Appendix

The history of the modern International Classification of Diseases (ICD) can be traced to William Farr who devised in 1839 a system of disease classification, which was revised later in the 1850s and 1860s. It had five main groups: (1) epidemic; (2) constitutional (general); (3) local (by anatomical site); (4) developmental; (5) violence. (For a detailed account in England and Wales see Eyler 1979; Hardy 1994; Rob-Smith 1969, 1970). Farr's classification largely became the basis for the International Classifications in the twentieth century. Though the international lists have been revised essentially every decade in the twentieth century, the principle of classifying disease largely by anatomical site (and to some extent by etiology) has been maintained through all revisions. The original list was proposed for international consideration in 1855 (though variations of it had been used earlier in England). It was then revised in 1881 and in 1891. The first International Classification was issued in 1893 by the International Statistical Congress; the Bertillon list or ICD-1 was issued in 1901 and was adopted/adapted by many nations. The subsequent lists were issued by the League of Nations, and after World War II, by the World Health Organization. The ICD revisions are: ICD-1 (1901–1910), ICD-2 (1911–1920), ICD-3 (1921–1930), ICD-4 (1931–1939), ICD-5 (1940–1949), ICD-6 (1850–1857), ICD-7 (1958–1967), ICD-8 (1968–1978), and ICD-9 (1979–2000).

To rebuild the time series of various disease categories across the classifications, scholars usually adopt a recent ICD list and track its constituents though time (e.g. Charlton and Murphy 1997). Following that cue, the book adopts the ninth revision of the International Classifications (ICD-9, WHO 1978) and isolates since the mid-nineteenth century the two main disease categories discussed in the book. The composition of *infectious diseases* is listed in Tables A.1 and A.2. For infectious diseases in ICD-1 and for the classifications before it, Table A.2 lists the diseases by name (instead of the codes) since they did not have an international code. In the Table, asterisks mark the diseases that had been originally classified under a different rubric and had to be brought in to make the composition as consistent as possible over time. The main reason for separating out this infectious

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sub-category is that they used to be readily identifiable on clinical grounds and physicians are likely to have been familiar with such diseases (Williams 1996; McKeown 1976). Nonetheless, in the annual reports, (1) many individual infectious diseases were combined with others and cannot be isolated; (2) the reportage of many has become more granular over time; (3) many infectious diseases can have similar symptoms and can be easily confounded. For all three reasons, it is safer, for the purpose of this study, to track them as a broad aggregate.

Likewise, Table A.3 lists all violent or external causes such as injuries, accidents and poisonings (referred as 'external causes' in the text). Table A.4 lists the pregnancy complications.

As mentioned in Chap. 2, the broad category 'non-communicable disease' was calculated as: All causes minus all infectious diseases minus all 'external causes' minus complications of pregnancy and childbirth.

The Registrar General's Annual Reviews since the mid-nineteenth century (and later, Office of National Statistics), and the World Health Statistics are the main sources. The series were built up from annual age-specific raw data. The age-specific data where converted to crude rates. The crude rates were then standardized based on 1994 weights where necessary (e.g. for the aggregate-level trends in Chaps. 2, 3, and 4). The data on annual population by age are from the Human Mortality Database.

The use of broad sub-categories, as opposed to individual diseases within each category, is safer for cross-decade comparisons. In each broad sub-category, the codes for individual diseases have become increasingly granular over time and many individual diseases are difficult, if not impossible, to reconstruct consistently across the revisions. Though the compositions of the broader categories, too, have been revised, the errors in their reconstruction are likelier to be less as the bulk of the revisions have pertained to within-category changes.

For that reason, the aggregate non-communicable diseases, as defined, produce the most reliable results, especially over the adult-age segment of the life-cycle. Over the years, apart from minor cases such as aortic syphilis (transferred from overall syphilis as an infectious disease to the sub-category circulatory system) or non-epidemic meningitis (transferred to nervous system), the composition of non-communicable diseases as an aggregate is more consistent than the composition of any of its sub-categories because any transfers between its sub-categories still remains within the aggregate 'non-communicable disease.' The confidence in any series, however, should diminish as one moves from that very broad level of aggregation to the sub-category-level. Among the Tables below, I have the least confidence in Neoplasms, especially before the 1890s and to a large extent in the nervous system diseases as many of them had been classified in the ICD lists before the 1890s as circulatory system diseases and the details reported may not have been enough to cleanly transfer from one-category to the other.

