

**Neurological diseases and risk of mortality in COVID-19 and SARS patients - a territory wide study in Hong Kong
Supplementary Materials**

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Supplementary Table 1. List of diagnosis codes and/or virological assays to define severe acute respiratory syndrome (SARS) and coronavirus disease 2019 (COVID-19)/ severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection.

Disease	ICD-9-CM Code	All Diagnosis Description
SARS	465.9	SARS - upper respiratory (465.9:2)
	466.0	SARS - acute bronchitis (466.0:1)
	480.8	SARS with atypical pneumonia (480.8:2)
	480.8	Pneumonia due to coronavirus (480.8:1)
	486	Atypical pneumonia (486:1)
	V67.59	SARS follow up (V67.59:1)
	COVID-19	079.89
	480.8	Pneumonia due to coronavirus (480.8:1)
	519.8	COVID-19 (519.8:8)
	519.8	Respiratory infection by 2019 nCoV (519.8:8)
Virological Test Description		
SARS	Test for Severe Respiratory Syndrome (SRS) agent by RT-PCR	
COVID-19	2019 novel Coronavirus (2019-nCoV) PCR	
	SARS and SARS related coronaviruses RNA	
	RT-PCR for Novel coronavirus (Novel CoV) RNA	
	RT-PCR for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA	
	Novel coronavirus (Novel-CoV) RNA	

COVID-19 = coronavirus disease 2019, ICD-9-CM = International Classification of Diseases, Ninth Revision, Clinical Modification, nCoV = novel coronavirus, nCoV = novel coronavirus, RT-PCR = Reverse transcription polymerase chain reaction, SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

Supplementary Table 2. International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis and procedure codes for comorbidities.

Disease	ICD-9-CM Code	Description
Cardiovascular diseases		
Hypertension and hypertensive diseases	401	Essential hypertension
	402	Hypertensive heart disease
	403	Hypertensive chronic kidney disease
	404	Hypertensive heart and chronic kidney disease
	405	Secondary hypertension
Ischemic heart disease	410	Acute myocardial infarction
	411	Other acute and subacute forms of ischemic heart disease
	412	Old myocardial infarction
	413	Angina pectoris
Atrial fibrillation	427.3	Atrial fibrillation and flutter
Heart failure	428	Heart failure
Other cardiovascular diseases	393-398	Chronic rheumatic heart disease
	420-429	Other forms of heart disease (excluding heart failure)
	440-449	Diseases of arteries, arterioles, and capillaries
Respiratory diseases		
Chronic obstructive pulmonary disease and allied conditions	490-492, 494-496	Chronic obstructive pulmonary disease and allied conditions
Asthma	493	Asthma
Other respiratory diseases	500-508	Pneumoconioses and other lung diseases due to external agents
	510-519	Other diseases of respiratory system
Gastrointestinal diseases		
Gastrointestinal haemorrhage	578	Gastrointestinal haemorrhage
Other gastrointestinal diseases	530	Diseases of esophagus
	531	Gastric ulcer
	532	Duodenal ulcer
	533	Peptic ulcer, site unspecified
	534	Gastrojejunal ulcer
	535	Gastritis and duodenitis
Hepatobiliary diseases		
Chronic liver diseases, liver failure, liver cirrhosis and complications	070.2-3	Chronic hepatitis B
	070.41, 44	Hepatitis C with hepatic coma
	070.51, 54	Hepatitis C without mention of hepatic coma
	V02.61	Hepatitis B carrier
	V02.62	Hepatitis C carrier
	070.42, 52	Hepatitis delta without mention of active hepatitis B
	275.0	Hemochromatosis
	275.1	Wilson's disease
	273.4	Alpha-1 antitrypsin disease

