EPIDEMIOLOGIC TRANSITION IN KOREA: A NEW PERSPECTIVE IN POPULATION AND DEVELOPMENT STUDIES

Lee Eun-Sul

This paper reviews the progress and prospects for mortality reduction in Korea, drawing upon scanty data available in the literature. Data seem to suggest that recent mortality improvement in Korea is slowing, male mortality patterns at older ages are evolving unexpectedly, and infant and child mortality is relatively high. These trends are examined in the framework of the epidemiologic transition theory. Implications of these trends constitute a principal basis for concern about population and developmental issues in Korea. Any continuing progress against mortality would require major efforts in several areas: further investigation of mortality trends and differentials, disease patterns, and health behavior; reexamination of the conventional health care strategies and public health measures; and analyses of social and economic development policies relevant to health conditions.

Introduction

Relatively little attention has been given to recent mortality trends in the developing world, compared to fertility changes, yet recent information points to noticeable changes in the pace and pattern of mortality decline. The changes appear to be evolving in ways that are potentially important for health and development policies. This paper first reviews recent mortality trends and differentials in Korea, compared with the United States patterns and then considers implications of new trends for health and development policy issues in Korea.

Of the many human achievements of the past two centuries, probably none has had a more profound effect on the conditions of everyday life than the radical reduction in mortality. A body of observations and explanations about this reduction and the associated change in fertility constitutes the so-called "theory of demographic transition." The conventional wisdom of this theory has been applied prominently in describing and guiding policies for fertility transition in the developing world (Caldwell, 1976), and mortality reduction has been taken for granted in most developmental planning. It has been generally assumed that the mortality level of developing countries would reach that of developed countries without exerting major efforts similar to those applied to fertility reduction programs. However, this assumption needs to be reexamined in light of recent mortality changes in the developing world (Gwatkin, 1980).

This paper proposes to examine recent mortality trends and differentials in Korea in the framework of the epidemiologic transition theory offered by Omran (1971 and 1977). This theory focuses on the shifting web of health and disease patterns in population groups and their linkages with demographic, socioeconomic, ecologic, and biologic changes. Despite its name, epidemiology is not just the study of epidemics, but deals with a broad area of health and disease. More specifically, it studies how disease are distributed in groups of people, their causes and consequeces, and how they can be prevented and controlled. Relating this perspective to the demographic transition

theory, Omran distinguishes three stages of epidemiologic transition: (1) age of pestilence (infection) and famine; (2) age of receding pandemics; and (3) age of degenerative and man-made diseases. The transition through these stages takes place differently in different cultural settings. It is nonsense to assume that the Western experience can automatically be repeated in another culture. Nonetheless, the epidemiologic perspective offers a new perspective in understanding recent mortality changes in Korea.

Since the changes in disease patterns are not even between countries and between subgroups within countries, a study of differential mortality and morbidity become an important area of inquiry for demographers and epidemiologists. Whenever a drastic difference is found in the frequency of a disease from one time to another or between disparate cultures, a special opportunity is created for research into the causes of the disease. There are ample opportunities for such research in Korea, and recent changes in the pace of mortality decline provide added dimensions to these opportunities. Unfortunately, mortality data in Korea are still inadequate, like in many developing countries. The Korean vital registration system has improved considerably over the years but has not yet generated vital statistics data of sufficient quality. These circumstances sharply limit the ability to analyze and interpret the disease patterns in Korea.

Data utilized in this paper are drawn mainly from published sources, and most mortality data are indirect estimates prepared by different researchers in and out of Korea. As will be seen later, data problems render any definite statement very difficult. There are unreconcilable differences among various estimates. But the scanty statistics and indirect estimates that exist are adequate to assess general trends and differentials, when used in conjunction with related data in other fields and in other countries. In this paper, the Korean data are compared with the nonwhite and white populations in the United States.

Background

The onset of industrialization signaled a long-term decline in mortality in the Western world; it occurred first in Western Europe and North America and later in Eastern and Southern Europe. These declines were generally attributed to improved standards of living and technological changes. Since 1900 a number of medical advances have occurred that have greatly reduced the risk of death from infectious diseases and have lowered mortality considerably. In many developing countries mortality declines started in 1920s and progressed much more rapidly than in the developed countries, especially since World War II. These declines in the developing world were generally attributed to diffusion of public health and medical technology. These factors are largely independent of the economic conditions of the population.

While economic development preceded mortality decline in the developed countries, many developing countries have experienced substantial drops in mortality prior to social and economic improvement, and maintaining of these reductions permanently would remain to be a challenge. In the Western model, the age of pestilence and famine merged slowly into the age of receding pandemics when the major infections started to decline. This happened during the 19th century and early part of the 20th century. Then came the age of degenerative and man-made diseases. The transition was socially determined and was gradual. Of course, medical discoveries have also contributed to the transition in the West, but only after it was well underway. In the delayed model that applies to most developing countries, the similar transition in health and disease patterns started much later and the shift is not yet complete. The transition in the belated model was predominantly medically determined and was much faster than in the

West. Much of the medical technology was imported through national and international assistance, particularly that of the World Health Organization.

The mortality decline in Korea followed the general trend in the developing world. In 1920s the mortality level started falling with the introduction of public health and disease control programs, signaling the shift from the age of infectious diseases. The decline has sustained ever since with a brief interuption during the Korean War, and the second wave of mortality decline appeared shortly after the war and the pace of decline accelerated, benefiting largely from newly imported medical technology. This rapid decline started without appreciable improvement in the level of living standard (Kwon et al., 1975:23-24).