Besides differences across the lists, the varying coverage of registration may influence the data over time. In the very early years of death registration, certification is likelier to have been more inaccurate than today and some deaths may not have been registered at all (Wrigley and Schofield 1981). The onus to register used

to be on the registrar's office instead of the informant. However, the informant could be prosecuted on refusal to comply with the registrar's query. All told, incomplete death registration was less of an issue as registration was legally required for burial. In the 1850s, 1860s and 1870s, the vast majority of deaths were reported by qualified practitioners familiar with the lists issued by the GRO (Williams 1996; Alter and Carmichael 1996). An 1874 law then made medical practitioners responsible for the information; the non-compliant were subject to penalty. In 1878 only about 5% of the deaths were not certified by a medical practitioner; By 1891–1900, about 2.3% not certified; by 1928, about 1% (Ashley and Devis 1992).

In 1927, the format of the death certificate changed, requiring a primary as well as a secondary cause (or accompanying causes); the certificate remained similar through 1990s. According to WHO (1978), the primary or the underlying cause is: (1) the disease or injury that initiated the chain of events leading to death; or (2) the circumstances of the accident or violence (e.g. suicide) that produced the fatal injury. Prior to 1940, however, the selection by the certifying practitioner was rule-based, whereas afterward it was in accordance of the certifier's preference expressed in the order on the certificate (Campbell 1965; Logan 1950), though the change did not seem to have altered the long-term trends since the nineteenth century. To gauge within-sub-category accuracy, Heasman and Lipworth (1966) studied 9,501 patients in 75 hospitals in England and Wales, and found disagreements in only 45% of the cases, but the overall numbers within the sub-categories was similar to the originals as the errors tended to cancel out. Alderson (1981) reviewed a number of validation studies to assess accuracy of the cause of death certification and found that in general 70% of the cases were accurate the first time over, with minor revisions required in 20% of the cases and only in 10% of cases was major change required.

All told, it appears that a safer way to use the data over the long-term, across ICD revisions, is at much broader levels of aggregation than at the individual disease level (Tables A.5, A.6, A.7, A.8, and A.9).

Table A.1 Infectious disease (as defined; see text, Chap. 2), ICD-2 through ICD-9

ICD-9	1–136; 460–519
ICD-8	1–136; 460–519
ICD-7	1–138, 571, 240–41, 470–527
ICD-6	1–138, 571, 240–41, 470–527
ICD-5	1–32, 34–44, 81, 119–120, 177; 33, 10–114, 115 (c)
ICD-4	1–10, 12–44, 79–80, 83, 119–120, 177, 11, 104–114, 115(2–4)
ICD-3	1–10, 12–42, 71, 72, 76, 113–116, 121, 175, 11, 109, 97–107
ICD-2	1–9, 11–25, 28–35, 37–38, 60–62, 67, 104–107, 112, 164, 10, 86–98, 100

Table A.2 Infectious disease ICD-1 and older lists

ICD-1(1901)	1881–1900	1861–1880	1855–1860
Smallpox	Smallpox	Smallpox	Smallpox
Cowpox	Chickenpox	Chickenpox	Chickenpox
Chickenpox	Measles	Measles	Miliaria
Measles (Morbilli)	Epidemic rose rash	Scarlet fever (Scarlatina)	Measles
German measles	Scarlet fever	Diphtheria	Scarlatina
Scarlet fever	Typhus	Quinsy	Cynache Maligna
Typhus	Relapsing fever	Croup	Diphtheria
Plague (all types)	Whooping cough	Whooping cough	Mumps
Relapsing fever	Mumps	Typhus	Whooping cough
Whooping cough	Diphtheria	Erysipelas	Croup
Mumps	Cerebrospinal fever	Carbuncle	Thrush
Diphtheria	Simple, ill-defined fever	Influenza	Typhus
Cerebrospinal fever	Enteric fever	Dysentery*	Diarrhea*
Pyrexia (uncertain)	Other miasmatic	Diarrhea*	Dysentery*
Enteric fever	Cholera	Enteric fever	Cholera
Asiatic cholera	Diarrhea*	Cholera	Influenza*
Diarrhea (food-caused)	Dysentery*	Ague	Ague
Infective enteritis*	Remittent fever	Remittent fever	Remittent fever
Epidemic diarrhea*	Ague	Malaria	Yellow fever
Dysentery*	Hydrophobia	Mumps	Typhus
Tetanus*	Glanders	Erythema	Erysipelas
Malaria (all types)*	Anthrax, Splenic fever	Yellow fever	Phlebitis
Rabies, Hydrophobia	Cowpox	Syphilis	Malignant pustule
Glanders	Syphilis	Gonorrhea, Stricture urethra	Glanders
Anthrax	Gonorrhea, Stricture urethra	Hydrophobia	Porrigo

