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ORIGINAL ARTICLE

A Comparative Analysis of Hospital-Acquired Complications and Sentinel Event Reporting Across Australia, Canada, New Zealand, England, and the United States

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Background: National health systems evaluate hospital safety and quality by incentivizing or mandating the reporting of both *hospital-acquired complications* (HACs), which are potentially preventable iatrogenic conditions, and *sentinel events*, which are potentially preventable but severely harmful incidents. The objective of this study was to describe the landscape of currently reported hospital quality measures across countries.

Methods: The authors compared HACs and sentinel events across five well-developed national reporting systems (Australia, Canada, New Zealand, England, and the United States) and collated publicly reported rates and/or event counts. Reported measures were first categorized using existing Australian groupings, with additional categories added by consensus.

Results: Per country, the number of unique HACs ranged from 7 to 43. The United States, Australia, New Zealand, and Canada have measures in the categories of *Pressure injuries*, *Falls and in-hospital injuries*, *Healthcare-associated infections*, and *Thromboembolism*. The United Kingdom England system reports aggregated counts under broader categories. Per country, the number of unique sentinel events ranged from 5 to 17 measures. “Unintended retention of a foreign body after a surgery” and “transfusion of incompatible blood” are a HAC, a sentinel event, or both depending on national definitions.

Conclusion: Hospital quality reporting varies considerably across countries, which may complicate comparisons and sharing of successful improvement strategies. Targets for harmonization were identified.

Over the past 100 years, safety and quality of care in hospitals has improved dramatically.¹ This includes reducing the transmission of infections and increasing the safety of surgeries, medications, and nursing care.^{2–5} To track and incentivize continued improvements, many national health systems develop hospital safety programs and care quality measures. These measures are typically based on local population needs, reimbursement models, and health system infrastructure, resulting in variability in the measures collected and reported. Because of this, we do not know which nations track which hospital care outcomes.

Adverse outcomes in hospitals are often reported as either hospital-acquired complications (HACs) or sentinel events. The US Centers for Medicare & Medicaid Services (CMS)—which uses the term *hospital-acquired condition*—defines a HAC as an adverse condition that “could reasonably have been prevented through the application of evidence-based guidelines.”⁶ HACs are potentially deadly

to patients and costly to health systems.⁷ Sentinel events, also known as “never events” or “always reportable” events, are potentially preventable and serious events that result in patient death, permanent harm, or severe temporary harm.^{8,9} An example is a surgery performed on the wrong patient. HACs and sentinel events are reported differently. HACs have standardized annual reporting across patient groups, while sentinel events are reported one at a time, at the time of the event.

It is important that HACs and measures for reporting are thoughtfully selected because hospital quality measures drive hospital monitoring and quality improvement efforts.¹⁰ They are also frequently tied to funding incentives and/or accreditation. Both the US CMS and the Australian Medicare system use a pay-for-performance system that penalizes hospital reimbursement if quality metrics are not reported or demonstrate underperformance.¹¹ Hospitals also use quality reporting to guide improvement or provide non-financial incentives, such as hospital quality ratings.^{12–14}

National quality measures promote hospital investment in prevention of HACs and sentinel events, and trends over time often show a reduction in complications.^{15,16} However, studies have found that monetary penalties for HACs

may inappropriately penalize hospitals that care for more complex patients, and focusing on specific complications may lead to higher rates of other complications.^{15,17,18} The benefits and potential risks of each quality measure must be carefully considered.

Despite the need to carefully select impactful hospital quality measures, there are no published comparisons of HACs and sentinel events across different nations. To address this gap, we compare and contrast hospital patient safety reporting in five health systems with robust national data. While national quality commissions evaluate HACs and sentinel events among hospitals or states, we present a country-to-country comparison. By collating the different measures and reporting rates, our goal is to shine a light on what is currently being evaluated, highlight harmonization issues, and spur continued quality improvement in hospitals around the world both in existing and emerging national health quality programs.

METHODS

Definitions and Categorizations

For pragmatic reasons we compared data from a convenience sample of five high-income English-speaking countries with robust health quality reporting systems. National health websites and reporting documents available in English were investigated for HAC measures, hospital harm measures, and any sentinel, serious, or never event reporting. Process measures that assess speed of healthcare delivery or access to healthcare, such as emergency department length of stay, were not included. Outcome measures after the hospital visit, such as 30-day rehospitalizations, were also not included, as quality during the hospitalization is the focus of this analysis. Measure specification and data reporting forms were used to gather further details on measures when there was a lack of clarity. All study authors reviewed all the measures and their definitions. HACs and sentinel events were then grouped, based initially on the existing 18 Australian categories. The Australian categorizations were used because, among the countries evaluated, they had the most measures grouped by category. These 18 categories were used to sort measures from the other four countries by one reviewer, and an additional category was added. The resulting classifications were then discussed, refined, and agreed upon by the consensus of a committee, which included all authors and an additional representative from Health Quality & Safety Commission Te Tāhū Hauora of New Zealand.

