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Conclusion

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Certain common themes recurred in the papers in this volume. These have been the relationship between socioeconomic factors and health; the relationship between infectious disease, environmental hazards, and migration and subsequent morbidity and mortality; and the roles of income, health, and social class in the retirement decision. The papers in this volume all brought new data to bear on these questions and shared a common methodological approach: Large data sets that cover the life histories of past populations who lived under very different institutions, disease environments, and technologies than populations today can help us understand long-run trends in health and in health differentials, the impact of disease on morbidity and mortality, and migration and retirement decisions.

In “The Rich and the Dead,” Ferrie analyzed a new sample of 175,000 individuals to assess the effect of socioeconomic status on mortality in the nineteenth-century United States. Although the lower mortality of those higher in socioeconomic status has received a great deal of attention in the recent public health literature, few historical studies have documented such disparities in the period before 1960. The sample consisted of decedents from the mortality schedules and survivors from the population schedules of the 1850 and 1860 federal censuses. In 1850, for males aged twenty to forty-four in fifty rural counties, occupation was a poor predictor of all-cause mortality, although deaths from consumption (tuberculosis) were substantially more likely among craft and white-collar workers than among farmers and unskilled laborers. For males and females of

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nearly all ages in eleven rural counties in Alabama and Illinois in 1850 and 1860, there was no clear relationship between family real estate wealth and mortality. There was, however, a large and statistically significant negative relationship between family personal wealth and mortality in 1860. For example, among both infants and adults aged twenty to forty-four, those in families with no personal wealth were more than twice as likely to die in the year before the census as those in families with any personal wealth. Even when the United States was largely rural and agricultural, then, disparities in mortality by socioeconomic status of the sort observed in modern data were quite common. Although previous studies have characterized the nineteenth-century pattern of death as egalitarian, by disaggregating cause of death and by focusing on adult deaths in rural areas, Ferrie found inequality in death rates.

Chulhee Lee's "Prior Exposure to Disease, and Later Health and Mortality" used the Union Army data to examine the effects of socioeconomic factors and local disease environment on the morbidity and mortality of recruits while in the service. One of his findings was that greater household wealth reduced the chances of a recruit's contracting disease while in the service, although not his chances of dying, suggesting that in the past there were substantial morbidity disparities. The major result of Lee's paper was that prior exposure to an unfavorable epidemiological environment reduced the chances of contracting and dying from disease while in service. Farmers and rural residents, native recruits, and recruits from areas with high child mortality rates—all men who were on average healthier prior to enlistment—were more likely to contract disease while in the service than nonfarmers, urban dwellers, foreigners, and those from areas with low child mortality rates. Explanations included differences in immunity to such common army diseases as typhoid, knowledge of how to avoid contracting disease, and population selection caused by differential mortality (i.e., individuals who survived an unhealthy environment were on average more robust). This study provided a counterexample to "insult accumulation" models in which repeated stresses lead to higher morbidity and mortality. Instead, it implied that a prior insult leads to future disease resistance, especially when in a severe disease environment such as Civil War army camps. The findings suggested that changing human resistance to disease may explain in part the deterioration in health in the mid-nineteenth century during a time of increased geographical mobility, industrialization, and urbanization, and the subsequent turnaround in health in the late nineteenth century.

Daniel Scott Smith's "Seasoning, Disease Environment, and Conditions of Exposure" focused on the effect of both locales of enlistment and regions of service during the war on wartime mortality. Smith examined Union Army soldiers and units from New York State because he augmented the Union Army data set with a detailed tabulation of the out-

comes of military service by New York regiments. He stressed the effect of the environment encountered during service, whereas Lee emphasized the prewar environment, interpreting the low incidence of disease among soldiers from cities as the legacy of having survived earlier exposure. Using the detailed, aggregate tabulations for New York, Smith showed that there was a positive relationship between the mortality of one company and that of all the others in the regiment. Among regiments, a similar relationship existed between the levels of disease mortality of officers and enlisted men, although officers died at much lower rates than enlistees. Regiments organized in counties characterized by lower mortality had higher disease death rates than regiments from higher-mortality environments such as cities. Units that were sent to the lower Mississippi Valley experienced particularly high disease death rates. Findings at the individual level, for New York soldiers in the Union Army data set, reinforced those evident at the aggregate level. Smith concurred with Lee that the lack of prior exposure to disease was the cause of the higher disease mortality of men who formerly were farmers. They were “seasoned,” that is, they suffered higher mortality due to the novel and deadly disease environment of the army camps. After the first year of service, these background factors faded in importance in predicting death from disease. On the other hand, soldiering in the lower Mississippi Valley continued to be particularly deadly after the first year in the army as did the death rate of other men in the regiment. Thus, over time, the factors responsible for disease mortality shifted from attributes of men before they became soldiers to the environment they experienced during the war.

