

Supplementary materials to: Fong WJ, Huang X, Tan WJ, et al. Identifying adults with serious illness in Singapore's surgical population and its impact on postoperative healthcare utilisation and costs. *Ann Acad Med Singap* 2026;55:OnlineFirst. DOI: <https://doi.org/10.47102/annals-acadmedsg.2026102>

Table S1. Adaptation of the definitions of SI in surgery in Singapore.

Consensus definition of SI in surgery (US)	Mapped definition of SI in surgery (Singapore)	Reason for deviation
Vulnerable elder (older adult >84 years, older adult >64 years with any functional or cognitive disability)	Not included	Functional status and cognitive-disability severity were not consistently captured in eHints; exclusion may underestimate SI prevalence among older adults.
Advanced cancer (stage 3 or 4 solid cancers) and ≥ 1 hospitalisation in prior year	Diagnosis of advanced cancer via ICD-10 codes as listed in Table S2	
Oxygen-dependent pulmonary disease	Diagnosis via ICD-10 codes as listed in Table S2	
Heart failure with any all-cause hospitalisation or ≥ 2 ED visits in prior 6 months	Diagnosis via ICD-10 codes as listed in Table S2	
Cirrhosis with any CTP class or MELD score	Diagnosis via ICD-10 codes as listed in Table S2	CTP class and MELD scores were not available in eHints; cirrhosis diagnosis codes were used.
End-stage renal disease on dialysis or eligible for dialysis	Diagnosis via ICD-10 codes as listed in Table S2	
Dementia with impaired daily function and ≥ 1 hospitalisation in prior year	Diagnosis via ICD-10 codes as listed in Table S2	
Frailty defined using Medicare claims frailty index	Not included	Frailty scores were not available in eHints; exclusion may underestimate SI prevalence and attenuate observed associations.
Nursing home residents	Not included	Nursing home residence was not consistently available in eHints; exclusion may underestimate SI prevalence among highly dependent adults.

CTP: Child-Turcotte-Pugh class; ED: emergency department; eHints: SingHealth Electronic Health Intelligence System; ICD-10: International Classification of Diseases, 10th Revision; MELD: Model of End-Stage Liver Disease; SI: serious illness

Table S2. ICD-10 codes used to define SI.

SI condition	ICD-10 code	Diagnosis description
Oxygen-dependent pulmonary disease	J431	Panlobular emphysema
	J432	Centrilobular emphysema
	J438	Other emphysema
	J439	Emphysema, unspecified
	J440	Chronic obstructive pulmonary disease with acute lower respiratory infection
	J441	Chronic obstructive pulmonary disease with acute exacerbation, unspecified
	J449	Chronic obstructive pulmonary disease, unspecified
	J961	Chronic respiratory failure
	I270	Primary pulmonary hypertension
	I272	Other secondary pulmonary hypertension
	I278	Other specified pulmonary heart diseases
	I279	Pulmonary heart disease, unspecified
	J982	Interstitial emphysema
Heart failure	I099	Rheumatic heart disease, unspecified
	I110	Hypertensive heart disease with (congestive) heart failure
	I130	Hypertensive heart and renal disease with (congestive) heart failure
	I132	Hypertensive heart and renal disease with both (congestive) heart failure and renal failure
	I139	Hypertensive heart and renal disease, unspecified
	I501	Left ventricular failure
	I500	Congestive heart failure
	I509	Heart failure, unspecified
Cirrhosis	I850	Oesophageal varices with bleeding
	I859	Oesophageal varices without bleeding
	K72	Hepatic failure, not elsewhere classified
	K721	Chronic hepatic failure
	K729	Hepatic failure, unspecified
	K766	Portal hypertension
	K767	Hepatorenal syndrome
End-stage renal disease	I120	Hypertensive renal disease with renal failure
	I131	Hypertensive heart and renal disease with renal failure
	N185	Chronic kidney disease, stage 5
Dementia	A810	Creutzfeldt–Jakob disease
	A811	Subacute sclerosing panencephalitis
	A812	Progressive multifocal leukoencephalopathy
	F000	Dementia in Alzheimer’s disease with early onset
	F001	Dementia in Alzheimer’s disease with late onset

	F002	Dementia in Alzheimer's disease, atypical or mixed type
	F009	Dementia in Alzheimer's disease, unspecified
	F010	Vascular dementia of acute onset
	F011	Multi-infarct dementia
	F012	Subcortical vascular dementia
	F013	Mixed cortical and subcortical vascular dementia
	F018	Other vascular dementia
	F019	Vascular dementia, unspecified
	F020	Dementia in Pick's disease
	F021	Dementia in Creutzfeldt–Jakob disease
	F022	Dementia in Huntington disease
	F023	Dementia in Parkinson's disease
	F024	Dementia in human immunodeficiency virus disease
	F028	Dementia in other specified diseases classified elsewhere
	F03	Unspecified dementia
	F051	Delirium superimposed on dementia
	G20	Parkinson's disease
	G300	Alzheimer's disease with early onset
	G301	Alzheimer's disease with late onset
	G308	Other Alzheimer's disease
	G309	Alzheimer's disease, unspecified
	G310	Circumscribed brain atrophy
	G311	Senile degeneration of brain, not elsewhere classified
Advanced cancer	C00–C75, C76, C760, C762, C763 and C77–C79	C00–C75 Specified primary cancer C77–C79 Secondary lymph node and neoplasms of other sites
	C50 and C78–C79	C50 Breast cancer C78–C79 Secondary neoplasm of other sites
	C767, C768, C80 and C480, C481, C451	C767, C768, C80 Malignant neoplasm of unspecified site C480 Malignant neoplasm of retroperitoneum C481 Malignant neoplasm of specified parts of peritoneum C451 Mesothelioma of peritoneum

ICD-10: International Disease Classification, 10th Edition; SI: serious illness

Table S3. Univariable analysis for SI and healthcare utilisation and cost outcomes among adults undergoing surgery.

SI status	Length of stay (IRR 95% CI)	30-day hospital readmission, any (OR 95% CI)	1-year hospital readmission, any (OR, 95% CI)	30-day ED visits, any (OR, 95% CI)	1-year ED visits, any (OR, 95% CI)	Gross bill size (relative ratio, 95% CI)
SI versus non-SI	2.30 (2.27–2.34)	1.36 (1.31–1.41)	3.14 (3.06–3.21)	1.78 (1.72–1.84)	2.97 (2.91–3.04)	2.12 (2.07–2.17)

CI: confidence interval; ED: emergency department; IRR: incidence rate ratio; OR: odds ratio; SI: serious illness

Table S4. Sensitivity analysis of the association between serious illness and postoperative healthcare utilisation and gross inpatient bill size using the first eligible surgical admission as the index admission.

Outcome	First-admission estimate (95% CI)	Highest TOSP admission estimate (95% CI)
Length of stay, IRR	1.693 (1.676–1.710)	1.814 (1.796–1.832)
Gross bill amount, gross bill ratio	1.543 (1.523–1.564)	1.642 (1.621–1.665)
30-day readmission, OR	1.748 (1.691–1.807)	1.580 (1.524–1.637)
1-year readmission, OR	2.707 (2.638–2.777)	2.597 (2.531–2.665)
30-day ED visit, OR	1.540 (1.483–1.599)	1.573 (1.513–1.635)
1-year ED visit, OR	2.032 (1.981–2.085)	2.084 (2.031–2.138)

CI: confidence interval; ED: emergency department; IRR: incidence rate ratio; OR: odds ratio; TOSP: Table of Surgical Procedures

All models are adjusted for age, sex, ethnicity, TOSP, surgery nature, admission type, and financial year.