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PREFACE

PREHISTORIC man appears to have lived an average of 20–25 years. Today, the average length of life in the United States is 75 years. This tripling of life expectancy is perhaps the single most beneficial feature of the changes that social scientists term “modernization.” It was not a smooth journey: warfare and famine have evidently afflicted the human race since its inception, and plagues and epidemics joined the episodic horrors when man settled into dense communities. These periodic crises were, moreover, just a supplement to the crushing burden of “normal” mortality.

In the industrialized world, about half of the progress in life expectancy since prehistoric times has occurred during the twentieth century. Many western European countries had good vital registration systems at the turn of the century, and these suggested that life expectancy at birth was approximately 50 years. In the United States, life expectancy in the 1900 Death Registration Area, which contained the 26 percent of the population with reliable data on mortality, was also in this range. Nevertheless, there were suspicions that the Death Registration Area was not a good representative of national mortality conditions.

Vital registration systems produced data for large geographic aggregates, not for individuals or families or social classes. Our information about the mortality of specific groups before the twentieth century is drawn mainly from unusually privileged groups such as the European aristocracy, from family genealogies of unusually long-lived families, or from local records. We lack a detailed portrait of the mortality conditions faced by common folk and of the principal differences among groups. As a result, we have an underdeveloped appreciation of the momentous progress that has been made in the twentieth century, and too vague an understanding of the sources of that progress.

A data set that recently became available for the United States provides an unparalleled opportunity to depict mortality conditions in the late nineteenth century. The U.S. Population Census of 1900 asked married women how many children they had ever borne (“Mother of how many children?”) and how many of those children were still living (“Number of these children living”). This pair of questions has become the principal basis of mortality estimation in contemporary developing countries, thanks largely to the pioneering methodological work of William Brass. But early Census officials ev-

idently had little knowledge of how these questions could be used, since no tabulations of them were ever made.

A public use sample constructed from microfilmed records of the 1900 U.S. Census of Population lets us apply the devices of modern demography to records from the past. This sample was produced at the University of Washington under the direction of Samuel Preston, Steven Graham, and Richard Johnson. A total of 100,438 individuals are included in this sample (Graham 1980). Women in the sample reported the birth of 81,916 children, of whom 61,778 had survived to the time of the census.

The time and place are opportune. As noted, the data pertain to an epoch about halfway between modern and prehistoric mortality circumstances. Important scientific developments in the late nineteenth century were just beginning to transform mortality conditions, but their penetration was far from complete by 1900. Old ideas about disease causation were formidable obstacles to the advance of health, and social institutions had only begun to realize their potential for improving survival chances.

The United States is an excellent stage for viewing this unfolding drama. Its population contained a relatively equal mixture of urban and rural residents and was spread over a wide array of disease environments. And it featured a high proportion of people who had been born in other countries and who carried with them childrearing behaviors and other customs that influenced their mortality levels. The United States also lagged far behind most European countries in the quality of its vital registration data, so that the 1900 census sample fills many gaps in American demographic history. In fact, the sample converts the United States from the industrialized country with the poorest mortality data at the turn of the century to the country with perhaps the richest and most detailed data on infants and children.

This book serves two related functions. One is to present better information than was previously available about levels, trends, and differences in child mortality for the United States at the turn of the century. This function involves careful description of the data and methods of analysis, some of which were developed specifically for processing these data. In one sense, we are presenting a monograph that could have been a publication from the census of 1900, had Census officials only possessed modern means of processing and interpreting the data that they collected. This component of our work, concentrated in Chapters 2 and 3, is likely to have greatest appeal to demographers and others who are eager to, as the Chinese say, learn truth from facts.

But presenting these data inevitably raises questions about why they look as they do: for example, why was child mortality so high, and why were social-class differences so muted and residential differences so pronounced? In working back and forth between our data and accounts of living conditions of the time, we have constructed an interpretation of some of the main results. This dual focus on data and interpretation is reflected in the organization of the volume.