In “The Height of Union Army Recruits,” Sven E. Wilson and Clayne L. Pope used the Union Army data to examine the effects of family and community on the height of recruits prior to their entering the army. (Recall that height is a measure of net nutritional status during the growing years.) They used the sample of recruits linked to the 1850 federal census schedules (which provide information on occupation, wealth, nativity, migration, school attendance, literacy, and family size) and matched the census records to county-level published data to obtain county-level economic and demographic data. They found that at the household level, the primary determinant of height was occupation, with farmers having a distinct advantage over nonfarmers. The migratory history of the recruit and his family also played an important role. Household wealth had only modest and statistically insignificant effects on height. This measure of health, in contrast to adult mortality (Ferrie’s paper) and army camp morbidity (Lee’s paper), showed an egalitarian pattern. The persistent positive effect of farming remained even after controlling for other household and county-level characteristics, including urbanization. Wilson and Pope concluded that farmers were better off, at least in part, because of better access to nutrition. However, it was among farmers that the effect of urbanization was

strongest, implying that the farming advantage was a function of disease exposure as well as nutrient supply. Their conclusion was reinforced by the negative effect on height of the level of agricultural capital within the county (a potential indicator of trade and commerce) and of proximity to rail and waterways. Their findings suggest that changes in both nutrition and infectious disease, changes that arose from economic development and migration, can explain the significant decline in mean heights that began with the cohort born after 1830 and bottomed out with the cohorts born in the 1880s.

Sven E. Wilson's "The Prevalence of Chronic Respiratory Disease in the Industrial Era" examined how economic development in the decades following the Civil War affected the prevalence of chronic respiratory disease among older men using the sample of Union Army soldiers who survived to receive a pension. The paper developed a disease classification system that can be used to summarize the historical data from the medical examinations of Union Army veterans in a manner consistent with modern disease classifications. The analysis made divisions between upper and lower respiratory disease, with the latter broken down into asthma and chronic obstructive pulmonary disease. The paper found that among men aged fifty-five to seventy-four the prevalence of chronic respiratory disease was rising between 1895 and 1910 across all age groups. For instance, the prevalence of respiratory disease among sixty-five- to sixty-nine-year-olds in the most comprehensive category (those ever diagnosed with a chronic respiratory disease) rose from 25 to 46 percent. The rise in prevalence was fairly widespread across occupational groups and level of urbanization. Those in rural communities had the highest prevalence of respiratory disease, although whether this was due to the higher incidence of disease (perhaps because of farmers' exposure to organic particles) or to lower all-cause mortality in rural communities remains unclear.

Wilson's paper also found evidence of the negative effect of wartime exposure to infectious respiratory disease and of stunted growth, evidenced by shorter adult heights, on respiratory disease later in life. In contrast to the papers by Lee and Smith the findings therefore provide support for an insult accumulation model. Prior exposure may have enabled men to survive the harsh disease environment of the army camps, but prior exposure also left permanent scars.

Werner Troesken and Patricia E. Beeson's "The Significance of Lead Water Mains in American Cities" examined whether living in 1900 in a city that had lead water mains affected the health of Union Army veterans. Lead water mains were pervasive, and pollution at the source, corrosion of lead water mains, and corrosion of household plumbing (which was made of lead) led to high levels of exposure. Troesken and Beeson reported that in Massachusetts in 1900, all cities and towns in the state that were surveyed by the state health department had drinking water that contained

lead levels several orders of magnitude greater than those set by the federal government today. Deaths from lead poisoning occurred in Lowell and in Milton. Troesken and Beeson found modest effects from the use of lead mains on the health of Union Army veterans. Veterans living in cities with lead mains in 1900 reported higher rates of dizziness and ear problems than veterans living in cities without lead, but they did not report higher levels of more serious lead-related ailments such as kidney failure. Given the relatively high levels of geographic mobility among Union Army veterans, their results are probably lower-bound estimates of the impact of lead water mains on health.