As a result of the accelerated mortality declines since World War II, life expectancies in developing countries have risen faster than in the West. It has been recognized that while further mortality declines in the developed countries may come to an end sooner or later, the developing world would likely to continue increasing their life expectancies for some time into the future until they reach the Western level. However, there are indications that the pace in mortality declines has been slowed considerably in major parts of the developing world, with increasingly diverse patterns among countries. Examining recent mortality information supplemented by reports about related medical, social, and economic trends, Gwatkin (1980) observed that the era of unusually rapid mortality declines in developing countries has at least temporarily come to an end. Evidently, the recorded rate of life expectancy progress in the developing world as a whole has begun to decline sharply before the life expectancy level of 45 years has been achieved, 20 years below the level at which the stabilizing tendency emerged in the West. Due to serious data problems that exist in many developing countries, these observations must be interpreted with more than the usual caution. But, similar observations have been made in Latin American countries for which adequate data were available. The decelerations have occurred at levels of life expectancy below the maximum levels observed in more developed countries (Palloni, 1981), although rates of infant mortality decline were greater in the 1970s than in the 1960s in 12 Latin American countries (United Nations, 1982b: 42).

The reasons for the slowing or even stagnating mortality reduction cannot be understood based solely on scanty mortality data, in developing countries. It is desirable to assess the plausibility of demographic estimates by comparing them with recent trends in medical and socioeconomic developments that thought to be associated with mortality trends. It has been reported that simple application of Western medical technology is not sufficient to handle effectively the disease patterns of many developing countries (Preston and Nelson, 1974). Mortality from diarrhea and pneumonia in the developing countries is typically two to three times higher than it was in the West at a time when overall mortality levels were similar (Preston, 1976: ch. 2). The Western model of health care delivery system may not be adequate to handle diarrhea, pneumonia, and malnutrition (Bryant, 1969). In the developing world as a whole, the modest acceleration in the rate of economic growth in the 1950s and 1960s have been offset by a deceleration in the 1970s. Similar trends have been observed in food production, school enrollment and other areas of social developments (Gwatkin, 1980). These observations on reduced power of existing medical technology and slowed social and economic progress would provide plausible explanations for the slowing mortality reduction in the developing world. It appears that the medically induced mortality transition now requires social and economic treatment for further progress.

Ironically, recent gains in life expectancy have been reported in the developed countries, where a deceleration had been expected. For example, the stagnant life expectancy

in the United States during the late 1950s and early 1960s started increasing in late 1960s and the rise is still continuing. The U.S. experienced about 4 years of increase in life expectancy since 1970 (U.S. National Center for Health Statistics, 1984). Western Europe and Australia/New Zealand experienced similar increases in life expectancy for each sex during the 1970s. In most of other developed countries, male life expectancy stagnated or declined between 1975 and 1980, and no appreciable gain was realized in female life expectancy in those countries (United Nations, 1984: 43).

The factors underlying the changing pace of mortality decline in the U.S. and Western Europe are not clear, despite the detailed mortality data available for those countries. In the U.S. the decline was reported in all major categories of diseases except cancer. The decline in heart disease mortality was a surprise to many experts and the reasons for the decline are not fully understood (Stallones, 1980). For more than 30 years ischemic heart disease has been the single greatest cause of death in the U.S. Without fanfare, however, the ischemic heart disease mortality rates reached total reduction of about 30 percent so far. Numerous epidemiologic investigations are being conducted to put together the puzzles of declining mortality in the U.S. In these investigations, social and behavioral factors receive more prominent attention than medical explanations. It appears that the socially-induced mortality transition in the West demonstrates once again the preponderance of social factors in mortality reduction.

