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The Rise of the Current Mortality Pattern of the United States, 1890–1930

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This article examines how the epidemiologic transition and the reduction of the urban mortality penalty gave rise to the current mortality regime of the United States and demonstrates how the 1918 influenza pandemic signaled its advent. This article approaches those issues through the analysis of urban-rural mortality differentials from 1890 to 1930. Until 1910, infectious diseases dwarfed degenerative diseases in leading causes of death, and generally, the more urban the location was, the higher infectious disease and overall death rates were—a direct relationship. But by 1930, degenerative diseases had eclipsed infectious diseases, and infectious disease mortality had ceased to differ between cities and rural areas. The 1918 influenza pandemic broke out toward the end of these changes, and the larger the city was, the lower influenza and overall death rates were in that year—an inverse relationship. Such gradations characterized a new mortality regime emerging in the late 1910s and foreshadowed urban-rural mortality differentials in 1930 among persons aged 45 years or older, the group whose high rates of degenerative disease death would symbolize that regime. Thus, intertwined changes in the late 19th and early 20th centuries—a shift in leading causes of death from infectious diseases to degenerative diseases and a concomitant shift from a direct relationship to an inverse relationship between urban environment and mortality—produced the current mortality regime of the United States.

1918 influenza pandemic; epidemiologic transition; historical epidemiology; urban mortality penalty; urban-rural mortality differentials

In the late 19th and early 20th centuries, 2 fundamental shifts, and a brief disruption of them, took place in the mortality regime of the United States. The first change was a shift in leading causes of death from infectious diseases to degenerative diseases, a phenomenon known as the "epidemiologic transition" (1, 2). The second was the reduction and virtual disappearance of excess mortality in cities, a health burden often referred to as the "urban mortality penalty" (3, 4). Intertwined, the epidemiologic transition and the reduction of the urban mortality penalty proceeded in tandem. Just when cities had managed to bring down their mortality significantly and when infectious diseases were about to give way to degenerative diseases, an influenza pandemic—a throwback to the old mortality regime—broke out. Impactful as it was, the 1918 influenza pandemic did not stem the tide of change. By 1930, the epidemiologic transition had been completed, the urban mortality penalty had largely been lifted, and a new mortality regime—the current one—was in place as a result.

This article examines what is still a dimly understood process of how the epidemiologic transition and the reduction of the urban mortality penalty gave rise to the current mortality regime of the United States and demonstrates how the 1918 influenza pandemic signaled its advent. This article approaches those issues through the lens of urban-rural mortality differentials. Before the epidemiologic transition, infectious diseases were rampant. The more urban the location was, the higher mortality was, because crowded, unsanitary city environments facilitated infectious disease deaths, while the sparseness of rural populations checked them (5). Advances in the standard of living and the increasing availability of public health infrastructure from the late 19th century onward brought infectious diseases under control, shifting leading causes of death to degenerative diseases (2, 6, 7). But how the epidemiologic transition reshaped the aforementioned urban-rural mortality differentials of the pretransition era has yet to be closely scrutinized.

More specifically, how the epidemiologic transition translated into the reduction of the urban mortality penalty—the development that produced the current mortality regime—is yet to be firmly grasped. Since improvements in living standards and public health reflected a given location's economic vitality, which correlated with its size, these improvements were probably larger in big cities than in small towns or rural counties. Then, it is plausible that the more urban the location was, the larger its residents' health gain (i.e., the reduction in its mortality penalty) was during the epidemiologic transition. Such a conjecture can be empirically examined with evidence of changes in urban-rural mortality differentials over time, an inquiry that can shed light on how the current mortality regime emerged from the epidemiologic transition and the reduction of the urban mortality penalty.

However, much about urban-rural mortality differentials in the late 19th and early 20th centuries is still unknown. Analyses of the urban mortality penalty and its reduction typically employ urban- and rural-aggregate comparisons (or just focus on large cities), drawing only rough contrasts in mortality (8, 9). It is true that such well-regarded works on differential mortality as those by Condran and Crimmins (10), Preston and Haines (5), and Preston et al. (11) show more detailed urban-rural mortality gradations than are commonly available. But the latter two studies do not relate those patterns to causes of death. The first one does so, but only for 1900, leaving unexplored how a shift in leading causes of death (i.e., the epidemiologic transition) would have reshaped urban-rural mortality differentials. Previous research actually does not investigate urban-rural mortality differentials after 1910 or compare such gradations from more than 2 observation years. Current knowledge on urban-rural morality differentials is too limited to delineate the intertwined processes of the epidemiologic transition and the reduction of the urban mortality penalty.

