



# Prospects for the Future

*“Prediction is a hazardous undertaking, and few serious attempts have been made to predict the future of sex mortality differentials in industrialized countries”* Nathanson and Lopez (1987).

There is great difficulty in projecting future mortality levels—the changing sex mortality differential is only one of the uncertainties. Given the pitfalls, opinions have been expressed and vary considerably as shown below.

- In a survey of attendees (actuaries, demographers, economists, and medical researchers) at a recent seminar on mortality, Rosenberg and Luckner (1998) found that, of the 59 respondents, 25% agreed that sex mortality differences will be reduced by at least 50% over the next 10 years in the U.S. or Canada; and 41% agreed that they will be reduced that much over the next 25 years. The written comments suggested that the sex mortality differential will narrow, but not by 50%; it might be 50 years until the differential narrows by 50%.
- Graney (1979) expected the trend of growth in the sex mortality differential to cease and possibly to decrease as women take up the risk-taking behaviors of men, such as smoking, greater alcohol use, and greater labor force participation. He also thought females were closer to their maximum lifespan than males were. He stated *“We can anticipate that there is now in progress a rapid leveling-off of life expectancy increase among women, and a long-term trend toward a diminished sex mortality differential.”*
- Verbrugge (1983) also predicted that during the next 50–75 years, the sex mortality differential would narrow because the multiple roles of employment and domestic responsibilities of men and women are becoming more similar.
- Christen (1991) speculated that the sex mortality differential may disappear because of the birth control pill increasing the risk of death by thrombosis in women, and because a small quantity of aspirin daily may substantially decrease the risk of cardiovascular mortality in men.
- Crimmins (1983) projected the sex mortality differential to the year 2000 by assuming that the cause-specific rates of decline experienced during the 1968–77 period would continue. As a result, she expected the difference between male and female expectation of life at birth for whites would increase from 7.7 years in 1977 to 11.8 years in 2000. The actual difference in 1998 for whites was 5.5 years (Murphy 2000), which illustrates the perils in predicting future mortality rates.
- In discussing the future of sex mortality differentials in the developed world, Ruzicka and Lopez (1983) indicated that the differential may narrow because of beneficial changes in male behavior and lifestyle, the likely impact of a successful breakthrough in medical research, and female adoption of some of the unwholesome health practices that had been found predominately among males.
- Moriyama (1983) noted that, in many developed countries, the sex mortality ratio had recently leveled off or actually declined. He expected that, as the lifestyles of females change, the sex mortality ratio in all countries eventually will level off and then decline.
- Passannante and Nathanson (1987) found little evidence to suggest that the increasing number of women in the labor force will narrow the sex mortality differential.
- Hishinuma (1978) projected a life expectancy difference of 4.3 years in favor of females by using a synthetic life table derived from the lowest recorded age-specific mortality rates for males and females over a given period.
- Francisco Bayo noted that the sex mortality differential tends to vary inversely with the level of mortality, which could be interpreted as an indication that, if mortality levels decrease in the future, then the sex mortality differential might widen. Because mortality tends to decrease as socioeconomic levels

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(especially education) rise, perhaps we should expect mortality to decrease and the sex mortality differential to widen as the population becomes more educated (Society of Actuaries 1969).

- Faber and Wade (1983) implicitly forecast that the difference in life expectancies by sex would remain relatively constant at 7.7 years until the year 2050. Projections by the U.S. Bureau of the Census (1984) and Wade (1987) assume that the sex mortality differential will stabilize. Bell et al. (1992) projected that the sex mortality differential will narrow from 7.1 years in 1990 to 6.4 years in 2080 because of increasing levels of tobacco use and job stress for women.
- Crose (1997) predicts the sex mortality differential will widen unless men start making dramatic changes in their lives.
- Smith (1993) expects the sex mortality differential to narrow, but notes that among patients with coronary heart disease, women receive less aggressive medical attention than do men, even when controlling for age and health insurance. He speculated that women might live even longer if they received medical care equivalent to that received by men.
- Rogers et al. (1999) asserted that, because of the disadvantaged social and economic position of women, relative to men, in the United States today, the improving status of women, all else being equal, may work to widen the U.S. sex mortality gap.
- Hazzard (1999) believes that the sex mortality differential may widen if long-term estrogen replacement therapy becomes nearly universal among postmenopausal women. Conversely, it could continue to decline because of men becoming more health conscious, abandoning more risky behaviors (such as cigarette smoking) and adopting more

healthy behaviors (such as low-fat diets and exercise).

A recent study finding a causal link between bacterial infection and heart disease, which confirmed previously known circumstantial links (Bachmaier et al. 1999; Maugh 1999), may influence the future of the sex mortality differential. If this link allows medical advances to decrease mortality from heart disease, such as by antibiotic use (Gura 1999), the sex mortality differential may narrow. But if, as with other infectious diseases, this link benefits women more than men, the differential may widen.

The differential in the United States has in fact narrowed since its peak of 7.8 years in the 1970s to 5.7 years in 1998 (Murphy 2000). As discussed previously, there is no evidence that this narrowing has been due to greater female labor force participation, but may be attributable to more similar behaviors, as illustrated in Tables 4, 7, and 8, cigarette smoking in particular.

The results of the Human Genome Project are expected to help in understanding the causes of the sex mortality differential. The Human Genome Project is an international program to find the estimated 100,000 human genes (the human genome) and to make them accessible for further biological study, as well as to determine the sequence of the three billion DNA base pairs (building blocks) that underlie all human biology and its diversity.

The human genome DNA sequencing project is expected to be completed by the end of 2003. A further goal of the project is to interpret the functions of human genes and other DNA sequences efficiently. Because all diseases have a genetic component, specific knowledge of the X and Y chromosomes will definitely help our understanding of the causes of the sex mortality differential (Human Genome Project Information 2000).