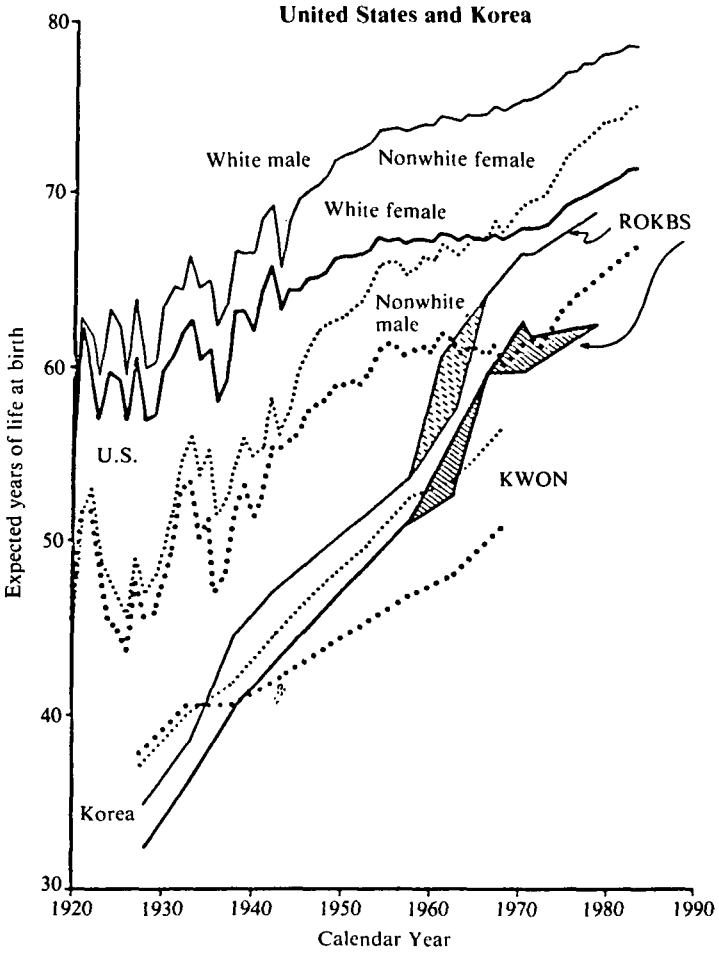
Trends in Life Expectancy

Numerous life tables for Koreans have been constructed for various periods since late 1920s. Due to incomplete registration of vital events, most of these tables were calculated by indirect statistical techniques applied to census survival ratios. In constructing these tables, professional judgements were necessarily exercised in selecting a statistical technique and adjusting the basic data for any known defects. As a result, estimates of life expectancy vary considerably from one source to another. These estimates are quite perplexing and would make it difficult to assess changing mortality trends in Korea (United Nations, 1982b: 118).

A summary of these estimates prepared by United Nations (1982b) indicates that the life expectancy for Korean males in the late 1950s ranges from 47 to 53 and from 52.5 to 54 for females, and for the 1965-71 it varies from 51 to 65 for males and from 57 to 69 for females. And, a different pattern of change is noted in different series of estimates. The Korean Bureau of Statistics series shows a gradual increase to 1970 with an indication of subsequent stabilization at 62 for males and at 67 for females, and the estimates based on "West family" of regional life tables reveals a stabilization of male life expectancy at 60 in the 1960s and a continued improvement of female life expectancy up to 1970. The series of estimates prepared by Kwon shows a persistant increase in both sexes at a lower level of life expectancy than that in other series (Kwon et al., 1975: 23).

To update the U.N. summary two new series of estimates are examined: the revised estimates by Kwon (1975 and 1977) and the recent estimates by the Korean Bureau of Statistics (Korean Economic planning Board, 1980). These two series of estimates are graphically shown in Figure 1, along with comparable data for U.S. populations. The revised Kwon series are based on graduated census survival ratios, which show about the same pattern shown in his earlier estimates cited in the summary by United Nations. Interestingly, the revised estimates reveal that male life expectancy was slightly higher than that for females in the late 1920s and early 1930s. This pattern has been observed in other Asian countries, and it is probably a reflection of social values and customs of that time in Korea (Kwon et al., 1975: 25). These estimates are considerably lower than

Figure 1
Comparison of Life Expectancy at Birth
United States and Korea



those prepared by the Korean Bureau of Statistics, but shows a constant increase in both sexes up to late 1960s. No estimate is available for more recent periods.

The most recent estimates of life expectancy was prepared by the Korean Bureau of Statistics for the 1978-79 period. These should be distinguished from all previous indirect estimates based on census data. The new estimates were based on age-specific death rates adjusted for underregistration, and the adjustment factors are estimated applying the dual system procedure (Chandra Sekar and Deming, 1949) to a total of about 1,000 deaths surveyed in sample areas. Although the standard error of adjustment factor for each of age-sex groups may not be negligible for that size of sample, this approach is a step in right direction and further refinements must be made to adapt this to the Korean situation.

The new estimates indicate that the life expectancy for Korean males in 1978-79 was 62 years, 3 years lower than that of U.S. nonwhite males, and 69 years for Korean females, 5 years behind U.S. nonwhite females. The most important contribution of the new estimates is to provide a base to reevaluate past indirect estimates. Based on new information the 1970 estimate of male life expectancy was adjusted downward from

62.9 to 59.8, while the adjustment did not change female life expectancy. This finding is consistent with observations made by collaborators of Committee on Population and Demography, U.S. National Academy of Sciences (Coals et al., 1980). They noted that while Korean adult female mortality is quite consistent with the West model tables, Korean adult male mortality deviates from the model schedules.

It is then safe to assume that all previous estimates for male life expectancy were exaggerated and need to be adjusted similarly. The stagnation of life expectancy noted in the U.N. summary may well be a reflection of increasing accuracy in estimation. Even with the new estimates, the pace in mortality reduction in Korea is slowing compared with the trends in the U.S. The gap in life expectancy between Koreans and U.S. nonwhites had been narrowed to the end of 1960s and started diverging after 1970 in both sexes.

Sex Difference in Mortality

As shown in Figure 1, sex difference in life expectancy was small in 1920, and the gap favoring females has gradually widened both in Korea and the U.S. In the U.S. the racially distinctive pattern of mortality gave way to a sexually distinctive pattern in 1960s when nonwhite female life expectancy surpassed that of white males. The changing sex mortality pattern in Korea is more clearly shown in the Kwon series of estimates than in the Korean Bureau of Statistics series. Generally the gap between sexes widens as life expectancy increases.

