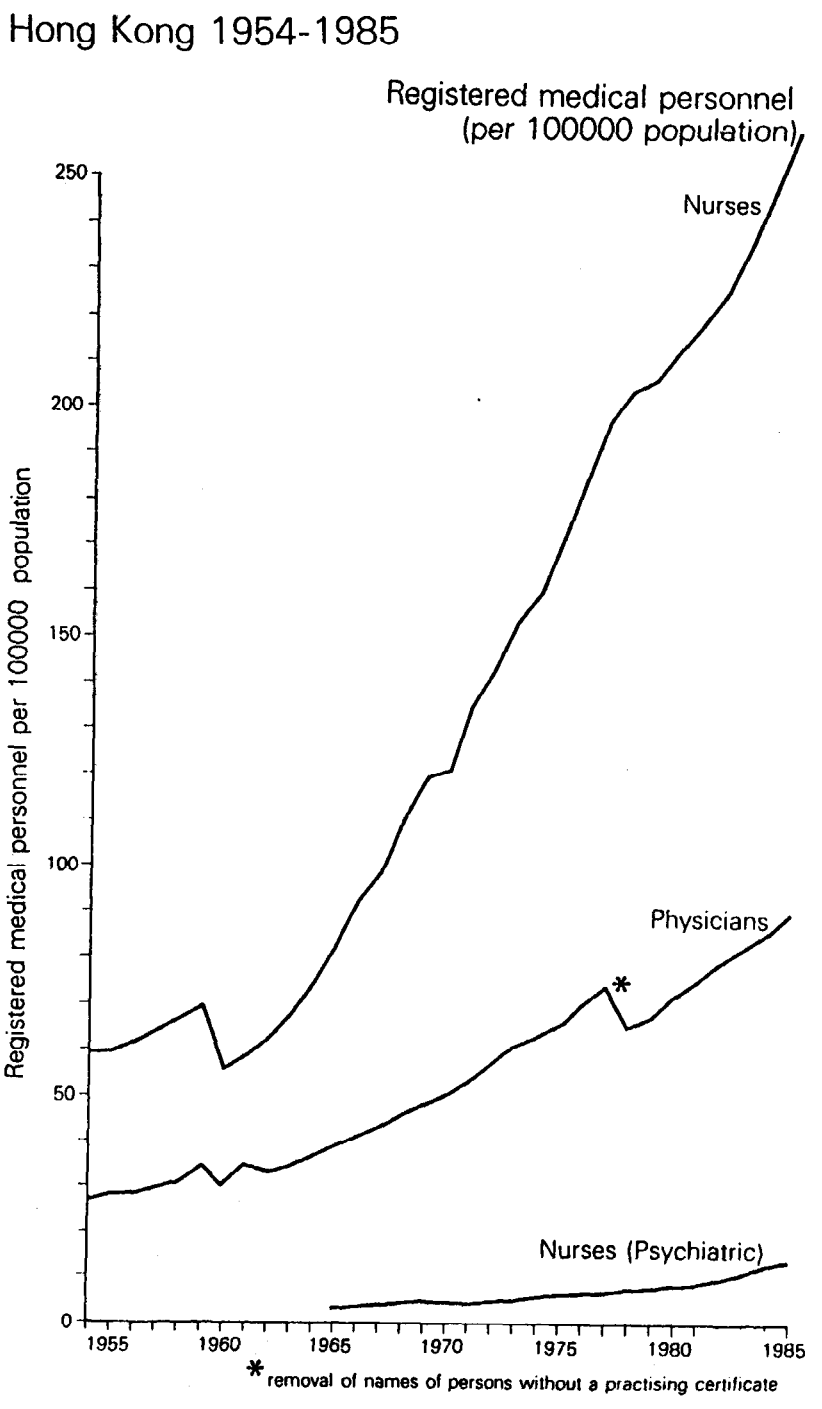
Source : Hong Kong Government, Census and Statistics Department