Mario A. Sánchez's "Internal Migration, Return Migration, and Mortality" used the rich residential information in the Union Army data to document the extent of internal migration, examine the characteristics of migrants across counties, and determine the effect of migration on health. He found that Union Army veterans were quite mobile, even at mature ages, and that many moved temporarily. The young, the single, and those with smaller families were less likely to move. The findings imply that workers were responsive to local economic shocks and therefore suggest that the degree of labor market integration in the United States during the late nineteenth century was fairly high. Migration, however, reduced workers' life expectancies. Life expectancies of migrants were significantly shorter than those of their counterparts who did not migrate because of migrants' higher probability of dying from infectious disease. Infectious diseases were particularly important in explaining the reduced life expectancies of migrants to urban counties. However, even migrants across rural areas suffered higher mortality rates relative to rural nonmovers. Migration was stressful in and of itself. Higher wages in cities relative to rural areas may therefore have compensated only for the increased risk of death faced by migrants.

The Union Army pension data are also a rich source of information on the retirement decision. Tayatat Kanjanapipatkul's "Pensions and Labor Force Participation of Civil War Veterans" examined the impact of Civil War pensions on the labor force participation, using a much larger data set than that which was available to previous researchers. In addition to using the Union Army data set, he also used the public use sample of the 1910 census to compare participation rates between Union and Confederate veterans, controlling for individual as well as regional characteristics. The results confirmed that the availability of pensions substantially reduced labor force participation rates among Union Army veterans. However, the results also showed that the magnitude of the effect varied with the measure of pension income and with occupation. Using lifetime income increased the estimated magnitude. Professionals and proprietors were more sensitive than blue-collar workers to pension income. Perhaps they were the only group with enough combined wealth to retire comfortably.

Chen Song and Louis L. Nguyen's "The Effect of Hernias on the Labor Force Participation of Union Army Veterans" examined the effect of health on the retirement decision by focusing on one specific health condition that can be extremely debilitating and that was incurable—hernias. They used detailed health information from Union Army data to quantify the severity of recorded cases of hernias using such symptoms as size, subtype of hernia, and location. They found weak evidence of the influence of hernias on the labor force participation of Union Army veterans, controlling for general health and demographic characteristics, regardless of whether they compared men with hernias to those without hernias but with other disabilities or to those with no disabilities. They also found that even among men in more manually demanding occupations, hernias had relatively small effects on labor force participation rates. Why wasn't retirement influenced by hernias so severe that they were described as being the size of a large grapefruit or the size of a man's two fists? Song and Nguyen argue that there are two possibilities. One of these is that what the pension surgeons, or even physicians today, believed to be extremely debilitating may only have been discomforting and therefore did not influence the retirement decision. The second possibility is that in a society where incomes were low and medical care was of limited efficacy, older veterans simply worked with pain either because they could not afford to retire or because suffering from ill health was so common that men simply endured.

The papers in these volumes raised several issues for future research. One is the need to reexamine the role of social class, wealth, and occupation on morbidity and mortality in the past. In a world where death from infectious disease was common and where there were large mortality differentials by city size, geographic differences may have been more important than socioeconomic disparities, but, controlling for geography, substantial socioeconomic disparities may still have been there. Another important topic dealt with the effect of infectious disease on later outcomes. Did prior exposure provide protection against later disease or did it have a permanent scarring effect that raised future morbidity and mortality? The papers in this volume suggested that the answer to both questions was yes. Prior exposure could protect against extreme conditions but there was also a cost to prior exposure. As the disease environment changed over the twentieth century, the costs of prior exposure may have increasingly dominated the benefits. Further analyses of the interactions between individual life histories and the environment are needed. Because it is impossible to obtain a full medical history from birth until death, these life histories should also include the characteristics of past environments, both residential and workplace. Work is underway to augment the Union Army data set with data on city and county characteristics. Another issue raised by this volume is the need to adjust wage or income numbers to reflect the costs of morbidity and mortality. The mortality penalty paid by migrants

suggests that during periods of high migration in the nineteenth century we may be overstating economic growth. Finally, this volume suggested that disability needs to be examined within a social context. In the past, men continued to work in pain with severe disabilities. Rising incomes allowed them to leave the labor force. Improvements in health did not lead them to remain in the labor force longer. As incomes continue to rise and as medical care becomes more efficacious, our notions of disability will continue to evolve.