Males typically have higher mortality than females at every age. While it is moot to examine age and sex differentials based on indirectly estimated life tables, a meaningful observation can be made using the latest life tables that were constructed based on adjusted age-specific death rates. The probabilities of dying from the latest life tables are shown in Figures 2 and 3, along with comparable values from the U.S. life tables. Contrary to expectation, male mortality rates for ages under 5 are lower than that for females, probably reflecting preferential treatment of sons over daughters in health care. In all other ages the usual excess male mortality is observed. While Korean male mortality for ages under 20 is higher than that for U.S. nonwhite males, the opposite is true for economically productive ages with another crossover around age 60. The similar pattern is observed for females, but the crossovers occur about 10 years later at both occasions. However, Korean mortality is consistently higher than that for U.S. whites at every age in both sexes. Although it may well be a statistical artifact, there is an indication that Korean female mortality during reproductive ages between 15 and 30 is somewhat higher than expected.

Another reported novelty in Korean mortality pattern is a relative excess of male mortality in ages over 40, although it is not immediately evident from a casual inspection of the latest Korean life tables. As noted earlier, while Korean female mortality rates confirmed to a West model of regional life tables, male rates deviated considerably from the model schedules (Coale et al., 1980). This discovery was made by comparing the West model life tables to mortality rates derived from death registeration data adjusted for estimated underregistration. The similar deviations were also discovered in other far eastern countries with an indication of gradual decrease with time (Goldman, 1980). These peculiar male mortality patterns in the Far East were taken into account in the construction of model life tables for developing countries (United Nations, 1982a: 29). The lagging male mortality transition is also present among Koreans in Japan. While Korean females in Japan experience the same level of life expectancy as Japanese females, life expectancy at birth for Korean males in Japan is about 5 years behind

Figure 2
Comparison of q_x Values for Male
Korea (1978-79) and United States (1978)

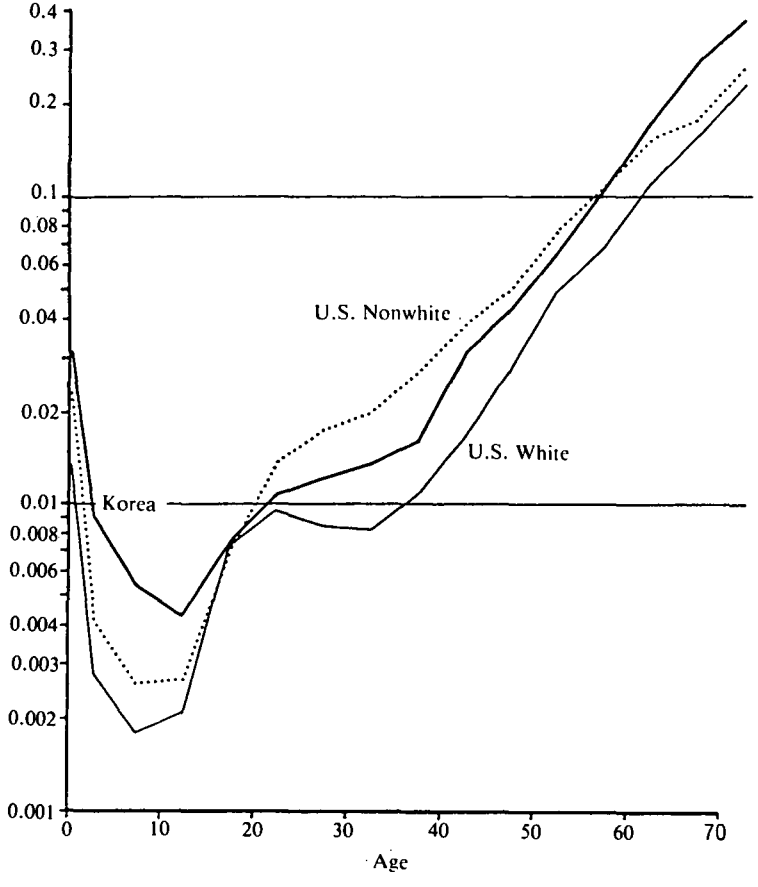
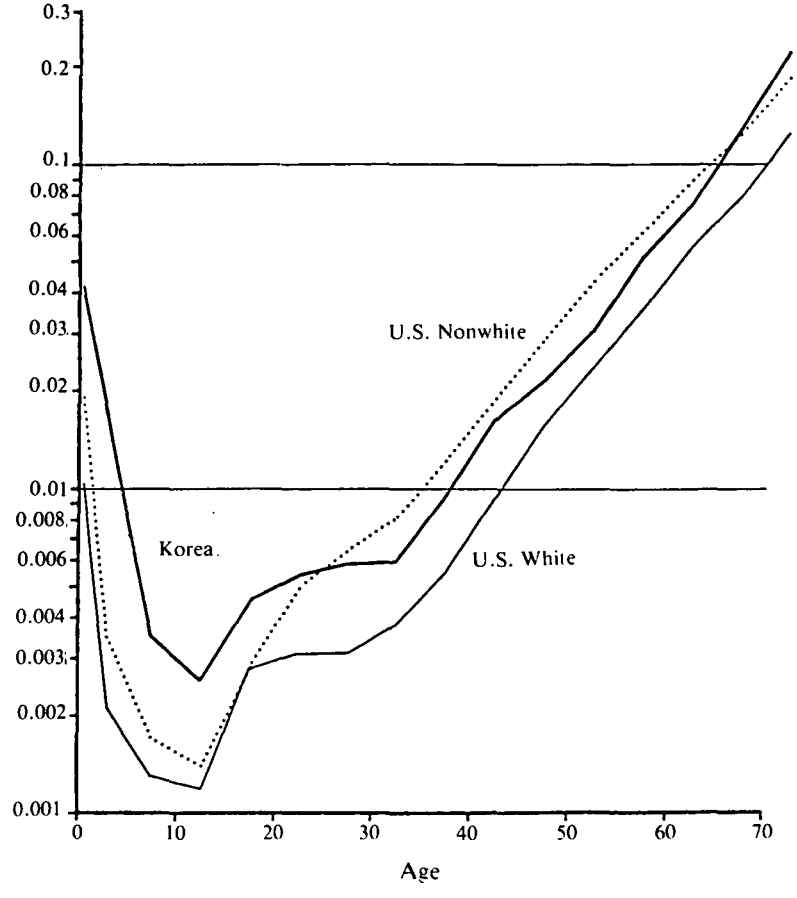


Figure 3
Comparison of q_x Values for Female
Korea (1978-79) and United States (1978)



Japanese males (Kim, 1982).

