

Table S1. *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)* codes for bacterial and fungal infections. Adapted from Angus et al. (1).

ICD-9-CM Code	ICD-9-CM Code Description
001	Cholera
002	Typhoid/paratyphoid fever
003	Other salmonella infection
004	Shigellosis
005	Other food poisoning
008.0	Intestinal infections due to <i>Escherichia coli</i>
008.1	Intestinal infections due to Arizona group of paracolon bacill
008.2	Intestinal infections due to <i>Aerobacter aerogenes</i>
008.3	Intestinal infections due to <i>Proteus (mirabilis) (morganii)</i>
008.4	Intestinal infections due to unspecified bacteria
008.5	Bacterial enteritis, unspecified
009	Ill-defined intestinal infection
013	Central nervous system tuberculosis
018	Miliary tuberculosis
020	Plague
021	Tularemia
022	Anthrax
023	Brucellosis
024	Glanders
025	Melioidosis
026	Rat-bite fever
027	Other bacterial zoonoses
032	Diphtheria
033	Whooping cough
034	Streptococcal throat/scarlet fever
035	Erysipelas
036	Meningococcal infection
037	Tetanus
038	Septicemia
039	Actinomycotic infections
040	Other bacterial diseases
041	Bacterial infection in other diseases not specified
098	Gonococcal infections
100	Leptospirosis
101	Vincent's angina
112.0	Candidiasis, of mouth
112.4	Candidiasis, of lung
112.5	Candidiasis, disseminated
112.8	Candidiasis, of other specified sites
114	Coccidioidomycosis
115	Histoplasmosis
116	Blastomycotic infection
117	Other mycoses
118	Opportunistic mycoses
320	Bacterial meningitis
321.0	Cryptococcal meningitis

321.1	Meningitis in other fungal diseases
324	Central nervous system abscess
325	Phlebitis of intracranial sinus
360.0	Purulent endophthalmitis
376.0	Acute inflammation of orbit
380.14	Malignant otitis externa
383.0	Acute mastoiditis
420.99	Acute pericarditis due to other specified organisms
421	Acute or subacute endocarditis
461	Acute sinusitis
462	Acute pharyngitis
463	Acute tonsillitis
464	Acute laryngitis/tracheitis
465	Acute upper respiratory infection of multiple sites/not otherwise specified
475	Peritonsillar abscess
481	Pneumococcal pneumonia
482	Other bacterial pneumonia
485	Bronchopneumonia with organism not otherwise specified
486	Pneumonia, organism not otherwise specified
491.21	Acute exacerbation of obstructive chronic bronchitis
494	Bronchiectasis
510	Empyema
513	Abscess of lung and mediastinum
522.5	Periapical abscess without sinus
522.7	Periapical abscess with sinus
526.4	Inflammatory conditions of the jaw
527.3	Abscess of the salivary glands
528.3	Cellulitis and abscess of oral soft tissue
540	Acute appendicitis
541	Appendicitis not otherwise specified
542	Other appendicitis
562.01	Diverticulitis of the small intestine without hemorrhage
562.03	Diverticulitis of the small intestine with hemorrhage
562.11	Diverticulitis of colon without hemorrhage
562.13	Diverticulitis of colon with hemorrhage
566	Abscess of the anal and rectal regions
567	Peritonitis
569.5	Intestinal abscess
569.61	Infection of colostomy or enterostomy
569.83	Perforation of intestine
572.0	Abscess of liver
572.1	Portal pyemia
575.0	Acute cholecystitis
590	Kidney infection
599.0	Urinary tract infection not otherwise specified
601	Prostatic inflammation
604	Orchitis and epididymitis
614	Female pelvic inflammation disease
615	Uterine inflammatory disease

616.3	Abcess of Bartholin's gland
616.4	Other abcess of vulva
634.0	Spontaneous abortion, complicated by genital tract and pelvic infection
635.0	Legally induced abortion, complicated by genital tract and pelvic infection
636.0	Illegally induced abortion, complicated by genital tract and pelvic infection
637.0	Unspecified abortion, complicated by genital tract and pelvic infection
638.0	Failed attempted abortion, complicated by genital tract and pelvic infection
639.0	Complications following abortion and ectopic and molar pregnancies, genital and pelvic infection
646.6	Infections of genitourinary tract in pregnancy
658.4	Infection of amniotic cavity
670	Major puerperal infection
675.1	Abscess of breast
681	Cellulitis, finger/toe
682	Other cellulitis or abscess
683	Acute lymphadenitis
685.0	Pilonidal cyst, with abscess
686	Other local skin infection
711.0	Pyogenic arthritis
728.86	Necrotizing fasciitis
730	Osteomyelitis
790.7	Bacteremia
958.3	Posttraumatic wound infection, not elsewhere classified
996.6	Infection or inflammation of device/graft
998.5	Postoperative infection
999.3	Infectious complication of medical care not otherwise classified

Table S2. *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)* codes for acute organ dysfunction. Adapted from Dombrovskiy et al. (2), Shen et al. (3), and Angus et al. (1).