	570	Acute and subacute necrosis of liver
	571	Chronic liver disease and cirrhosis
	572	Liver abscess and sequelae of chronic liver disease
	573.0-5	Other disorders of liver
	348.3	Encephalopathy, unspecified
	349.82	Toxic encephalopathy
	456.0, 20	Oesophageal varices with bleeding
	456.1, 21	Oesophageal varices without bleeding
	456.8:1-2	Bleeding gastric varices
	456.8:4-5	Gastric varices
	567.2:9	Spontaneous bacterial peritonitis
	789.5	Ascites
Biliary-pancreatic diseases	574	Cholelithiasis
	575	Disorders of gallbladder
	576	Disorders of biliary tract
	577	Disorders of pancreas
	Renal diseases	
Nephritis, nephrotic syndrome, and nephrosis	580	Acute glomerulonephritis
	581	Nephrotic syndrome
	582	Chronic glomerulonephritis
	583	Nephritis and nephropathy not specified as acute or chronic
	584	Acute kidney failure
	585	Chronic kidney disease
	586	Renal failure, unspecified
	587	Renal sclerosis, unspecified
	588	Disorders resulting from impaired renal function
Genitourinary diseases		
Diseases of the urinary system	591	Hydronephrosis
	592	Calculus of kidney and ureter
	593	Other disorders of kidney and ureter
	594	Calculus of lower urinary tract
	596	Other disorders of bladder
Diseases of male genital organs	600	Hyperplasia of prostate
	602.0	Calculus of prostate
Disorders of female genital tracts	617	Endometriosis
	618	Genital prolapse
	621	Disorders of uterus, not elsewhere classified
	Neurological diseases	
Stroke	430	Subarachnoid haemorrhage
	431	Intracerebral haemorrhage
	432	Other and unspecified intracranial haemorrhage
	433	Occlusion and stenosis of precerebral arteries
	434	Occlusion of cerebral arteries
	435	Transient cerebral ischemia
	436	Acute, but ill-defined, cerebrovascular disease
	437	Other and ill-defined cerebrovascular disease
	438	Late effects of cerebrovascular disease

	290	Dementia
	291.2	Alcoholic-induced persisting dementia
Dementia	331.0	Alzheimer's disease
	331.1	Frontotemporal dementia
	331.82	Dementia with Lewy bodies
Parkinson's disease	332	Parkinson's disease
	721	Spondylosis and allied disorders
Spine problems	722	Intervertebral disc disorders
	723.0	Spinal stenosis of cervical region
	724.0	Spinal stenosis, other than cervical
Traumatic brain injury related disorders	800	Fracture of vault of skull
	801	Fracture of base of skull
	850-854	Intracranial injury, excluding those with skull fractures
	277.87	Disorders of mitochondrial metabolism
	320-326	Inflammatory diseases of the central nervous system
Other neurological diseases	330-337	Hereditary and degenerative diseases of the central nervous system (excluding dementia and Parkinson's disease)
	339	Other headache syndromes
	340-349	Other disorders of the central nervous system
	350-359	Disorders of peripheral nervous system
Metabolic and endocrine diseases		
Diabetes mellitus	249	Secondary diabetes mellitus
	250	Diabetes mellitus
Hyperlipidaemia	272	Disorders of lipid metabolism
Other metabolic disorders and endocrinopathies	240-246	Disorders of thyroid gland
	251-259	Diseases of other endocrine glands (exclude diabetes mellitus)
	278.0	Overweight and obesity
Malignancies		
	140-149	Malignant neoplasm of lip, oral cavity, and pharynx
	150-159	Malignant neoplasm of digestive organs and peritoneum
Solitary malignant tumours	160-165	Malignant neoplasm of respiratory and intrathoracic organ
	170-176	Malignant neoplasm of bone, connective tissue, skin, and breast
	179-189	Malignant neoplasm of genitourinary organs
	190-199	Malignant neoplasm of other and unspecified sites
	209.0-3	Neuroendocrine tumours
Hematological malignancies	200-208	Malignant neoplasm of lymphatic and hematopoietic tissue

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