The deviant Korean male mortality pattern in older ages simply suggest that Korean males are exposed to risks of death that are different from those affected the "West family" populations at a time when overall mortality levels were similar. Noting the progressive disappearance of the deviations in other far eastern countries, Goldman (1980) attributed these to "cohort effects" of tuberculosis mortality. He speculated that the elimination of excess male mortality from tuberculosis alone would not erase the male deviations in mortality from the West model pattern, and thus one would have to consider an interaction between tuberculosis and several other causes of death. These speculations clearly point to a need for more epidemiologic investigations focusing on multiple decrement life tables and competing risk analysis of causes of death in Korea.

Infant Mortality

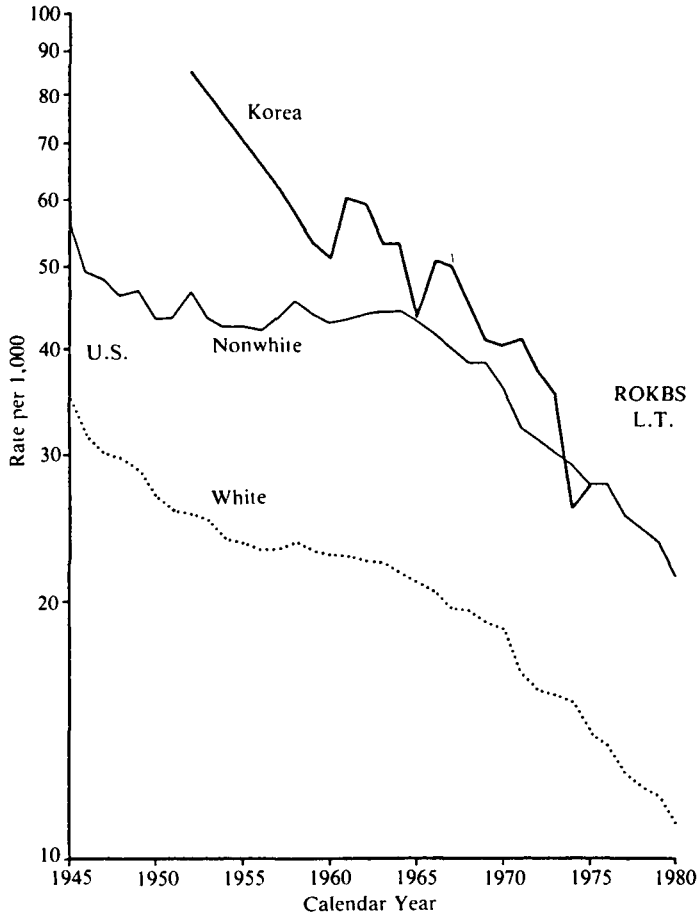
There are several reasons for giving infant mortality special consideration in epidemiologic transition. In high mortality populations the highest mortality rate is in the first year of life, due largely to infectious diseases. Deaths during infancy are generally due to diseases and conditions to which other segments of the population are less exposed or vulnerable. Since infant mortality may be directly and significantly affected by health care programs, the infant mortality rate may change more rapidly than the overall death rate, and it may vary independently of mortality rates at older ages.

To examine infant mortality transition in Korea, we have to resort to a series of indirect estimates derived from various data sources. Although estimates vary considerably, it is beyond doubt that an impressive decline of infant mortality has taken place in Korea since 1920, especially after World War II. Relying on indirect estimates by the Korean Bureau of Statistics, a recent U.N. publication (1982b: 123) observed that about 10 percent of all children born in Korea did not live to celebrate their first birthday between 1955 and 1960, but by 1971 the infant mortality rate had been halved. Similar changes occurred in most developing countries, evidenced by estimates obtained from World Fertility Survey (Rutstein, 1983), but there is a wide variation among countries in the current levels of infant and child mortality. Some countries have four to five times higher infant mortality rates than others.

The most consistent set of indirect estimates of infant mortality rate was derived from the 1976 Korean Fertility Survey (Park, 1980). These estimates are plotted along with the U.S. infant mortality rates in Figure 4. Although somewhat erratic, the Korean infant mortality rate has declined sharply since the 1950s, and the rate of decline was faster than that for U.S. nonwhites. There is an indication that the Korean rate might have been lower than U.S. nonwhites in mid-1970s, but the latest estimate derived from corrected vital registration data put the Korean rate higher than U.S. nonwhites. It is interesting to note that the U.S. infant mortality experienced a period of stagnation between 1950 and 1965 when fertility levels were high, indicated more clearly for nonwhites. The U.S. rates are still declining, and the white infant mortality rate now reached to the level where 99 out of 100 babies survive to their first birthday.