Organ System	ICD-9-CM Code	ICD-9-CM Code Description
Cardiovascular	427.5	Cardiac arrest
	458.0	Orthostatic hypotension
	458.8	Other specified hypotension
	458.9	Hypotension, unspecified
	785.5	Shock without mention of trauma
	796.3	Hypotension, transient
Hematologic	286.2	Disseminated intravascular coagulation
	286.6	Defibrination syndrome
	286.9	Other and unspecified coagulation defects
	287.3-5	Thrombocytopenia, primary, secondary or unspecified
	790.92	Abnormal coagulation profile
Hepatic	570	Acute and subacute necrosis of liver
	572.2	Hepatic encephalopathy
	573.3	Hepatitis (septic & not elsewhere classified)
	573.4	Hepatic infarction
Neurologic	293	Transient organic psychosis
	348.1	Anoxic brain damage
	348.3	Encephalopathy, acute
	780.01	Coma
	780.09	Altered consciousness, unspecified
	89.14	Electroencephalography
Renal	580.x	Acute glomerulonephritis
	584.x	Acute renal failure
	586	Renal shutdown, renal failure unspecified
	39.95	Hemodialysis
		Pulmonary insufficiency following trauma and surgery
Respiratory	518.5	
	518.8	Respiratory failure
	786.03	Apnea
	799.1	Respiratory arrest
	786.09	Respiratory insufficiency
	96.7 (96.71,96.72)	Ventilator management
	96.04	Endotracheal intubation (emergency procedure)
	93.90	Continuous positive airway pressure ^e
Metabolic	276.2	Acidosis, metabolic or lactic

ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

Table S3. *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)* codes used to identify the source of infection causing sepsis. Adapted from Esper et al. (4) and Wang et al. (5), and subsequently modified for HIV patients.

Organ System	ICD-9-CM Code	ICD-9-CM Code Description
Nervous	013	Tuberculosis of meninges and central nervous system
	036	Meningococcal infection
	091.81	Acute syphilitic meningitis (secondary)
	098.82	Neurosyphilis
	320	Bacterial meningitis
	321	Cryptococcal meningitis
	321.1	Meningitis in other fungal diseases
	324	Central nervous system abscess
	325	Phlebitis of intracranial sinus
	360	Purulent endophthalmitis
	376	Acute inflammation of orbit
	380.14	Malignant otitis externa
	383	Acute mastoiditis
Circulatory	093	Cardiovascular syphilis
	098.83 – 098.84	Gonococcal infections
	036.4	Meningococcal carditis
	391.2	Acute rheumatic myocarditis
	420.99	Acute pericarditis due to other specified organisms
	421	Acute or subacute endocarditis
Respiratory	010.1	Tuberculous pleurisy in primary progressive tuberculosis
	011	Pulmonary tuberculosis
	012	Other respiratory tuberculosis
	018	Miliary tuberculosis
	031.0	Pulmonary diseases due to other mycobacteria
	032	Diphtheria
	034	Streptococcal throat/scarlet fever
	098.6	Gonococcal infection of pharynx
	112.4	Candidiasis, of lung
	114.0	Primary coccidioidomycosis (pulmonary)
	114.2	Primary extrapulmonary coccidioidomycosis
	115.15	Histoplasma duboisii pneumonia
	115.05	Histoplasma capsulatum pneumonia
	115.95	Histoplasmosis pneumonia unspecified
	117.5	Cryptococcus neoformans
	117.3	Aspergillosis
	136.3	Pneumocystosis
	461	Acute sinusitis
	462	Acute pharyngitis
	463	Acute tonsillitis
	464	Acute laryngitis/tracheitis
	465	Acute upper respiratory infection of multiple sites/not

	otherwise specified
475	Peritonsillar abscess
480	Viral pneumonia
481	Pneumococcal pneumonia
482	Other bacterial pneumonia
483	Pneumonia due to other specified organism
485	Bronchopneumonia with organism not otherwise specified
486	Pneumonia, organism not otherwise specified
487.0	Influenza
491.21	Acute exacerbation of obstructive chronic bronchitis
494	Bronchiectasis
510	Empyema
513	Abscess of lung and mediastinum

Digestive

001	Cholera
002	Typhoid/paratyphoid fever
003	Other salmonella infection
004	Shigellosis
005	Other food poisoning
008	Intestinal infections due to <i>Escherichia coli</i>
008.1	Intestinal infections due to Arizona group of paracolon bacillus
008.2	Intestinal infections due to <i>Aerobacter aerogenes</i>
008.3	Intestinal infections due to <i>Proteus (Mirabilis morganii)</i>
008.4	Intestinal infections due to unspecified bacteria
008.5	Bacterial enteritis, unspecified
009	Ill-defined intestinal infection
014	Tuberculosis of intestines peritoneum and mesenteric glands
129	Intestinal parasitism unspecified
522.5	Periapical abscess without sinus
522.7	Periapical abscess with sinus
526.4	Inflammatory conditions of the jaw
527.3	Abscess of the salivary glands
528.3	Cellulitis and abscess of oral soft tissue
540	Acute appendicitis
541	Appendicitis not otherwise specified
542	Other appendicitis
562.01	Diverticulitis of the small intestine without hemorrhage
562.03	Diverticulitis of the small intestine with hemorrhage
562.11	Diverticulitis of colon without hemorrhage
562.13	Diverticulitis of colon with hemorrhage
566	Abscess of the anal and rectal regions
567	Peritonitis
569.5	Intestinal abscess
569.61	Infection of colostomy or enterostomy
569.83	Perforation of intestine
572	Abscess of liver
572.1	Portal pyemia
575	Acute cholecystitis