Using historical city- and county-level mortality data, this article estimates detailed urban-rural differentials in cause-specific, age-specific, and overall death rates in the United States from 1890 to 1930. Surveying those differentials, it examines how the epidemiologic transition unfolded across the urban-rural spectrum over the course of 4 decades and how the 1918 influenza pandemic manifested itself across that spectrum. Such analyses can help us understand how the epidemiologic transition translated into the reduction of the urban mortality penalty and thereby how the current mortality regime came to be.

Those investigations will reveal a fundamental shift in urban-rural mortality differentials behind the rise of the current mortality regime. Until 1910, infectious diseases dwarfed degenerative diseases in leading causes of death, and generally, the more urban the location was, the higher infectious disease and overall death rates were—a direct relationship. But by 1930, degenerative diseases had eclipsed infectious diseases, and infectious disease mortality had ceased to differ between cities and rural areas. The 1918 influenza pandemic broke out toward the end of these changes, and the larger the city was, the lower influenza and overall death rates were in that year—an inverse relationship. Such gradations characterized a new mortality regime that was beginning to take shape in the late 1910s. Mortality gradations of influenza in 1918, in fact, foreshadowed urban-rural mortality differentials in 1930 among persons aged 45 years or older, the group whose high rates of degenerative disease death would symbolize that regime. Furthermore, the emerging new regime suggested that the more urban the location was, the larger the reduction in the mortality penalty had been, for the most part. Thus, intertwined changes in the late 19th and early 20th centuries—a shift in leading causes of death from infectious diseases to degenerative diseases and a concomitant shift from a direct relationship to an inverse relationship between urban environment and mortality—produced the current mortality regime of the United States.

DATA AND METHODS

This study analyzes mortality data culled from historical US censuses and *Mortality Statistics*, the annual Census Bureau publication that preceded the current *National Vital Statistics Reports* produced by the National Center for Health Statistics. This study collected all available city- and county-level mortality data for 1900, 1910, 1918, 1920, and 1930 from corresponding volumes of *Mortality Statistics* (12–17). It also drew county-level data from the 1880 census and city-level data from the 1890 census because of uneven availability of mortality data in these source materials (18–20). The basis for historical studies by the National Office of Vital Statistics, the predecessor of the National Center for Health Statistics (21, 22), the available data can be deemed of reliable quality. The geographic coverage of the data is the continental United States for 1890 and the Death Registration Area—states and cities with a satisfactory death registration system—for 1900–1930 (22). Web Table 1 (available at https://academic.oup.com/aje) provides details of the data.

In analyzing mortality differentials, this study employs the following urban-rural categories. The first 3 are 1) rural counties, 2) largely rural counties, and 3) suburban areas. None of those categories contains cities with 10,000 or more residents. Category 1 refers to counties not having a city with 5,000–9,999 residents. Category 2 comprises counties having a city with 5,000–9,999 residents. Category 3 consists of areas outside cities with 10,000 or more residents in the counties that contain such cities, along with a small number of counties having a few (usually 2) cities with 5,000–9,999 residents. The remaining categories are 4) cities with 10,000–49,999 residents, 5) cities with 50,000–99,999 residents, 6) cities with 100,000–499,999 residents, and 7) cities with 500,000 or more residents. When appropriate, categories 1–3 will be referred to as areas outside cities with 10,000 or more residents, and categories 4–7 will be referred to as cities with 10,000 or more residents.

Figures 1 and 2, along with Web Figures 1 and 2, show urban-rural differentials in cause-specific, age-specific, and overall death rates estimated from the available data. Table 1 distills those analyses. In Figures 1 and 2, panel A presents county-level data from 1880 and city-level data from 1890. Age-standardized rates were calculated for cause-specific and overall death rates. However, except in reference to urban-rural differentials in overall mortality, those age-standardized rates will not be discussed because they closely parallel unadjusted rates.

