Table 1: Hospital acquired complications list v3.1 ACSQHC and interventions applied in this study

HAC Group	Diagnosis	Interventions	Modified IHI 90-Day Cycle
1. Pressure injury	• Stage III ulcer • Stage IV ulcer • Unspecified decubitus ulcer and pressure area • Unstageable pressure injury • Suspected deep tissue injury	• General • Cultural	• Not applied
2. Falls resulting in fracture or intracranial injury	• Intracranial injury • Fractured neck of femur • Other fractures	• General • Cultural	• Not applied
3. Healthcare-associated infection	• Urinary tract infection • Surgical site infection • Pneumonia • Blood stream infection • Infections or inflammatory complications associated with peripheral/central venous catheters • Multi-resistant organism • Infection associated with prosthetics/implantable devices • Gastrointestinal infections • Other high impact infections	• General • Cultural • Targeted contextualized interventions, e.g., comprehensive oral care, invasive device management, hydration, mobilization; targeted real-time bedside auditing and feedback	• Applied with objective data for feedback
4. Surgical complications requiring unplanned return to theatre	• Post-operative haemorrhage/haematoma requiring transfusion and/or return to theatre • Surgical wound dehiscence • Anastomotic leak • Vascular graft failure • Other surgical complications requiring unplanned return to theatre	• General • Cultural • Targeted contextualized interventions, e.g., dressing selection criteria for median and high-risk patient; antibiotic prescription for prolonged procedures	• Applied without objective data for feedback
5. *Unplanned intensive care unit admission	• Unplanned admission to intensive care unit	• Not applicable	• Not applicable
6. Respiratory complications	• Respiratory failure including acute respiratory distress syndrome requiring ventilation • Aspiration pneumonia • Pulmonary oedema	• General • Cultural • Targeted contextualized interventions for aspiration pneumonia, e.g., comprehensive oral care	• Applied (for aspiration pneumonia) with objective data for feedback
7. Venous thromboembolism	• Pulmonary embolism • Deep vein thrombosis	• General • Cultural • Targeted contextualized interventions e.g., appropriate prescription of anticoagulant for patient at risk	• Applied with objective data for feedback
8. Renal failure	• Renal failure requiring	• General	• Not applied due to small

	haemodialysis or continuous veno-venous haemodialysis	• Cultural • Targeted contextualized interventions by specialists who reviewed, disseminated, and applied findings from each case	number of cases with low level of preventability; objective data available for feedback through clinical case reviews
9. Gastrointestinal bleeding	• Gastrointestinal bleeding	• General • Cultural	• Not applied
10. Medication complications	• Drug related respiratory complications/depression • Haemorrhagic disorder due to circulating anticoagulants • Movement disorders due to psychotropic medication • Serious alteration to conscious state due to psychotropic medication	• General • Cultural • Targeted contextualized interventions, e.g., targeted auditing & feedback for prescription by clinical pharmacists	• Not applied; embedded process with objective data for feedback
11. Delirium	• Delirium	• General • Cultural • Targeted contextualized interventions, e.g., Cognitive Impairment Program, peri-operative interventions for surgical patients; 4AT-screening for delirium & cognitive impairment	• Not applied; embedded process with objective data for feedback
12. Incontinence	• Urinary incontinence • Faecal incontinence	• General • Cultural • Targeted contextualized interventions by specialists who reviewed, disseminated, and applied findings from each case	• Not applied due to small number of cases with low level of preventability; objective data available for feedback through clinical case reviews
13. Endocrine complications	• Malnutrition • Hypoglycemia	• General • Cultural • Targeted contextualized interventions, e.g., *Make 4mmol/L the Floor* for blood glucose level management; Think HYPOglycemia campaign	• Applied with objective data for feedback
14. Cardiac complications	• Heart failure and pulmonary oedema • Arrhythmias • Cardiac arrest • Acute coronary syndrome including unstable angina, STEMI and NSTEMI	• General • Cultural • Targeted contextualized interventions, e.g., HAC Matters Report on Cardiac Complications; clinical documentation review for unspecified atrial fibrillation (AF)	• Not applied, embedded processes with objective data for feedback • This complication benefited from improving clinical documentation to reduce unspecified AF as a HAC [3]
15. *Third and fourth degree of perineal laceration during delivery	• Third- and fourth-degree perineal laceration during delivery	• General • Cultural	• Not applied although local efforts to implement the Women's Healthcare Australasia Perineal Protection Bundle [4]
16. *Neonatal birth trauma	• Neonatal birth trauma • Hypoxic ischemic encephalopathy	• General • Cultural	• Not applied

*Currently not considered for the IHACPA risk adjustment model therefore no funding adjustment.

