	Data Years and ICD Revision								
Cause and Rate	1900 (ICD 1)	1910, 1920 (ICD 2)	1930 (ICD 4)	1940 (ICD 5)	1950 (ICD 6)	1960 (ICD 7)	1970 (ICD 8)	1980, 1990 (ICD 9)	2000, 2010 (ICD 10)
All causes									
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Influenza and pneumonia	10, 92, 93	10, 91, 92	11, 107–109	33, 107–109	480–493	480–493	470–474, 480–486	480–487	J10–J18
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Tuberculosis	26–34, 35	28–35	23–32	13–22	001–019	001–019	010–019	010–018	A16–A19
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Diarrhea and enteritis	13, 105, 106	13, 104, 105	119, 120	119, 120	543, 571, 572	543, 571, 572	009	009	A09
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder	Wonder	Wonder
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder	Wonder	Wonder
Cancers (malignant neoplasms)[a]	39–45	39–45	45–53	45–55	140–205	140–205	140–209	140–208	C00– C97
DR	Linder T15	Linder T15	Linder T15	Linder T15	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Cancers of respiratory system	NA	NA	47	47	160–164	160–164	160–163	160–165	C30–C39
DR	NA	NA	NA	Grove T63	Hist290	Hist290	Hist290	Hist290	Wonder

AADR	NA	NA	NA	NA	Hist293	Hist293	Hist293	Hist293	Wonder
Major cardiovascular diseases[a]	64–66, 77–86, 142	47, 64–66, 77–85, 142	56, 82, 90–95, 97–103	58, 83, 90–103	330–334, 400–468	330–334, 400–468	390–448	390–448	I00–I78
DR	Hist290	Hist290	Hist290	Grove T63	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013,
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Heart diseases[a]	77–80	77–80	90–95	90–95	400–402, 410–443	400–402, 410–443	390–398, 402, 404, 410–429	390–398, 402, 404, 405–409, 410–429	I00–I09, I11, I13, I20–I51
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Stroke (cerebrovascular diseases)	64–66, 82	64–66, 82	82	83	330–334	330–334	430–438	430–438	I60–I69
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Chronic lower respiratory diseases	NA	NA	NA	NA	NA	241, 501, 502, 527.1	490–493, 519.3	490–496	J40–J47
DR	NA	NA	NA	NA	NA	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	NA	NA	NA	NA	NA	NA	Wonder	Hist293	Wonder, NCHS 2013
Unintentional injuries (accidents)	164–175, 176pt	165–181, 185, 186	176, 178–195, 201–214	169–176, 178–195	E800–E962	E800-E962	E800–E949	E800–E949	V01–X59, Y85–Y86
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013

AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Unintentional motor vehicle injuries (motor vehicle accidents)	166part	175part	206, 208, 210, 211	170	E810–E835	E810–E835	E810–E823	E810–E825	V02–V04, V09.0, V09.2, V12–V14, V19.0–V19.2, V19.4–V19.6, V20–V79, V80.3–V80.5, V81.0–V81.1, V82.0–V82.1, V83–V86, V87.0–V87.8, V88.0–V88.8, V89.0, V89.2
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Unintentional injuries, nonmotor vehicle	164, 165, 166pt, 167–175, 176pt	165–174, 175pt, 176–181, 185, 186	176, 178–195, 201–205, 207, 209, 212–214	169, 171–176, 178–195	E800–E802, E840–E962	E800–E802, E840–E962	E800–E807, E825–E949	E800–E807, E826–E949	V01, V05–V06, V09.1, V09.3–V09.9, V10–V11, V15–V18, V19.3, V19.8–V19.9, V80.0–V80.2, V80.6–V80.9, V81.2–V81.9, V82.2–V82.9, V87.9, V88.9, V89.1, V89.3, V89.9, V90–V99, W00–X59, Y85–Y86
DR	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Ill-defined conditions[a]	154, 177–179	154, 187–189	162, 199, 200	162, 199, 200	780–795	780–795	780–796	780–799	R00–R99
DR	Linder T15	Linder T15	Linder T15	Hist290	Hist290	Hist290	Hist290	Hist290	Wonder, NCHS 2013
AADR	NA	NA	NA	NA	Hist293	Hist293	Hist293	Hist293	Wonder, NCHS 2013
Senility	154	154	162	162	794	794	794	797	R54
DR	Linder T15	Linder T15	Linder T15	Linder T15	Grove T65	Grove T65	Wonder	Wonder	Wonder
AADR	NA	NA	NA	NA	NA	NA	Wonder	Wonder	Wonder