URBAN-RURAL MORTALITY DIFFERENTIALS

Infectious and degenerative diseases

Of particular interest is how urban-rural differentials in infectious and degenerative disease mortality shifted during the epidemiologic transition. Figure 1 (and Table 1) traces infectious and degenerative disease death rates per 100,000 persons. Web Table 2 shows the composition of infectious and degenerative diseases for each observation year. In Figure 1A, infectious disease death rates for rural and largely rural counties pertain to 1880, and the rates for these counties would likely have been lower in 1890 than in 1880. Then, urban-rural differentials in infectious disease mortality in 1890 would probably have resembled those in 1900. Urban-rural differentials in degenerative

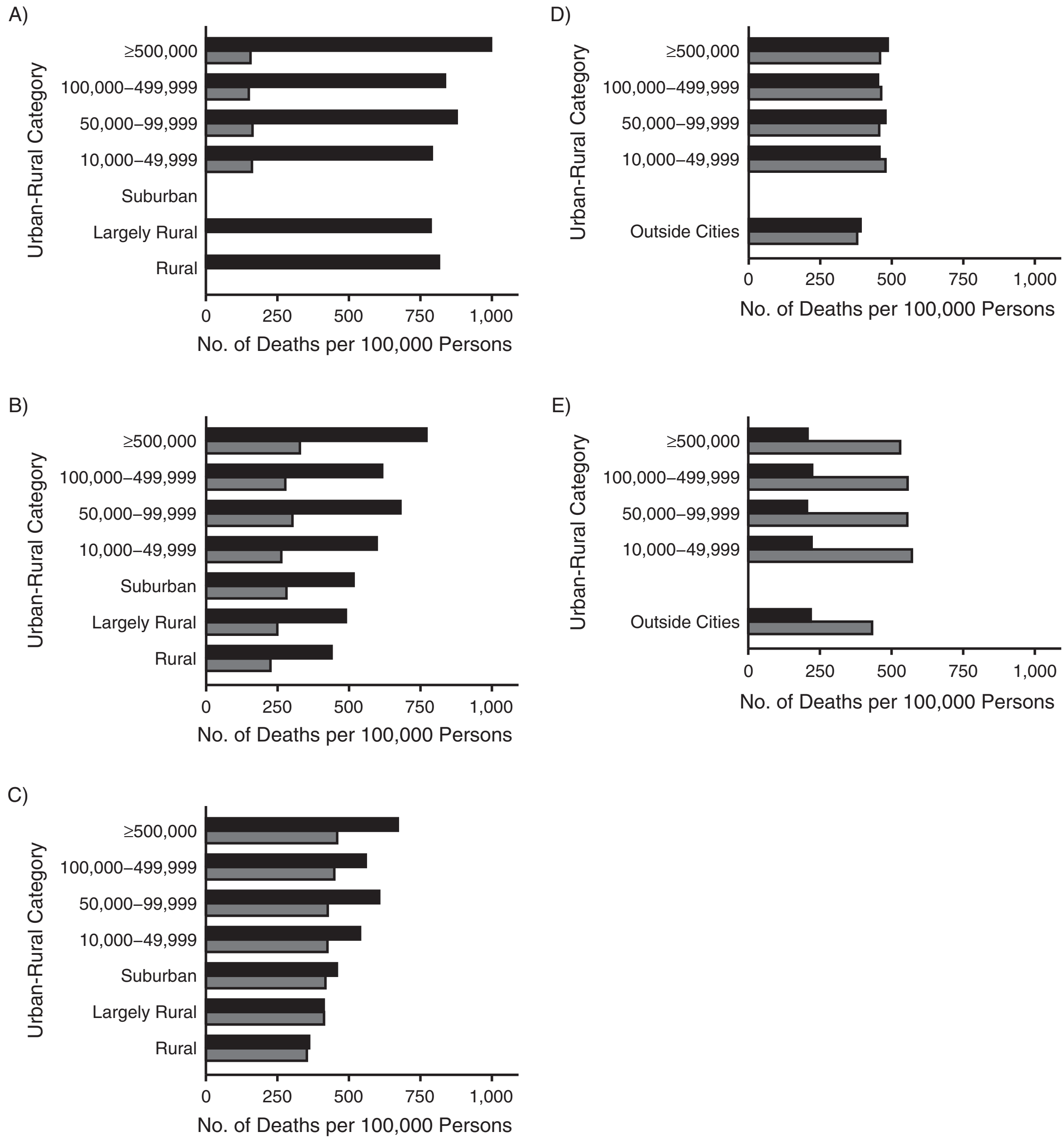

Figure 1. Cause-specific death rates (per 100,000 persons) by urban-rural category in the continental United States (1880/1890) and the Death Registration Area (1900–1930) for 1880/1890 (A), 1900 (B), 1910 (C), 1920 (D), and 1930 (E). The Death Registration Area refers to states and cities with a satisfactory death registration system. Black bars, infectious disease; gray bars, degenerative disease. "Outside cities" refers to the aggregate of suburban areas, largely rural counties, and rural counties.

disease mortality did not change very much between 1890 and 1910. Levels of degenerative disease mortality in 1890 and 1900 might not have been substantially different from those in 1910, either, because degenerative disease mortality before 1910 is calculated from far fewer diseases than is that for 1910–1930. Thus, urban-rural mortality differentials from 1910 can serve as a baseline pattern for degenerative diseases, while those from 1900 can serve as a baseline pattern for infectious diseases.

Baseline mortality gradations differed considerably between infectious and degenerative diseases. In 1900, infectious disease mortality was 440 per 100,000 persons in rural counties; 520 in suburban areas; 680 in cities with 50,000–99,999 residents; and 770 in cities with 500,000 or more residents. In 1910, degenerative disease mortality was 350 per 100,000 persons in rural counties; 420 in suburban areas; 430 in cities with 50,000–99,999 residents; and 460 in cities with 500,000 or more residents. Infectious disease mortality was much higher than degenerative disease mortality, and generally, the more urban the location was, the higher infectious disease mortality was. By contrast, degenerative disease mortality did not vary significantly across the urban-rural spectrum, except for a modest increase from rural counties to largely rural counties, the latter of which contained a small city.