Genitourinary

016	Tuberculosis of genitourinary system
098.17	Gonococcal salpingitis specified as acute
112.2	Candidiasis of other urogenital sites
590	Kidney infection
599	Urinary tract infection not otherwise specified
601	Prostatic inflammation
604	Orchitis and epididymitis
614	Female pelvic inflammation disease
615	Uterine inflammatory disease
616.3	Abscess of Bartholin's gland
616.4	Other abscess of vulva

Pregnancy

634	Spontaneous abortion, complicated by genital tract and pelvic infection
635	Legally induced abortion, complicated by genital tract and pelvic infection
636	Illegally induced abortion, complicated by genital tract and pelvic infection
637	Unspecified abortion, complicated by genital tract and pelvic infection
638	Failed attempted abortion, complicated by genital tract and pelvic infection
639	Complications following abortion and ectopic and molar pregnancies
646.6	Infections of genitourinary tract in pregnancy
658.4	Infection of amniotic cavity
670	Major puerperal infection
675.1	Abscess of breast

Skin, soft tissue, or bone

003.24	Salmonella osteomyelitis
015	Tuberculosis of bones and joints
017	Tuberculosis of other organs
031.1	Cutaneous diseases due to other mycobacteria
035	Erysipelas
036.82	Meningococcal arthropathy
040.0	Gas gangrene
095.5	Syphilis of bone
098.5	Gonococcal infection of joint
681	Cellulitis, finger/toe
682	Other cellulitis or abscess
683	Acute lymphadenitis
685	Pilonidal cyst, with abscess
686	Other local skin infection
711	Pyogenic arthritis
728.86	Necrotizing fasciitis
730	Osteomyelitis

Other

790.7	Bacteremia
958.3	Posttraumatic wound infection, not elsewhere classified
996.6	Infection or inflammation of device/graft
998.5	Postoperative infection
999.3	Infectious complication of medical care not otherwise classified

Table S4. *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)* coding algorithms for Charlson comorbidities. Adapted from Quan et al. (6).

Comorbidities	ICD-9-CM
Myocardial infarction	410.x, 412.x
Congestive heart failure	428.x
Peripheral vascular disease	443.9, 441.x, 785.4, V43.4, Procedure 38.48
Cerebrovascular disease	430.x–438.x
Dementia	290.x
Chronic pulmonary disease	490.x–505.x, 506.4
Rheumatic disease	710.0, 710.1, 710.4, 714.0–714.2, 714.81, 725.x
Peptic ulcer disease	531.x–534.x
Mild liver disease	571.2, 571.4–571.6
Diabetes without chronic complication	250.0–250.3, 250.7
Diabetes with chronic complication	250.4–250.6
Hemiplegia or paraplegia	344.1, 342.x
Renal disease	582.x, 583–583.7, 585.x, 586.x, 588.x
Any malignancy, including lymphoma and leukemia, except malignant neoplasm of skin	140.x–172.x, 174.x.–195.8, 200.x–208.x
Moderate or severe liver disease	456.0–456.21, 572.2–572.8
Metastatic solid tumor	196.x–199.1
AIDS/HIV	042.x–044.x

REFERENCES

1. Angus DC, Linde-Zwirble WT, Lidicker J, Clermont G, Carcillo J, Pinsky MR. Epidemiology of severe sepsis in the United States: analysis of incidence, outcome, and associated costs of care. *Crit Care Med*. 2001;29(7):1303-10.
2. Dombrovskiy VY, Martin AA, Sunderram J, Paz HL. Rapid increase in hospitalization and mortality rates for severe sepsis in the United States: a trend analysis from 1993 to 2003. *Crit Care Med*. 2007;35(5):1244-50.
3. Shen HN, Lu CL, Yang HH. Epidemiologic trend of severe sepsis in Taiwan from 1997 through 2006. *Chest*. 2010;138(2):298-304.
4. Esper AM, Moss M, Lewis CA, Nisbet R, Mannino DM, Martin GS. The role of infection and comorbidity: Factors that influence disparities in sepsis. *Crit Care Med*. 2006;34(10):2576-82.
5. Wang HE, Shapiro NI, Angus DC, Yealy DM. National estimates of severe sepsis in United States emergency departments. *Crit Care Med*. 2007;35(8):1928-36.
6. Gustot T, Felleiter P, Pickkers P, Sakr Y, Rello J, Velissaris D, et al. Impact of infection on the prognosis of critically ill cirrhotic patients: results from a large worldwide study. *Liver Int*. 2014;34(10):1496-503.