The increase in the proportion and number of elderly people (however defined) in Hong Kong has only really been noticed since the 1970s and perhaps the implications of this trend have yet to be fully realised. The ageing of the population will undoubtedly mean the epidemiological transition will advance yet further and degenerative and chronic disorders which are common in middle and later life will become yet more important as causes of morbidity and mortality. Space does not permit this feature of demographic change to be discussed in greater length but it is interesting to note the figures of increase of elderly people in the population. In 1961, the number of persons aged 60+ was about 100.000 (or 4.8% of the total population). By 1971, this had increased to some 293.000 (7.5%), to some 527.000 (10.3%) in 1981 and 640.000 (11.6%) in 1986. The absolute and proportional increases are therefore of considerable significance in terms of planning of medical and other social welfare provision in the future (see, for example, Kwan, 1986; Phillips, 1987).

The increase in trained medical personnel and health care facilities

Since the mid-195Os, there has been a steady and marked increase in the number of personnel trained in western medicine. The numbers of traditional practitioners of Chinese medicine is not known precisely but is possibly about equal to the number of western-trained doctors (see Topley, 1975; Phillips, 1984). The notable feature of growth shown in Figure 4 is the almost fourfold increment in the ration of doctors-to-population from 27.6 per 100.000 (1954) to 90.0 per 100.000 in 1985 (0.28 per 1.000

Figure 4


Hong Kong 1954-1985
Registered medical personnel
(per 100000 population)
Nurses
Physicians
Nurses (Psychiatric)
Registered medical personnel per 100000 population
250
200
150
100
50
0
1955
1960
1965
1970
1975
1980
1985
* removal of names of persons without a practising certificate

to 0.9 per 1.000). This puts Hong Kong today in a favourable position with regard to other countries in the region, such as Malaysia which in 1980 had 0.3 doctors per 1.000 population and Singapore which had O.9 (1982). Other countries are, however, yet better provided. In Japan (1981), the ratio was 1.4; and, elsewhere, Britain (198O), 1.3, and USA (198O), 2.1. Nevertheless, the increase in trained and efficient personnel has a positive correlation with increasing affluence and decreasing morbidity/mortality from infectious ailments in particular as discussed earlier.

A similar increase can be seen in the support services such as nursing. Often these are of greater importance to "public health" improvements than an increase in the number of doctors. The ratio of registered nurses per 100.000 population has grown from 59.7 (1954) to 261.5 (1985), a steady increase but with significant improvements coming about during the 1970s. Of particular significance is the increase in the number of nursing staff specialising in psychiatric ailments, which has really only come about during the past decade. This is interesting and indicates recognition of the further progression in diseases of affluence or modernisation which are often associated with mental ailments. By 1985, there were some seven hundred and fifty registered nurses (mental) compared with about two hundred in 1973.

Hospital beds have increased in numbers during the period since 1970 at almost 3% per annum, ahead of population growth. In 197O, there was a total of 16.471 hospital beds (4.16 per 1.000 population); by 1985, this had grown to 24.638 beds, provided at a rate of 4.54 per 1.000 population (Table 4). The planning norm which it is aimed for is 5.5 beds per 1.000, although the achievement of this is still some way off, and even that rate is not generous by international standards. Nevertheless, many community facilities for health care are being provided at a good standard. With the epidemiological transition progressing as far it has, community care facilities are very likely to become those most needed in the future.

Table 4 - Provision of hospital beds and bed-to-population ratios

	1965	197O	1975	198O	1985
Government hospitals	4.769	6.299	8.1O8	9.297	11.883
Government dispensaries	4O2	489	432	387	—
Governement maternity homes/clinics	—	—	—	—	4O5
Government assisted hospitals	5.975	7.533	7.849	7.849	9.622
Priv.hospit.	1.511	1.8O6	2.175	2.479	2.666
Priv.matern.	449	3O2	98	36	—
Priv.nursing matern.homes	7O	42	43	22	62
Total permanent beds	13.176	16.471	18.561	2O.8O6	24.638
Mid-year pop. estimate	3804300	3959000	4395800	5067000	5422800
Hospital beds per 1OOO	3.46	4.16	4.22	4.15	4.54