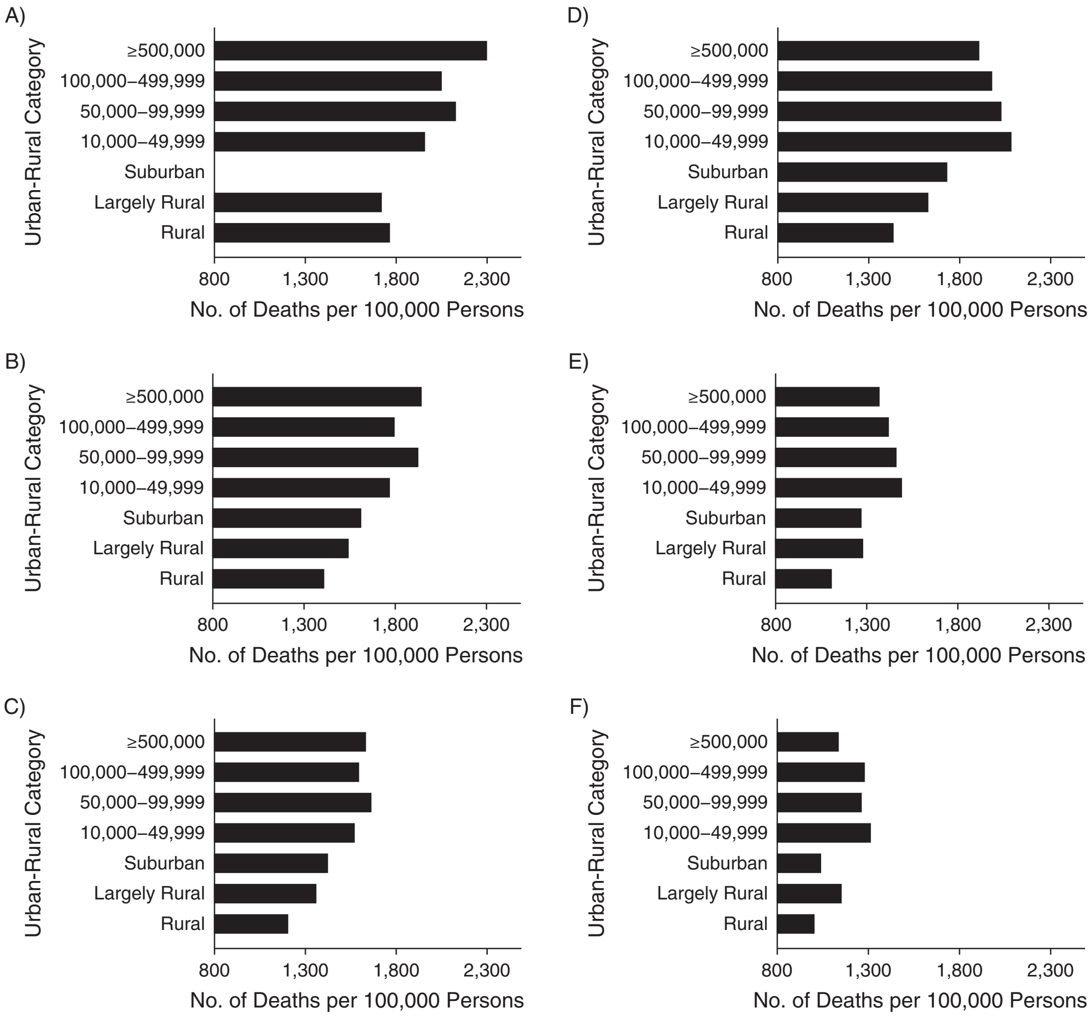

Figure 2. Overall death rates (per 100,000 persons) by urban-rural category in the continental United States (1880/1890) and the Death Registration Area (1900–1930) for 1880/1890 (A), 1900 (B), 1910 (C), 1918 (D), 1920 (E), and 1930 (F). The Death Registration Area refers to states and cities with a satisfactory death registration system.

Urban environments might have had a threshold effect on degenerative disease mortality, while a dose-response relationship existed between urban environments and infectious disease mortality.

An oddity in infectious disease mortality between 1890 and 1910 is that it was lower in cities with 100,000–499,999 residents than in cities with 50,000–99,999 residents. Possessing greater resources to invest in public health, cities with 100,000 or more residents were better positioned to combat urban health problems than were smaller cities (3). However, it could have been that those problems were initially so severe in cities with 500,000 or more residents that it took longer for these cities to lower infectious disease mortality than for cities with 100,000–499,999 residents—hence a mortality advantage in the second-largest cities but not in the largest ones.

After 1910, urban-rural differentials in infectious disease mortality shifted dramatically, while those in degenerative disease mortality changed only slightly. By 1920, infectious disease mortality had ceased to vary meaningfully among cities with 10,000 or more residents, though it was still higher in these cities than in the areas outside them in that year. By 1930, it had ceased to differ meaningfully between the cities and the areas outside them as well. No less important is that urban-rural differentials and levels of infectious disease mortality had become indistinguishable from those of degenerative disease mortality by 1920. In that year, degenerative disease mortality did not vary greatly among cities with 10,000 or more residents, but it was noticeably higher in these cities than in the areas outside them. From 1920 to 1930, that mortality gap widened, lending support to a possible threshold effect. Interestingly, in 1930, the larger the city was, the lower degenerative disease mortality was. Although such gradations contrasted with infectious disease mortality differentials of 1900, the range of degenerative disease mortality differentials in 1930 was quite small.

By 1930, the precipitous decline of infectious disease mortality had resulted in a sizable reduction in the urban mortality

Table 1. Cause-Specific and Overall Death Rates (per 100,000 Persons) by Urban-Rural Category in the Death Registration Area[a], 1900–1930