The phenomenal decline in infant mortality reflects the change in causes of infant deaths. It can be speculated that most of the decline in Korea had been realized with a reduction in diseases that affect infants in the postneonatal period. Better understanding of this change would help charting future strategies for reducing preventable infant deaths. As seen in Figures 2 and 3, the Korean infant and child mortality rates are considerably higher than U.S. rates, while Korean adults appear to enjoy about equal or even better chance of survival as U.S. nonwhites do. Any further mortality reduction

Figure 4
Comparison of Infant Mortaility Rates
Korea and United States



should be achieved by preventing infant and child deaths with improved child health programs.

Major Causes of Death

The theory of epidemiologic transition offers a general picture of changing cause of death patterns, while detailed transition pattern need to be filled in different settings. Unfortunately, data by causes of death are scarce in most developing countries, and Korea is not an exception. Even in developed countries a study of mortality transition by causes of death is sharply limited due to changes in the coding system and insufficient quality assurance by medical practitioners in determining causes of death. The coding has been revised at approximately 10 year intervals to reflect the evaluation of medical concepts of diseases and their causes. The changes in medical terminology pose problems in assessing long term trends in cardiovascular diseases, malignant neoplasms, and other chronic diseases. The comparability of diseases poses less problems in developing countries, but incomplete or total lack of data severely hampers mortality studies in those

Figure 5
Comparison of Cause-of-Death Patterns for all Ages
Korea and United States, 1979

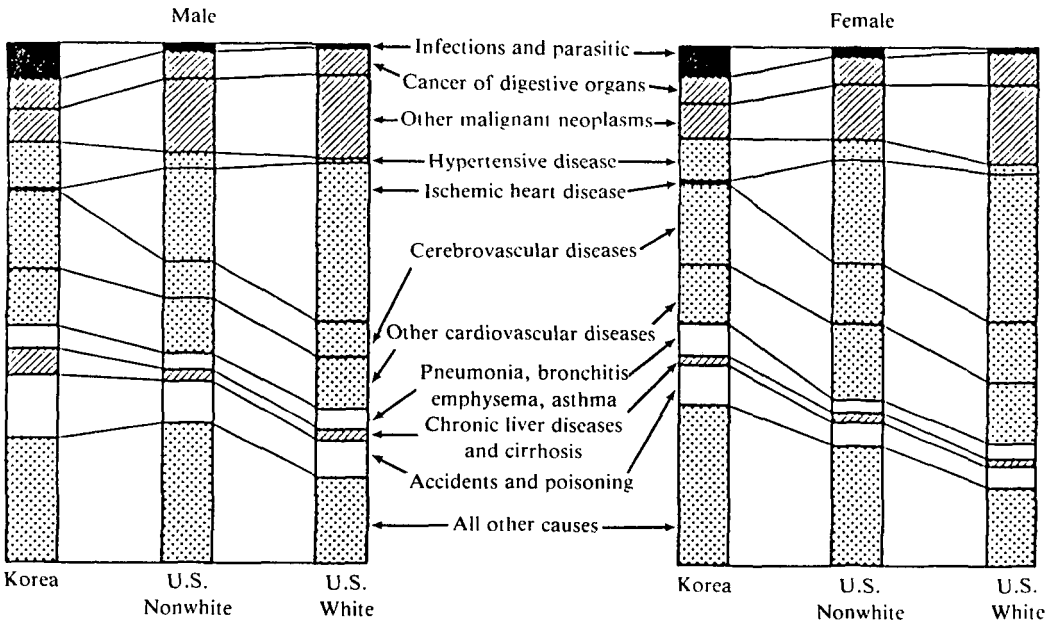
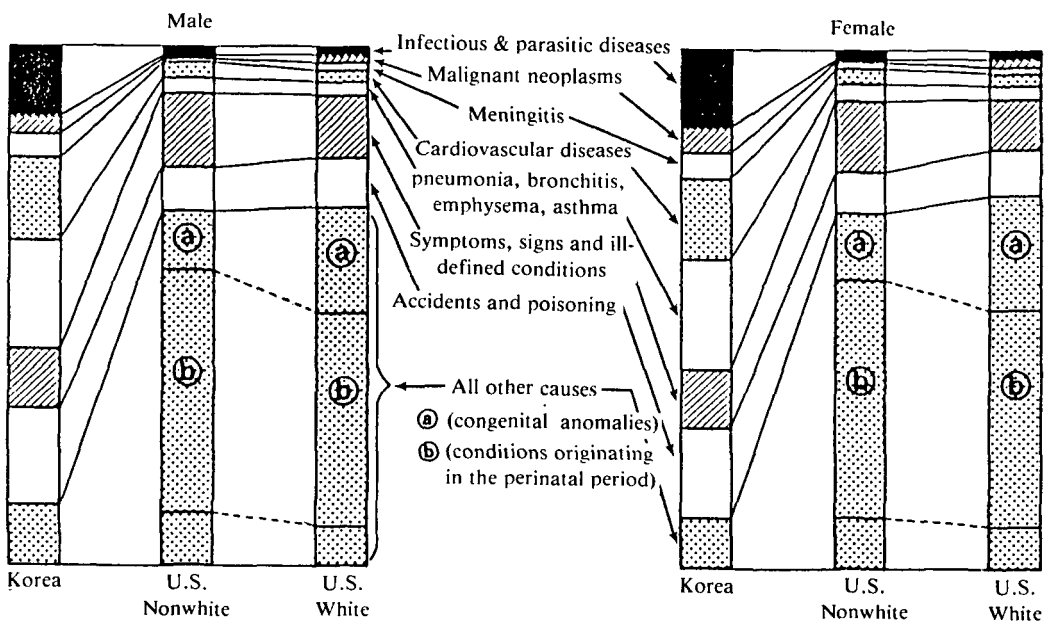