Factors associated with the epidemiological transition in Hong Kong

As noted earlier, there is probably no single factor which may be isolated as being of overwhelming importance in the rapid epidemiological transition in Hong Kong. The underlying trend has been "modernisation" although this has a number of manifestations. The following factors, and probably many others, have operated simultaneously in Hong Kong during the postwar period bringing about changes in mortality and morbidity. The factors are not in any particular order of significance :

1) Improvements in the "disease environment". The host-disease balance has altered rapidly since the 194Os in part as a result of medical intervention but also in relation to public health campaigns and the other factors below.

2) Investment in health care by the government, subvented and private or charitable institutions. This includes primary, secondary and tertiary care, curative and preventive medicine and health education. Rapid improvements in medical staff to population ratios.

3) Rapid rate of growth of GNP and family incomes, which have enabled greater public investment in services and infrastructure and family expenditure on food and consumer items. Labour legislation and environmental controls.

4) Much improved conditions of accoMmodation :

- less crowding
- better disposal of sewage/sanitation
- clean water
- relatively fewer squatters
- campaign for good, self-contained housing

5) Much changed life styles :

- more or less full employment
- more disposable income
- higher education levels
- fewer employed in dangerous occupations
- smaller families; rapid decline in fertility rate

6) Associated with (5), dietary changes :

- disappearance of deficiency diseases
- "malnutrition" today perhaps associated with "modern" foods
- more balanced diets

7) Considerable investment in social, welfare and educational services

- care for the elderly
- compulsory (free) education of nine years
- education and services for those in special needs

It is possible to focus on a few statistics which are associated with the epidemiological transition in Hong Kong. The government budget has large elements allocated to welfare, services and infrastructure. It is very difficult to provide precise comparisons from one period to another but, as examples, the following approximate proportional changes in public expenditure are interesting :

	1954/5	1964/5	1974/5	1984/5
Education/educ. Department	6.6%	4.8% 9.4(subv.)	18.3%	18.7%
Medical and Health Servic. Med.Depart.	6.7%	6.6% 2.3%(subv)	8.7%	9.1%
Social welfare (Office Depart.)	O.6%	O.6% O.4%(subv)	3.5%	6.O%
Urban services (San.Division)	3.6%	*	*	*
Housing	17.2% (no expenditure pre-1954)	*	6.2%	4.1% (+ land for free housing)

** Difficult to identify separately*

These admittedly crude indicators show increasing direct public involvement in education, health and social welfare, in an ever-growing budget.

Expenditure on housing is perhaps slightly misleading as the mid-195Os figure is taken at the time public involvement in housing in Hong Kong first really took place.

Housing

Perhaps Hong Kong is internationally best known in the welfare field for its thirty-year history of provision of public rental housing and, more recently, medium cost home ownership schemes. The growth of Hong Kong's public housing programme since 1954 is a fascinating story in itself and has been associated with various eras of types of

housing with different levels of space allocation and service provision (see, for example, Drakakis-Smith, 1979). By 1979, some two million people were accommodated in public housing. In 1985, some 2.34 million were living in public housing, government quarters and home ownership blocks, amounting to about 43% of the territory's population (Hong Kong Government, 1986).

Today, public housing in Hong Kong is mostly well-appointed, even if relatively small in space allocation, and most of the recent building has been in a series of new towns in the New Territories. Many new medical and welfare services have been built in conjunction with these new towns (Phillips and Yeh, 1987). These new town public housing schemes have also been developed near to private housing which often shares the same welfare facilities. The housing campaign has not only alleviated housing shortage but has sought to upgrade existing stock. It has been conducted in association with the provision of excellent infrastructure (roads, mass transit systems, electricity, etc..) and, of direct relevance to health, drainage, sewerage and potable water supplies have been improved. All have helped to reduce the underlying causes of the spread of many infectious diseases. Medical, education and welfare services have also been made vastly more accessible to many people and income is no longer a barrier to the receipt of education and health care (Phillips, 1981, 1987; Joseph and Phillips, 1984).