Year and Urban-Rural Category	Death Rate (per 100,000 Persons)				
	Infectious Disease	Influenza	Influenza and Pneumonia	Degenerative Disease[b]	Overall
1900					
Cities with ≥500,000 residents	770			330	1,940
Cities with 100,000–499,999 residents	620			280	1,790
Cities with 50,000–99,999 residents	680			300	1,920
Cities with 10,000–49,999 residents	600			260	1,770
Suburban areas	520			280	1,610
Largely rural counties	490			250	1,540
Rural counties	440			230	1,410
1910					
Cities with ≥500,000 residents	670			460	1,630
Cities with 100,000–499,999 residents	560			450	1,590
Cities with 50,000–99,999 residents	610			430	1,660
Cities with 10,000–49,999 residents	540			430	1,570
Suburban areas	460			420	1,420
Largely rural counties	410			410	1,360
Rural counties	360			350	1,200
1918					
Cities with ≥500,000 residents		230	430		1,900
Cities with 100,000–499,999 residents		280	460		1,980
Cities with 50,000–99,999 residents		350	520		2,030
Cities with 10,000–49,999 residents		380	540		2,080
Suburban areas					1,730
Largely rural counties					1,620
Rural counties					1,430
Areas outside cities with ≥10,000 residents[c]		280	380		
1920					
Cities with ≥500,000 residents	490			460	1,370
Cities with 100,000–499,999 residents	450			460	1,420
Cities with 50,000–99,999 residents	480			460	1,460
Cities with 10,000–49,999 residents	460			480	1,490
Suburban areas					1,270
Largely rural counties					1,280
Rural counties					1,110
Areas outside cities with ≥10,000 residents[c]	390			380	
1930					
Cities with ≥500,000 residents	210			530	1,130
Cities with 100,000–499,999 residents	220			560	1,280
Cities with 50,000–99,999 residents	210			560	1,260
Cities with 10,000–49,999 residents	220			570	1,310
Suburban areas					1,040
Largely rural counties					1,150
Rural counties					1,000
Areas outside cities with ≥10,000 residents[c]	220			430	

[a] States and cities with a satisfactory death registration system (22).
[b] Degenerative disease death rates for 1900 are calculated from fewer diseases than are those for 1910–1930 (see Web Table 2).
[c] Aggregate of suburban areas, largely rural counties, and rural counties.

penalty and the ascendance of degenerative diseases. Between 1890 and 1930, infectious disease mortality fell 79% in cities with 500,000 or more residents and 72% in cities with 10,000–49,999 residents. Between 1900 and 1930, it dropped 68% in cities with 10,000 or more residents and 55% in the areas outside these cities. Such figures suggest that the more urban the location was, the larger the reduction in the mortality penalty was. On the other hand, between 1910 and 1930, degenerative disease mortality rose, albeit to a far smaller extent than infectious disease mortality plummeted. Thus, in 1930, infectious disease mortality was around 220 per 100,000 persons across the urban-rural spectrum, while degenerative disease mortality was 550 per 100,000 persons in cities with 10,000 or more residents and 430 in the areas outside these cities. Degenerative disease mortality had become 2–2.5 times higher than infectious disease mortality by 1930.

The 1918 influenza pandemic

In 1918, when infectious diseases were about to give way to degenerative diseases, an influenza pandemic broke out. Web Figure 1 (and Table 1) shows urban-rural mortality differentials for influenza, tuberculosis of the lungs, and diarrhea and enteritis. Tuberculosis of the lungs and diarrhea and enteritis epitomized the infectious diseases of the pre–epidemiologic transition era. In 1880/1890, urban-rural mortality differentials of tuberculosis of the lungs and of diarrhea and enteritis resembled those of infectious diseases as a whole. In 1918, the influenza death rate per 100,000 persons was 280 in areas outside cities with 10,000 or more residents and 290 in these cities. But it was 380 in cities with 10,000–49,999 residents; 350 in cities with 50,000–99,999 residents; 280 in cities with 100,000–499,999 residents; and 230 in cities with 500,000 or more residents. In short, the larger the city was, the lower influenza mortality was. Urban-rural mortality differentials of influenza in 1918 were not what infectious diseases would have produced in the late 19th century or what would have been expected from mortality gradations at that time of tuberculosis of the lungs, which had afflicted adults just like the 1918 influenza pandemic (14, 23).

It was difficult to distinguish pneumonia deaths secondary to influenza from influenza deaths proper during the pandemic. Data on pneumonia deaths between 1913 and 1918 from 23 states and the District of Columbia, whose mortality statistics are available for every year during that period, indicate that the pneumonia death rate per 100,000 persons had stayed around 140 until 1918, when it soared to 290 (14, 24–28). These figures suggest that about half of pneumonia deaths in 1918 could have been attributed to influenza. Web Figure 1 shows urban-rural mortality differentials calculated from all influenza deaths and half of pneumonia deaths in 1918. These gradations were essentially the same as those of influenza deaths alone.