(continued)

Table A.2 (continued)

ICD-1(1901)	1881–1900	1861–1880	1855–1860
Syphilis	Phagadena	Glanders	Syphilis
Gonorrhea	Erysipelas	Thrush	Hydrophobia
Erysipelas	Pyaemia	Worms	Scrofula
Septicemia (non-puerperal)	Septicemia (non-puerperal)	Porrigo*	Tabes mesenterica
Pyaemia	Thrush*	Tapeworms*	Tubercular peritonitis
Phlegmon, carbuncle*	Other veg. parasites*	Hydatids*	Phthisis
Phagadena	Hydatid disease*	Ascarides Lumbricoides*	Hydrocephalus*
Other infective processes	Animal parasites*	Scrofula	Tetanus*
Pulmonary tuberculosis	Tabes Mesenterica	Tabes Mesenterica	Hydrophobia
Tuberculous meningitis	Phthisis (lung TB)	Tubercular Peritonitis	Syphilis
Tuberculous peritonitis	Other TB, Scrofula	Phthisis (lung TB)	Cephalitis
Tabes mesenterica	Inflammation of brain*	Hydrocephalus	Gastritis*
Tubercle, other organs	General paralysis of insane	Cephalitis	Enteritis*
General tuberculosis	Idiopathic tetanus	Idiopathic tetanus*	Hepatitis*
Scrofula	Enteritis*	General paralysis of insane	Jaundice*
Parasitic diseases*	Gastro-enteritis*	Enteritis*	Carbuncle*
Meningitis, inflammation of brain*	Carbuncle*	Hepatitis*	Laryngitis*
General paralysis of insane	Croup	Jaundice*	Emphysema
Locomotor ataxy*	Food poisoning	Laryngitis*	Bronchitis
Croup	Influenza*	Emphysema	Pleurisy
Influenza*	Laryngitis	Bronchitis	Pneumonia
Laryngitis	Diseases of Larynx and Trachea	Pleurisy	Asthma
Other diseases larynx	Bronchitis	Pneumonia	Other lung diseases
Bronchitis	Emphysema, Asthma	Asthma	Pharyngitis
Emphysema, Asthma	Pleurisy	Influenza	
Pleurisy	Pneumonia	Other diseases of lungs	
Fibroid disease of lung	Other respiratory	Pharyngitis	
Other respiratory diseases	Quinsy		
Tonsilitis			
Quinsy			
Disease of the pharynx			
Pneumonia			

Table A.3 Complications of pregnancy, childbirth and puerperium

ICD-9	630–679
ICD-8	630–679
ICD-7	640–689
ICD-6	640–689
ICD-5	401–503
ICD-4	400–503
ICD-3	431–500
ICD-2	134–141
ICD-1 and *before*	Puerperal Septicaemia, Septic intoxication, Puerperal Pyaemia, Phlegmasia Alba Dolens, Puerperal fever (not defined), Abortion, Miscarriage, Puerperal mania and convulsions, Placenta Praevia, Flooding, Other complications; (Metria (including Puerperal mania and Convulsions), Childbirth, Puerperal fever, Paramenia (less Chlorosis)

Table A.4 Injury and poisoning ('external causes')

ICD-9	E800-999
ICD-8	E800-E999
ICD-7	E800-999
ICD-6	E800-999
ICD-5	163–176, 178–198
ICD-4	163–175, 178–198
ICD-3	165–174, 176–203
ICD-2	57–58, 153, 155–163, 165–173, 174–186
ICD-1 and *before*	Violent deaths: in mines and quarries; vehicles and horses, building operations, machinery, weapons and implements, burns and scalds, poisons, drowning, suffocation, falls, weather agencies, battle, homicide, suicide, execution. (Accidents or negligence (fractures and contusions, gunshot wounds, cut, stab, burns and scalds, poison, drowning, suffocation, others, murder and manslaughter, suicide, execution, other violent deaths)