Table 2: HAC rate modelling as a function of year with and without adjustment for risk factors

Complication	Year	Rate	Unadjusted 95% confidence interval	p	Rate	Adjusted 95% confidence interval	p
All HACs	Baseline (n=5419)	1	Reference	-	1	Reference	-
	2019 (n=2171)	0.77	0.73-0.81	<.001	0.79	0.75-0.83	<.001
	2020 (n=2133)	0.75	0.71-0.79	<.001	0.74	0.71-0.82	<.001
	2021 (n=2372)	0.78	0.74-0.82	<.001	0.76	0.73-0.80	<.001
	2022 (n=2339)	0.82	0.78-0.86	<.001	0.79	0.75-0.83	<.001
Pressure injury	Baseline (n=165)	1	Reference	-	1	Reference	-
	2019 (n=69)	0.81	0.61-1.07	0.130	0.87	0.65-1.15	0.314
	2020 (n=46)	0.53	0.38-0.73	<.001	0.52	0.38-0.73	<.001
	2021 (n=62)	0.67	0.50-0.90	0.007	0.65	0.49-0.88	0.004
	2022 (n=86)	0.99	0.76-1.28	0.916	0.90	0.69-1.17	0.440
Falls resulting in fracture or intracranial injury	Baseline (n=94)	1	Reference	-	1	Reference	-
	2019 (n=55)	1.13	0.81-1.57	0.484	1.11	0.80-1.55	0.526
	2020 (n=47)	0.95	0.67-1.35	0.746	0.90	0.63-1.29	0.568
	2021 (n=46)	0.87	0.61-1.24	0.446	1.81	0.57-1.16	0.256
	2022 (n=46)	0.93	0.65-1.32	0.669	0.86	0.60-1.22	0.388
(*T) Healthcare-associated infection	Baseline (n=2,136)	1	Reference	-	1	Reference	-
	2019 (n=853)	0.78	0.71-0.83	<.001	0.80	0.74-0.87	<.001
	2020 (n=791)	0.70	0.65-0.76	<.001	0.69	0.64-0.75	<.001
	2021 (n=1053)	0.88	0.82-0.95	<.001	0.84	0.78-0.90	<.001
	2022 (n=1083)	0.96	0.89-1.03	0.265	0.91	0.84-0.98	0.011
(*T) Surgical complications requiring unplanned return to theatre	Baseline (n=109)	1	Reference	-	1	Reference	-
	2019 (n=43)	0.76	0.53-1.08	0.126	0.81	0.57-1.16	0.253
	2020 (n=55)	0.96	0.69-1.32	0.788	0.99	0.72-1.37	0.950
	2021 (n=72)	1.18	0.87-1.59	0.284	1.19	0.88-1.60	0.263
	2022 (n=67)	1.16	0.86-1.58	0.331	1.19	0.88-1.62	0.256
(*T) Respiratory complications	Baseline (n=653)	1	Reference	-	1	Reference	-
	2019 (n=262)	0.77	0.67-0.89	<.001	0.81	0.70-0.94	0.005
	2020 (n=280)	0.81	0.71-0.94	0.004	0.84	0.73-0.97	0.015
	2021 (n=357)	0.97	0.86-1.11	0.689	0.99	0.87-1.12	0.819
	2022 (n=330)	0.96	0.84-1.09	0.507	0.94	0.82-1.08	0.372
(*T) Venous thromboembolism	Baseline (n=190)	1	Reference	-	1	Reference	-
	2019 (n=55)	0.56	0.41-0.75	<.001	0.59	0.43-0.78	<.001
	2020 (n=58)	0.58	0.43-0.78	<.001	0.58	0.44-0.79	<.001
	2021 (n=64)	0.60	0.45-0.80	<.001	0.59	0.45-0.79	<.001
	2022 (n=60)	0.60	0.45-0.80	<.001	0.58	0.43-0.78	<.001
Renal failure	Baseline (n=73)	1	Reference	-	1	Reference	-
	2019 (n=33)	0.87	0.58-1.31	0.507	0.95	0.63-1.44	0.817
	2020 (n=35)	0.91	0.61-1.36	0.642	0.97	0.65-1.46	0.898
	2021 (n=21)	0.51	0.32-0.83	0.007	0.51	0.31-0.83	0.007