Mortality gradations of influenza in 1918 resembled urban-rural mortality differentials in 1930 of diarrhea and enteritis and of other common infectious diseases that had raged in the late 19th century. The link between reduced mortality from waterborne diseases such as diarrhea and enteritis and public health interventions, which contributed to the epidemiologic transition, has been well established (9, 29, 30). Web Figure 1 shows that in 1930, the larger the city was, the lower diarrhea and enteritis mortality was. It also shows urban-rural mortality differentials for measles, whooping cough, diphtheria and croup, typhoid fever, malarial fever, and scarlet fever combined as common infectious diseases. In 1890, these diseases collectively killed more people than tuberculosis of the lungs did (19). In 1930, urban-rural mortality differentials of these common infectious diseases were virtually identical to those of diarrhea and enteritis. Urban-rural mortality differentials of influenza in 1918 previewed what mortality gradations of once-potent infectious diseases would become as a result of the epidemiologic transition.

The implication of those patterns is important in appreciating the historical significance of the 1918 influenza pandemic. With the data in hand, it is not possible to explain why urban-rural differentials in influenza mortality formed the way they did. But it is plausible that they signaled the emergence of a new mortality regime shaped more by degenerative diseases than by infectious diseases. The switchover from an old mortality regime to a new one would probably have been reflected in changes in urban-rural mortality differentials among persons aged 45 years or older—the group that would face elevated risks of degenerative diseases once the epidemiologic transition had contained the threat of infectious diseases. In 1900, urban-rural mortality differentials in this group, shown in Web Figure 1, were indistinguishable from those of infectious diseases. But in 1930, with infectious diseases in retreat, mortality differentials in this group were such that the larger the city was, the lower its mortality was. Thus, urban-rural differentials in influenza mortality in 1918 anticipated mortality gradations in 1930 among persons aged 45 years or older, whose high rates of degenerative disease death would symbolize the post–epidemiologic transition mortality regime. The 1918 influenza pandemic was a blast from the infectious-disease-dominated past that foreshadowed the degenerative-disease-driven future.

Overall mortality

Reflecting the shifts in mortality patterns examined so far, changes in urban-rural differentials in overall mortality between 1890 and 1930 can help us discern how the epidemiologic transition translated into the reduction of the urban mortality penalty. Figure 2 (and Table 1) traces the overall death rate per 100,000 persons during this period. In 1900, when the epidemiologic transition was still in an early stage, overall mortality increased from 1,410 per 100,000 persons in rural counties to 1,610 in suburban areas and to 1,920 in cities with 50,000–99,999 residents—a direct relationship between urban environment and mortality. Although such a relationship did not extend to cities with 100,000 or more residents in 1900, it had more or less prevailed across cities with 10,000 or more residents in 1890. In 1900 and 1910, mortality gradations between rural counties and cities with 50,000–99,999 residents were so smooth that a linear regression analysis would fit an upward slope where a move from one urban-rural category to the next more urban one would have resulted in 123 more deaths per 100,000 persons.

By the late 1910s—when the epidemiologic transition passed a tipping point, as evidenced by the 1918 influenza pandemic's mortality gradations—urban-rural differentials in overall mortality had changed drastically. In 1918, as in 1910 and

1900, overall mortality increased from rural counties to cities with 10,000–49,999 residents. However, it decreased from 2,080 per 100,000 persons in those cities to 2,030 in cities with 50,000–99,999 residents, to 1,980 in cities with 100,000–499,999 residents, and to 1,900 in cities with 500,000 or more residents—an inverse relationship between city size and mortality. In 1918 and 1920, mortality gradations among cities with 10,000 or more residents were so smooth that a linear regression analysis would fit a downward slope where a move from one class of cities to the next one below (i.e., that of smaller cities) would have resulted in 45 more deaths per 100,000 persons. While not entirely mirroring urban-rural differentials in overall mortality from 1918 or 1920, mortality gradations in 1930 were fundamentally different from those of 1910 or earlier.