Chapter 1 presents a description of the major arenas in which the struggle to reduce child mortality was being enacted. The great killers of children in the 1890s were infectious diseases, although they were not always recognized as such. The United States, like European countries, was in the midst of a revolution in bacteriology. The germ theory of disease, which had received striking empirical validation in the 1880s, was beginning to replace earlier theories of disease causation that stressed the importance of miasmata, atmospheric contaminants mainly to be found in public places and detectable principally by their odor.

The germ theory allowed the possibility of much more effective public and private interventions to reduce the incidence of infectious diseases; it was not only more "modern," it was also fundamentally correct. Enlightened public officials and up-to-date physicians saw clearly the implications of the theory for public and personal health-care practices. But the old ideas gave way slowly and continued to be reflected in the daily practices of health professionals of the time. The 1890s were a period of tumult and contention among competing ideas of disease, and advocates of the germ theory often despaired at the backwardness of some of their colleagues.

Parents appear to have been, in general, highly motivated to enhance their children's survival chances (unlike, it is alleged, some European parents of the nineteenth century), but they had few means at their disposal for doing so. One of the surest means available at the time was extended breastfeeding, although the practice faced increasing competition from the use of cow's milk. Chapter 1 reviews what little is known about the breastfeeding practices of different groups at the time. It also notes that the attempt to purify milk brought into the home, which was such an important component of the public-health effort during the twentieth century, had barely begun in the 1890s.

Chapter 1 also reviews evidence from other studies regarding the influence of social factors on child mortality in the late nineteenth century. Much of this evidence comes from other countries, or from later periods in the United States, since there were very few data on these matters in the United States at the time. We do, however, es-

establish that food was abundant and relatively cheap in the late nineteenth century, so that the high levels of child mortality were unlikely to have had a dietary source.

Chapter 2 presents our basic estimates of levels and trends in child mortality for blacks and whites in the years preceding 1900. The census sample provides the first opportunity to gauge the representativeness of mortality data from the Death Registration Area (DRA). By comparing our estimates of child mortality for the U.S. as a whole to those for the states that constituted the DRA (estimates also constructed for the census sample), we are able to show that the DRA had substantially higher mortality than the nation as a whole for whites and, especially, for blacks. Ironically, the DRA gave much more satisfactory estimates when both races were combined because its very low proportion of blacks, 1.9 percent, offset much of the bias that existed for each race separately.

We validate the basic quality of data in the census sample by showing that, for the DRA, the sample produces levels of child mortality very similar to those coming from vital registration in the Area. The registration data are certainly the most important independent test of the quality of census data. Furthermore, we show that states in the DRA had higher levels of reported mortality, levels that were closer to our own estimates, than did states whose mortality estimates were drawn solely from a census question on household deaths in the year before the census. The latter information is so incomplete as to be virtually unusable.

Our census sample suggests that child mortality had been declining in the two decades before 1900 for whites and for the total population. No such improvement is evident for blacks, but any assessment of mortality trends for the black population is plagued by data problems. Marital disruption was frequent for blacks, making marital duration a less reliable indicator of the timing of children's deaths. Furthermore, there are more questions for blacks than for whites about the suitability of the models of age-specific death rates that we use to establish trends.

Chapter 3 presents information about child mortality differences among social and residential groupings that can be constructed from questions asked on the 1900 census. The census sample provides the first opportunity to examine these differences, and the results are sometimes surprising. In particular, we show that the South had mortality levels that were slightly better than those of the Northeast; that second-generation women (i.e., those born in the U.S whose mothers were born abroad) had child mortality levels that were typically well below average; and that there was relatively little differen-

tiation in child mortality levels according to the father's occupation. Other results were more predictable: residents of large cities had much higher child mortality levels than rural residents; children of foreign-born women had higher mortality than those born to natives; and wives of men who were unemployed in the year preceding the census had much higher child mortality than wives of fully employed men.

Chapter 3 shows that immigrants to the U.S. typically achieved lower child mortality than those who remained in the countries from which they emigrated. It also shows that the pattern of interstate differences in child mortality in the 1890s was correlated with interstate differences in the heights and weights of World War I recruits, most of whom were young children in the 1890s. Regional factors that served to raise child mortality also appear to have reduced rates of physical growth.