Figure 6
Comparison of Cause-of-Death Patterns for Ages 0-4 Year
Korea and United States, 1979



by a recent downward adjustment made by the Korean Bureau of Statistics on the 1970 male life expectancy estimate. Even if the new estimates accurately represent what has been happening, the indication of slowdowns still remain when compared with mortality trends in the United States. The narrowing trends in life expectancy between Koreans and U.S. nonwhites in each sex appear to be halting or even widening. The slowing in mortality decline may be expected if we recognize the existence of a physiological limit in human life. The issue is then not simply whether slowdowns are occurring but rather whether slowdowns are inevitable at this stage of progress. A comparison of Korea and U.S. mortality experience suggests that the slowdowns are ocurring at a much earlier stage of the mortality transition in Korea than in the U.S.

Reasons for such slowdowns may be sought in differential mortality patterns. Even in a period of rapid mortality decline, changes are not occurring uniformly among all subgroups, and people benefit selectively from such progress. If significant differentials in mortality and morbidity persist and no new significant medical innovation is introduced, the continued mortality reduction cannot be expected. Some analytic results of Korean mortality data indicate that mortality levels of older Korean males are much higher than the western experience might suggest, and mortality rates of Korean infants and children are realtively high. The scanty mortality data by causes of death suggest that Korean children are lagging behind their elders in epidemiologic transition. Indication is clear that children in Korea are suffering from infectious and parasitic diseases and other virus caused diseases much more than what the epidemiologic transition seems to suggest. These differential progress in mortality transition would account for the indicated slowdowns in mortality reduction and lead us to conclude that continued rapid progress can be achieved with improved child health status.

Charting a strategy for continued mortality reduction in Korea would require major efforts in several areas. First, levels, trends and differentials of mortality need to be understood more accurately and fully. Any critical reviewer of Korean mortality estimates cannot help but remain unconvinced about the purported levels of mortality. There is a definite need for improvement in basic data sources that would allow demographers and epidemiologists to analyze and explain population dynamics and disease patterns. Epidemiologic research must be conducted at the national as well as local level. Without epidemiologic knowledge on evolution and distribution of diseases and other risk factors in social and physical environments of Korea, effective prevention and control programs cannot be designed and implemented. While epidemiology of infectious diseases may not require any new concepts and methodology, a study of chronic diseases would call for new ideas and innovative methodology. Social and behavioral sciences should play an increasingly important role in epidemiology of chronic diseases. Many important risk factors for degenerative and man-made diseases are in social and behavioral domain. If individual characteristics and habits are influencing the frequency of diseases, we need to direct more attention to social and behavioral research.

Second, the present health care strategies need to be reexamined. The relative neglect of child health that is reflected in infant and child mortality patterns, must be addressed. While reduction of mortality can be achieved most easily in children, the present system does not appear to be effective to control childhood diseases. Impression is that medical professionals in Korea are quick to adapt new mode of practice for treating diseases and conditions that are more prevalent among adults, whereas the classic disease control programs that were effective for controlling of childhood diseases is neglected. The neglect of child health may well be a reflection of general attitudes toward children in Korean culture. At any rate, further progress in mortality reduction cannot be made

without improving child health status.

Finally, attention should be given to social and economic policies that are relevant to health conditions. The promotion and protection of the health of people is essential to continued economic and social development. Child health status today will affect the future development process. Perhaps, early concerns about the relationship between population growth and economic development need to be redirected to matters concerning the relationship between health and sustained socioeconomic development. Of the many long-term health policy issues that need to be debated, none has more sociological significance than the socialization of medical profession itself. The mode of Western medical education needs to be evaluated in light of current and anticipated health conditions in Korea, and known shortcoming of Western medicine can be alleviated. To name a few problems of American medicine, we can list: overemphasis on biological sciences over social concerns, socialization leaning toward an upper class life style, jealous protection of the profession, and emphasis on costly individual care over pre ventive community health care (see Starr, 1982). This and other important policy issues must to be addressed in the light of the slowing mortality reduction and the lagging child health progress in Korea.

References

Bryant, J.
1969 *Health and the Developing World,* Ithaca, N.Y.: Cornell University Press.

Coale, A.J., Cho, L.J., and Goldman, N.
1980 *Estimation of Recent Trends in Fertility and Mortality in the Republic of Korea,* Committee on Population and Demography, National Academy of Sciences, Washington, D.C.

Chandra Sekar, C. and Deming, W.E.
1949 "On a method of estimating birth and death rates and the extent of registration," *J. of Amer. Statist. Ass.* 44 (245): 101-115.

Goldman, N.
1980 "Far Eastern patterns of mortality," *Population Studies* 34(1): 5-19.

Gwatkin, D.R.
1980 "Indications of change in developing country mortality trends: the end of an era?" *Population and Development Review* 6(4): 615-644.

Kim, Y.S.
1982 "Mortality of the Korean popultion in Japan: life table analysis of selected causes of death," *Journal of Biosocial Science* 14: 465-472.