Table A.5 Circulatory system

ICD-9	390–459
ICD-8	390–444, 444–589, 782–89
ICD-7	330–334, 400–468 (less 455), 782
ICD-6	330–334, 400–468 (less 455), 782
ICD-5	58, 83 (less 83e), 87a, 90–97, 99–103
ICD-4	56. 82, 87a, 90–97, 99–103
ICD-3	51, 74, 81, 83, 87–96
ICD-2	47, 64–65, 72, 77–85
ICD-1 and *before*	Acute articular rheumatism, Rheumatic fever*, cerebral hemorrhage and apoplexy, Softening of brain, Chorea*, Pericarditis, Acute Endocarditis, Valvular Disease, Hypertrophy of heart, Dilation of heart, angina pectoris, Fatty degeneration of heart, Aneurysm, Non-cerebral Embolism and Thrombosis, Phelbitis, Varicose veins, Other diseases of blood vessels, Other diseases of the heart, Syncope (unspecified heart disease), Diseases of the lymphatic system, Hemorrhage

Table A.6 Nervous system and organs of special sense

ICD-9	320–459
ICD-8	320–389, 733–781
ICD-7	335–398, 740–744
ICD-6	335–398, 740–744
ICD-5	80–82, 83e, 85, 87b, 87c, 87d, 88, 89
ICD-4	78-79, 81, 85, 87b, 87c, 87d, 87e, 88, 89
ICD-3	70, 73, 75, 78, 79–80, 82, 84(3), 84(4), 84(5), 85, 86
ICD-2	60, 61b, 61c, 63, 66, 69, 73, 74a, 74b, 74d, 75, 76
ICD-1 and *before*	Epilepsy, Periplegia, Diseases of Spinal Chord, Peripheral Neuritis, Polyneuritis, Other diseases of the nervous system, Otitis (otorrhoea), Mastoid disease, Opthalmia, Diseases of eyes (including cataract, etc.), Epistaxis and other diseases of the nose, Other disease of the brain; (Nercrencephalus, Spinal Marrow disease, Neuralgia, Shaking palsy, Undistinguished brain disease)

Table A.7 Digestive system

ICD-9	520–577
ICD-8	520–577
ICD-7	530–570, 572–587
ICD-6	530–570, 572–587
ICD-5	115b, 116–118, 121–129
ICD-4	115a, 115b, 116–118, 121–129
ICD-3	108, 110–112, 117–120, 122–127
ICD-2	99, 101–103, 108–111, 113–115, 117–118
ICD-1 and *before*	Gastric Ulcer, Gastric Catarrh, Other diseases of the stomach, Appendicitis, Perityphilitis, Hernia, Intestinal Obstruction, Other diseases of the intestines, Peritonitis, Cirrhosis of liver, Other diseases of liver and gall bladder, Other diseases of the digestive system; (Ascites, ulceration of intestines, Ileus, Intussusception, Stricture of intestinal canal, Diseases of stomach, Diseases of liver)

Table A.8 Musculoskeletal system

ICD-9	710–739
ICD-8	710–738
ICD-7	710–732, 734–738
ICD-6	720–743, 745–749
ICD-5	58b, 59, 154–156
ICD-4	57, 154–156
ICD-3	52, 155–158
ICD-2	48, 146–149
ICD-1 and *before*	Chronic Rheumatism, Rheumatic Arthritis, Rheumatic Gout, Gout, Caries, Necrosis, Arthritis, Periostitis, Other diseases of locomotion; (Orthritis, rheumatism, Diseases of joints, Gout, Diseases of the organs of locomotion)

Table A.9 Neoplasms

ICD-9	140–239
ICD-8	140–239
ICD-7	40–239, 294
ICD-6	40–239, 294
ICD-5	44–57, 74
ICD-4	44–55, 72
ICD-3	43–49, 50, 65, 84b, 139
ICD-2	39–45, 46, 74c, 53, 129
ICD-1 and *before*	Carcinoma, Sarcoma, Cancer and Malignant Disease, Anaemia and Leucocythaemia, Brain tumor, Ovarian tumor, Tumor, Uterine Tumor; (Cancer, Melanosis, Sweep's Cancer, Lupus, Polypus, Undistinguished Cancer, Cancrum Oris (Noma), Abcess, Tumor)

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