Housing improvements have helped to reduce the proportion of persons inadequately housed although sadly there are still substantial numbers of squatters. In 1952, it is estimated that some 340.000 persons lived in squatter huts and a further 350.000 lived in substandard urban conditions (Drakakis-Smith, 1979). This amounted to almost one-third of the total population inadequately housed, in conditions ripe for the spread of enteric fever and dysentery. Threats of epidemics always existed and the reduction of the total squatter population has been a recurrent problem. In 1964, a survey enumerated some 490.000 squatters including 65.300 on rooftops and many in unseaworthy boats. Whilst the government struggled to reduce this total, fresh influxes of refugees tended to maintain it or even to increase it at times. A new territorywide survey to register all occupants of squatter huts was completed in September 1985, when a total of 477.189 persons were found to be located in them (Hong Kong Government, 1986). This was only about 12.000 fewer than twenty years previously in spite of the massive growth of public housing. At least the survey enabled a new registration exercise to estimate elegibility for public housing and help planning for the future.

Nevertheless, even squatter families have generally benefited from Hong Kong's economic boom. Housing shortage and locational imbalance (rather than merely costs) tend to have perpetuated the numbers of squatters. Many surveys have shown that the possession of employment and consumer durables is high even among physically «poor» Hong Kong neighbourhoods (Drakakis-Smith, 1979). Table 5 illustrates some of the improvements in income levels up to 1981. It is evident that Hong Kong does not have the very uneven distributions of income that exist in many Third World cities and countries. Whilst there are undoubtedly many who are fabulously wealthy, the majority of Hong Kong households today have a reasonable income. Nutrition levels have improved; there have been no cases of the deficiency disease beri-beri since the early

1960s; cases fell rapidly after the late 1940s. Certain cancers, such as nasopharyngeal carcinoma, in which high intake of salt fish during childhood has been implicated as a major risk factor, are now declining. This indicates diets are changing as more varied foods become available and costs change. However, certain occupationally-related cancers are on the increase (Ng, 1986).

Table 5 - Percentage distribution of domestic households by monthly household income - 1971, 1976 and 1981

Monthly Household Income (HK $)	At Current Prices 1971 %	1978 %	1981 %	At 1981 Prices 1971 %	1976 %	1981 %
Under 1.000	7O.3	29.1	9.5	2O.4	13.3	9.5
1.000 - 1.999	21.5	4O.5	19.O	43.4	32.6	19.O
2.000 - 2.999		16.2	22.3	19.1	23.7	22.3
3.000 - 4.999			26.2	1O.3	18.O	26.2
5.000 - 6.999	8.2		11.2	2.9	6.5	11.2
7.000 - 9.999		14.2	6.4	2.1	3.O	6.4
10.000 and +			5.4	1.8	2.9	5.4
Median income (HK$)	7O8	1.425	2.955	1.6OO	2.132	2.955

Source : Hong Kong Government Census and Statistics Department

Health care provision is not necessarily directly correlated with improvements in "health" (however defined). However, the increase in provision of hospital beds by almost four times between 1953 and 198O undoubtedly helped to improve access to care. More public health nurses and primary care doctors also have had the same effect. Recent consultants' reports have identified ways in which management and regionalisation may be changed to improve access to the now good range of main-line health care (Coopers and Lybrand, 1985). The major demands for improvements in the future are likely to come from welfare-associated provision such as daycare centres for handicapped and elderly people and for the other needs of the elderly (see, for example, Kwan, 1986). These will, however, be increasingly expensive to provide in the community although not as expensive as much "high-tech" care.

Today, it is this type of challenge that Hong Kong is facing. The epidemiological transition may have run most of its course in the territory. Its experience will be of value to other newly industrialising countries especially those in Southeast Asia but it does not really present a model for many of the poorer Third World countries and cities. However, its urbanisation and health changes are undoubtedly amongst the most rapid and spectacular yet witnessed anywhere, so for this reason alone its example repays further research.

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