Other ill-defined conditions	177–179	187–189	199, 200	199, 200	780–793, 795	780–793, 795	780–793, 795–796	780–796, 798–799	R00–R53, R55–R99
DR	Linder T15	Linder T15	Linder T15	Linder T15	NA	NA	Wonder	Wonder	Wonder
AADR	NA	NA	NA	NA	NA	NA	Wonder	Wonder	Wonder

<1>Appendix I: Sources of Mortality Data

Data for the analysis of decadal mortality trends were obtained from yearly tabulations of causes of death from published compilations and from public-use computer data files. Data for 1900 through 1940 were drawn from mortality information from death registration states, which included 10 (out of 45) states and the District of Columbia in 1900 (representing 40.5% of the U.S. population) and gradually expanded to include all 48 states and the District of Columbia by 1933 (2). For decennial mortality rates from 1940 through 1960, a compilation of mortality information was utilized (3). CDC's Compressed Mortality File 1968–1992 and WONDER data system (Wide-ranging Online Data for Epidemiologic Research; wonder.cdc.gov) were used for mortality counts and census denominators from 1970 through 2010 (4). Two physician epidemiologists (S.M.T. and R.G.P.) linked ICD codes (Appendix I).

To the extent possible, we focused on the five causes of death that were major causes in either 1900 or 2010, using standard ICD condition classifications and available data. We use the term "major" to distinguish causes examined here from the "leading" used by the CDC National Center for Health Statistics. Causes of death were coded according to the particular revision of the ICD in use, starting in 1900. The ICD underwent 10 revisions during the 110-year period

analyzed. Available sources link succeeding ICD codes and estimate differential counts associated with ICD changes (42, 43). Several ICD changes substantially distort observed trends: Apparent declines in pneumonia and influenza between 1900 and 2000 are substantially affected by revisions in ICD coding. The trend in stroke before and after 1950 is substantially affected by the revision in ICD 6. The trend in chronic lower respiratory disease beginning in 1970 has also been substantially affected by changes in ICD coding.

Beginning with the ICD 6 in 1949, the "underlying cause of death" in sources was selected by standardized algorithms from the medical conditions on the death certificate. From 1900 through 1940, leukemia was not classified with cancers, and rates for leukemia are only available for these years for the whole population (i.e., without sex- or race-specific rates). In order to show rates for cancers for the entire period 1900–2010, leukemia is excluded from the "all cancer" category for 1900–1940 in this report. Because unintentional nonmotor vehicle injury (UI-NMV) mortality (i.e., deaths from injury sources other than motor vehicles) becomes the fifth major cause in 2010, we also report trends in motor (UI-MV) vehicle mortality; although not currently among the major five causes, UI-MV mortality was the fourth or fifth major cause from 1970–1990.

Because data specific to blacks became available only beginning in 1970, we summarized only all-cause trends for blacks for the available period and concentrated on trends over the century for "blacks," a category that includes racial groups other than blacks. (For 1970–2010, crude cause-specific rates for black females are available in Appendix III and adjusted rates are available in Table 1) In 1970, black females constituted 89.2 percent of the black female population (wonder.cdc.gov/welcomeT.html). By 2010, the proportion had declined to 66.7 percent; thus the "black" category has become increasingly unrepresentative of the black

population. Mortality data on Hispanics became available only after 1980 and are thus not reported in this long-term trend analysis.