Mortality levels were considerably lower in 1930 as well. Between 1900 and 1930, overall mortality declined 42% in cities with 500,000 or more residents; 34% in cities with 50,000–99,999 residents; 36% in suburban areas; and 29% in rural counties. These figures suggest that, roughly, the more urban the location was, the larger the reduction in the mortality penalty was during the epidemiologic transition. (Suburban areas deviated from that generalization, though.) Such a pattern of mortality reduction altered the aforementioned urban-rural differentials in overall mortality from 1890 and 1900 by reversing their hallmark feature, a direct relationship between urban environment and mortality, among cities with 10,000 or more residents without modifying that relationship in the areas outside these cities as conspicuously. Thus, by 1918, urban-rural differentials in overall mortality had come to exhibit a downward slope across those cities, while largely retaining an upward slope across the areas outside them. The epidemiologic transition translated into the reduction of the urban mortality penalty as a shift from a direct relationship to an inverse relationship between urban environment and mortality among cities with 10,000 or more residents.

The changes in urban-rural differentials in overall mortality discussed above do not take into account the fact that the Death Registration Area expanded over time as more states and cities joined it. To address such a compositional issue, Web Figure 2 traces the overall death rate per 100,000 persons in so-called original registration states only (i.e., 10 northern states, along with the District of Columbia, that were part of the Death Registration Area in 1900). Those rates are age-standardized to facilitate examination of urban-rural mortality differentials free of bias from changes in age structure as well as constituent populations over time. Web Figure 2 shows that a direct relationship between urban environment and mortality existed in the original registration states until 1910, but an inverse relationship between city size and mortality did not clearly materialize there afterward. Such findings do not mean that the shift from a direct relationship to an inverse relationship observed in the Death Registration Area was an artifact of its expansion. It can be inferred from Preston and Haines (5) that mortality patterns in the registration area prevailed nationwide in 1900. Beginning in the late 1910s, mortality patterns in the registration area conveyed those of the entire country reasonably well, as the registration area included states from all regions and 75% of the nation's population by then (22). Hence, changes in urban-rural differentials in overall mortality in the registration area were likely genuine.

DISCUSSION

Analyzing urban-rural mortality differentials of the late 19th and early 20th centuries, this article has uncovered several features that warrant further investigation. Although an urban mortality penalty from infectious diseases had disappeared by 1930, one from degenerative diseases remained. Cosby et al. (31), James (32), and Cossman et al. (33) have noted the emergence of a "rural mortality penalty" from degenerative diseases in the early 1990s. Research on how the "urban" mortality penalty from degenerative diseases in 1930 had turned into the "rural" mortality penalty by 1990 could contribute to the continuing examination of the posttransition phase of the epidemiologic transition (34, 35).

No other urban-rural mortality differentials call for more inquiry than those of influenza in 1918. It would be of great interest to find out whether urban-rural differentials in influenza and overall mortality exhibited an inverse relationship between city size and mortality before 1918. If such were the case, it would suggest that long-term epidemiologic shifts, and the societal changes underpinning them, exerted as much or even greater influence on shaping the influenza pandemic in the United States than did influenza itself.

Through the analysis of urban-rural mortality differentials, this article weaves together the epidemiologic transition, the reduction of the urban mortality penalty, and the 1918 influenza pandemic in the exploration of the rise of the current mortality regime. A direct relationship between urban environment and mortality, with a heavy penalty on cities, characterized urban-rural differentials in infectious disease mortality until 1910. The epidemiologic transition had largely lifted such an urban mortality penalty by 1930, when infectious disease mortality hardly varied across the urban-rural spectrum and was half as high as degenerative disease mortality. An inverse relationship between city size and mortality characterized urban-rural differentials in influenza mortality in 1918. Such mortality gradations would have been inconceivable in 1890, indicating how far the epidemiologic transition had advanced and how much the urban mortality penalty had been reduced. In 1930, the same inverse relationship depicted urban-rural mortality differentials for diarrhea and enteritis and other common infectious diseases. The downward slope from the largest cities to smaller cities defined urban-rural differentials in overall mortality after 1910, though until that time these gradations had been delineated by the upward slope across the urban-rural spectrum (except for the largest cities after 1890). Such a striking shift resulted because, generally, the more urban the location was, the larger the reduction in the mortality penalty was during the epidemiologic transition. The shift from an upward slope to a downward slope—the manifestation of the lifting of the urban mortality penalty by the epidemiologic transition—thus encapsulates the emergence of the current mortality regime of the United States.

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