Kong, S.K. and Cho, A.J.
1983 "A study on the deaths caused by disease of the circulatory system," *Journal of Population and Health Studies* (Korean) 3(2): 35-49.

Kwon, T.H.
1975 "Constructing life tables for Korea: 1935-70," *Bulletin of the Population and Development Studies Center* 4:1-37.
1977 *Demography of Korea: Population Change and Its Components, 1925-66,* Seoul National University Press.

Korea Economic Planning Board
1979 *Death Rates by Cause of Death* (Korean), Bureau of Statistics.
1980 *Life Tables of Koreans: 1978-79* (Korean), Bureau of Statistics.

Omran, A.R.
1971 "The epidemiologic transition: a theory of the epidemiology of population change," *Milbank Memorial Fund Quarterly* 49(4): 509-538.
1977 "Epidemiologic transition in the U.S.," *Population Bulletin* 32(2): 1-42), Population Reference Bureau, Inc.

countries.

Quality of Korean vital statistics has been improving, but data are still inadequate for comprehensive analysis of disease patterns. The death registration was estimated to be 77 percent complete during 1975-78 and only 52.7 percent of all reported deaths were codable for cause in accord with the International classification of Diseases (Korea Economic Planning Board, 1979). Surprisingly, 28.7 percent of physician certified death certificates did not provide sufficient information for coding.

The available Korean cause-of-death data may only be sufficient for an examination of relative importance of the major categories of causes of death. In Figures 5 and 6 percentage distributions of deaths by cause are compared with U.S. mortality structure in 1979. For all ages combined (Figure 5) Korean mortality structure is somewhat different from that for U.S. populations. However, the differences would decrease if the percentage distributions were standardized for differences in age distributions. The proportions of infectious and parasitic diseases are higher for both Korean males and females than U.S. counterparts. Relative importance of stomach cancer is about the same between the two countries, and other malignant neoplasms carry more weights in U.S. than in Korea. The proportion of ischemic heart disease is unusually small in Korea, and this may be due to differences in medical terminology; it appears that ischemic heart disease is classified as either hypertensive diseases or other cardiovascular diseases. The increasing importance of major cardiovascular diseases in Korean mortality structure also is reported by a recent study based on latest vital statistics in Korea (Kong and Cho, 1983).

Figure 6 shows large differences in infant and child cause-of-death structure between the two countries. These differences would not be affected by differences in age distribution. About 15 percent of deaths under age 5 in Korea are due to infectious and parasitic diseases, as compared to 2 percent or less in U.S. populations. Pneumonia and meningitis are also heavily weighted in Korean child mortality structure. Differences in child cause-of-death structure between the two countries are summarized in Table 1, using the index of dissimilarity. While Korean mortality in general shows a moderate difference from U.S. nonwhite, Korean children exhibit a markedly different mortality by cause from U.S. nonwhites. Conversely, in the U.S. the white-nonwhite difference is much smaller in child mortality than in overall mortality. These findings suggest that the epidemiologic transition in U.S. favors the child over the adult, whereas the transition in Korea favors the adult over the child.

Table 1. **Index of Dissimilarity for Difference in Mortality Structure Between Korea and United States, 1979.**

	Ages 0-4		All Ages	
Comparison	Male	Female	Male	Female
Korean vs. U.S. Nonwhite	59.8	61.4	27.3	26.8
Korean vs. U.S. White	59.7	62.0	40.1	38.8
U.S. Nonwhite vs. U.S. White	4.3	5.2	15.4	13.4

Discussion

The mortality data available in Korea suggest that the rapid mortality decline that has been sustained since Korean War is now slowing. This indication of slowdowns may be interpreted as a reflection of improvement in demographic measurements, as evidenced

Palloni, A.,
1981 "Mortality in Latin America: emerging patterns," *Population and Development Review* 7(40): 112-114.
Park, B.T.
1980 "Infant and childhood mortality in Korea." (Korean), Korean Institute for Family Planning.
Preston, S.H.
1976 *Mortality Patterns in National Populations,* New York: Academic Press.
Preston, S.H. and Nelson, V.
1974 "Structure and change in causes of death: an international summary," *Population Studies* 28(1): 19-51.
Rutstein, S.O.
1983 "Infant and child mortality: levels, trends and demographic differentials," *WFS Comparative Studies* No. 24. Voorburg, Netherlands: International Statistical Institute.
Stallones, R.A.
1980 "The rise and fall of ischemic heart disease," *Scientific American* 243(5): 53-59.
Starr, P.
1982 *The Social Transformation of American Medicine,* New York: Basic Books.
United Nations
1982a "Model Life Tables for Developing Countries," Department of International Economic and Social Affairs, *Population Studies* No. 77, ST/ESA/SER.A/77.
1982b *Levels and Trends of Mortality since 1950,* Department of International Economic and and Social Affairs, ST/ESA/SER.A/74.
1984 "Mortality and health policy: main issues for the 1980s," *Population Bulletin of the United Nations* No. 16-1984: 40-61.
United States National Center for Health Statistics
1980 *Life Tables, Vital Statistics of the United States: 1978* Vol. II, Sec. 5.
1984a *Vital Statistics of the United States: 1979* Vol. II—Mortality, Part A, Table 1-25.
1984b "Advanced report of final mortality statistics, 1982," *Monthly Vital Statistics Report* 33(9), December.