<1>Appendix II: Study Limitations

Mortality is not an optimal measure of the burden of disease and suffering and thus is not ideal for planning and monitoring interventions to improve public health. However, mortality is the only measure available over the time span examined. Measures combining morbidity and estimates of suffering or lost ability, such as healthy life expectancy or disability-adjusted life-years, are only available for recent decades. In addition, available mortality data are imperfect:

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- Data on all states in the United States became available only in 1933, as all states joined in the federal death registration area (44). Thus, early rates may not be representative of the U.S. population and early trends are assessed in different populations over time.
- Analysis of mortality rates is limited by the consistency and completeness of data available, as noted by Linder and Grove (cdc.gov/nchs/data/vsus/vsrates1900_40.pdf). Completeness of population and mortality reporting is likely to have increased substantially since 1900. Incomplete reporting leads to underestimates of death rates. The completeness of death reporting (i.e., assurance that all deaths that occur are reported) has not been assessed; however, participation in the death registration system required that more than 90 percent of deaths were reported. It is believed that death reporting is

more complete than birth reporting, which, in 1940 and 1950, was 92.5 percent and 97.9 percent, respectively, although variable among states (9).

<1>Appendix III: Data Sources and International Classification of Diseases Codes Used for Death Rates, 1900–2010

Abbreviations: AADR, age-adjusted death rate; DR, death rate; NCHS, National Center for Health Statistics.

a Hist290 and Hist293 rates for 1900 for major cardiovascular diseases do not include International Classification of Diseases (ICD) 1 code 47. From 1900 through 1940, leukemia was not classified with cancers, and rates for leukemia are only available for these years for the whole population (i.e., without sex- or race-specific rates). Thus, for 1900 through 1940, cancer rates do not include deaths from leukemia. Hist290 Death Rates for 1970 for heart disease do not include ICD 8 code 402. The title for "Ill-Defined Conditions" has varied among the 10 ICD revisions. From 1900 through 1940, senility was classified separately and not as an "Ill-Defined Condition." From 1950 through 2010, senility was classified within Ill-Defined Conditions (ICD-6 through ICD-9) or within Symptoms, Signs and Abnormal Clinical and Laboratory Findings, Not Elsewhere Classified (ICD-10).

Data sources:

1. Centers for Disease Control and Prevention, National Center for Health Statistics. CDC WONDER online database. http://wonder.cdc.gov/. Accessed January 13, 2018.

2. Grove RD, Hetzel AM. Vital statistics rates in the United States 1940–1960. US Department Of Health, Education, and Welfare; Public Health Service; National Center for Health Statistics. Washington (DC): US Government Printing Office; 1968. Table 63: Death Rates for 35 selected

causes by age, color, and sex: United States, 1940–60. http://www.cdc.gov/nchs/data/vsus/vsrates1940_60.pdf. Accessed January 13, 2018.

3. Centers for Disease Control and Prevention, National Vital Statistics System. HIST290: death rates for selected causes by 10-year age groups, race, and sex: death registration states, 1900–32, and United States, 1933–98. Unpublished tables. http://www.cdc.gov/nchs/nvss/mortality/hist290.htm.

4. Centers for Disease Control and Prevention, National Vital Statistics System. HIST293: AADRs for selected causes, death registration states, 1900-32, and United States, 1933–98. Unpublished tables. http://www.cdc.gov/nchs/nvss/mortality/hist293.htm.

5. Linder FE, Grove RD. Federal Security Agency: United States Public Health Service: National Office Of Vital Statistics. Vital Statistics Rates in the United States 1900-1940. Washington (DC): United States Government Printing Office; 1947. Table 15. Specific DRs for selected causes, by sex: death-registration states, 1900–1940. http://www.cdc.gov/nchs/data/vsus/vsrates1900_40.pdf. Accessed January 13, 2018.

6. Murphy SL, Xu JQ, Kochanek KD. Deaths: final data for 2010. National vital statistics reports; vol. 61, no. 4. Hyattsville (MD): National Center for Health Statistics; 2013. http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_04.pdf. Accessed January 13, 2018.