In presenting results about the relation between mortality and various social and residential conditions in Chapter 3, we discuss a number of reasons why these conditions may have influenced mortality, including reasons that were offered by those writing at the time. The task of sorting out which of these conditions was most influential, and which appear to be unrelated to mortality once other variables are controlled, however, belongs to Chapter 4. There is no single best way to answer these questions, and Chapter 4 uses a variety of criteria.

Whatever approach is used, race stands out as a dominant influence on mortality at the time. Blacks had higher child mortality for reasons that are not primarily explicable in terms of other measured characteristics, such as their low levels of literacy and poor occupational standing. Size of community also remains influential throughout the analysis; residents of larger cities clearly paid a price in terms of child health. Other variables that continue to have a strong influence on child mortality levels when the remaining variables are controlled are father's unemployment, the presence of boarders in the household, the average income level in one's state of residence, and one's region of residence. Once all other variables are controlled, residence in New England or the Mountain region was associated with unusually high mortality, while the South Atlantic is found to have been a region of low mortality.

The results are almost as noteworthy for what is not closely related to mortality as for what is. The husband's occupation, the wife's literacy, and the wife's ethnicity all lose most of their association with child mortality when other variables are introduced. We do show that some of the occupational differences are significant in urban areas,

but the process of occupational labelling is evidently sufficiently imprecise in rural areas, and in the nation as a whole, that occupational differences in child mortality are small and generally insignificant. A similar result pertains when we use very detailed occupational titles to assign a mean occupational income and mean occupational months unemployed to men in the sample. Neither of these variables is significant, nor do their coefficients even take the proper sign, in multivariate analysis.

When multivariate relations are examined separately for rural and urban areas, we show that the comparative advantage of the South Atlantic relative to New England is more pronounced in rural areas. We speculate that New England's rural disadvantage may be attributable to its high rural population densities. The income level of a state is also much more influential in rural mortality than in urban, suggesting that it is principally reflecting rural living conditions. The husband's literacy is shown to have a sizable influence on child mortality in urban areas, whereas his ability to speak English is far more important in rural areas.

Chapter 5 shows that England and Wales in 1911 had much sharper occupational differences in mortality than did the United States in 1900. Part of the explanation is that occupation-specific incomes were substantially more unequal in England. But even apart from income differentials, occupational class appears to have conveyed far more information about conditions of life in England than in the United States. England's early industrialization evidently had created a far more differentiated class structure than was true of the United States (except for the notable distinctions associated with race). We suggest that larger occupational differences in mortality in England may be partly explained by a higher degree of residential segregation by occupation.

Chapter 5 also compares American child mortality differences at the turn of the century to those typically observed in present-day developing countries. We show that the relative and absolute mortality advantage of literate mothers and of members of the professional classes is far greater today. We argue that, in view of the relatively primitive state of knowledge about ways to prevent infectious disease in 1900, there were many fewer steps available to these groups in the United States that would enable them to enlarge the advantage conveyed by their purely economic circumstances. The pattern of higher urban mortality in the U.S., now decisively reversed in developing countries, is further evidence of the extent to which the U.S in 1900 remained in the grip of natural forces.

Chapter 6 summarizes a main theme that runs throughout the volume: child mortality was high in the United States in the late nineteenth century not because parents neglected their children or because resources were severely limited. Mortality was high simply because people lacked the know-how to reduce it. Social efforts to improve child mortality were at an early stage, and individual parents and their physicians had few means at their disposal to prevent infectious diseases. The inability of privileged groups in the U.S. to achieve sharply superior mortality levels is, we believe, further evidence for this proposition.

Portions of Chapter 2 appeared in the *Journal of the American Statistical Association* 79, no. 386 (1984):272–81. Portions of Chapter 5 appeared in the *Journal of Economic History* 45(4) (1985):885–912, and in *Proceedings, International Population Conference of the International Union for the Scientific Study of Population. Florence, Italy, 1985*, 4 (1985):373–88. We are grateful for permission to reproduce them here.

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FATAL YEARS