	2022 (n=23)	0.60	0.37-0.95	0.030	0.59	0.37-0.95	0.029
Gastrointestinal bleeding	Baseline (n=223)	1	Reference	-	1	Reference	-
	2019 (n=102)	0.88	0.70-1.11	0.287	0.91	0.72-1.15	0.410
	2020 (n=100)	0.85	0.67-1.08	0.177	0.83	0.66-1.06	0.132
	2021 (n=110)	0.88	0.70-1.10	0.267	0.84	0.67-1.06	0.135
	2022 (n=106)	0.90	0.71-1.13	0.368	0.85	0.67-1.07	0.167
(*T) Medication complications	Baseline (n=305)	1	Reference	-	1	Reference	-
	2019 (n=146)	0.92	0.76-1.12	0.416	0.92	0.76-1.13	0.431
	2020 (n=116)	0.72	0.58-0.89	0.003	0.74	0.60-0.92	0.006
	2021 (n=102)	0.60	0.48-0.75	<.001	0.61	0.49-0.76	<.001
	2022 (n=95)	0.59	0.47-0.74	<.001	0.60	0.47-0.75	<.001
(*T) Delirium	Baseline (n=933)	1	Reference	-	1	Reference	-
	2019 (n=387)	0.79	0.71-0.90	<.001	0.81	0.72-0.91	<.001
	2020 (n=388)	0.79	0.70-0.89	<.001	0.80	0.71-0.90	<.001
	2021 (n=389)	0.74	0.66-0.84	<.001	0.74	0.65-0.83	<.001
	2022 (n=371)	0.75	0.67-0.85	<.001	0.75	0.66-0.84	<.001
(*T) Incontinence	Baseline (n=89)	1	Reference	-	1	Reference	-
	2019 (n=22)	0.48	0.30-0.76	0.002	0.49	0.30-0.79	0.003
	2020 (n=23)	0.49	0.31-0.78	0.002	0.48	0.30-0.76	0.002
	2021 (n=33)	0.66	0.44-0.99	0.042	0.63	0.42-0.93	0.022
	2022 (n=21)	0.45	0.28-0.72	0.001	0.41	0.25-0.66	<.001
(*T) Endocrine complications	Baseline (n=739)	1	Reference	-	1	Reference	-
	2019 (n=295)	0.77	0.67-0.88	<.001	0.80	0.70-0.92	<.001
	2020 (n=292)	0.75	0.65-0.86	<.001	0.76	0.66-0.87	<.001
	2021 (n=366)	0.88	0.78-1.00	0.050	0.89	0.78-1.00	0.069
	2022 (n=332)	0.85	0.75-0.97	0.014	0.83	0.73-0.94	0.005
(*T) Cardiac complications	Baseline (n=1,090)	1	Reference	-	1	Reference	-
	2019 (n=354)	0.63	0.56-0.71	<.001	0.65	0.57-0.73	<.001
	2020 (n=352)	0.61	0.54-0.69	<.001	0.64	0.56-0.72	<.001
	2021 (n=294)	0.48	0.42-0.55	<.001	0.49	0.43-0.56	<.001
	2022 (n=259)	0.45	0.39-0.52	<.001	0.46	0.41-0.53	<.001
3rd and 4th degree perineal laceration during delivery	Baseline (n=141)	1	Reference	-	1	Reference	-
	2019 (n=53)	0.72	0.53-0.99	0.045	0.72	0.52-0.99	0.040
	2020 (n=53)	0.71	0.52-0.98	0.035	0.79	0.58-1.09	0.147
	2021 (n=77)	0.97	0.74-1.28	0.846	0.92	0.69-1.21	0.535
	2022 (n=75)	1.00	0.76-1.33	0.965	0.80	0.60-1.06	0.114
Neonatal birth trauma	Baseline (n=51)	1	Reference	-	1	Reference	-
	2019 (n=21)	0.79	0.48-1.32	0.370	0.82	0.49-1.37	0.447
	2020 (n=21)	0.78	0.47-1.30	0.339	0.79	0.47-1.31	0.360
	2021 (n=20)	0.70	0.42-1.17	0.174	0.63	0.37-1.08	0.092
	2022 (n=16)	0.59	0.34-1.04	0.069	0.54	0.31-0.95	0.034

**T* indicates that targeted intervention/s were implemented for this HAC.