Data Sources

The most recent measure list and data available as of March 2025 were included using publicly reported data collected from the respective reporting bodies (see Supplemental Data A, available in online article). For each examined country, the recency of the available data differed. For HACs, American data are from the Agency for Health-

care Research and Quality (AHRQ) Patient Safety Indicators (PSI) Benchmark Data Tables, version 2024.¹⁹ Australian data are from the Australian Commission on Safety and Quality in Health Care and the Australian Institute of Health and Welfare and are from the 2022–2023 reporting year.²⁰ United Kingdom England data are from the National Health Service (NHS) England only and obtained from the Reporting and Learning System (NRLS) for reported incident types in acute general hospitals, April 1, 2021– March 31, 2022. Canadian data are from the Canadian Institute for Health Information and Healthcare Excellence Canada and include the 2023–2024 reporting year.²¹ New Zealand information is from the Health Quality & Safety Commission Te Tāhū Hauora Quality and Safety Markers and includes data from August 2023 to September 2024.²²

For the sentinel or “never events,” American data are from Joint Commission for calendar year 2024.²³ Australian data are from the 2022–2023 reporting year for sentinel events in public hospitals. New Zealand data are from July 1, 2023 to June 30, 2024, and are reported by the Health Quality & Safety Commission Te Tāhū Hauora. NHS England data are from “never events” reported as occurring between April 2023 and March 2024.²⁴ For Canada, a sentinel event reporting list is from Health Care Excellence Canada 2015, but numerical rates or prevalence of these events were not found.

RESULTS

Differences in Data Collection

A summary of each health system and reporting criteria is provided in Table 1.^{21,25} In Australia, reporting is mandatory in public hospitals. Although close to a third of private hospitals also contribute data, only data from public hospitals are included here. In the United States, reporting requirements exempt certain oncology and military hospitals. In the United Kingdom, national reporting is mandatory for certain specific sentinel events, while other healthcare incidents are reported and investigated locally and then aggregated at a national level. The UK health system is also divided into NHS England, NHS Scotland, NHS Northern Ireland, and NHS Wales. Each has different quality reporting standards. NHS England was used for the data reporting here. In New Zealand and Canada, all public hospitals are required to report data.

Data Reporting and Transparency

No countries included process measures or posthospitalization outcomes as part of HACs or sentinel events, so these exclusion criteria did not come into use and all measures found were reported. Some countries report incidents by count and some by incidence rates. Risk adjustment is used for some measure reporting, and this can be done using patient-level factors or aggregate indices such as a case-mix

Table 1. Comparison of Health Systems and Reporting of Hospital Complications and Event Reporting: Australia, United States, Canada, New Zealand, United Kingdom

	Australia	United States	Canada	New Zealand	England
Population	27.7 million	330 million	40.1 million	5.2 million	United Kingdom: 68.4 million England: 57.7 million
Health System	Medicare is a national health system that provides basic care and coverage to all persons. Payments for hospital care are provided through the federal health funds and outpatient care, and community services are covered by state funds.	Private insurance is tied to employment. National healthcare insurance is provided for persons older than 65 years old and others with select conditions through Medicare (18.9% of the population). Health care insurance for persons with low incomes/disabilities is provided through Medicaid and the Children's Health Insurance Program (20.5%). ²⁵	Canadian Medicare is a decentralized publicly funded system that is administered by each province/territory.	Publicly funded universal health coverage is provided through the Ministry of Health. Hospitals are regulated by the Ministry of Health. Public hospitals are run by Health New Zealand Te Whatu Ora (HNZ) who also commission some largely elective services from private hospitals.	The National Health Service (NHS) is devolved, such that the four countries have independent administration, commissioning, and governance. Each area has a separate quality and safety performance planning and reporting system.
Mandatory Reporting	While state level reporting started in the early 2000s, nationwide mandatory HAC reporting began in 2018 for public hospitals and is encouraged for private hospitals. Data collection is overseen by the Australian Institute of Health and Welfare (AIHW).	Since 2008 all hospitals that treat Medicare or Medicaid patients are required to report data to CMS with some exemptions (below). Hospital accreditation is through Joint Commission, which also monitors sentinel events.	Healthcare Excellence Canada and the Canadian Institute for Health Information grew out of earlier tracking systems and began reporting Hospital Harm indicators in 2016. ²¹ Data are reported individually to hospitals, and national rates are publicly available.	Health Quality & Safety Commission Te Tāhū Hauora monitors quality. Public hospital data are amalgamated by HNZ into national collections, which are used by Health Quality & Safety Commission Te Tāhū Hauora to construct quality metrics. Public hospitals and others are required to report more severe adverse "harm events" to the commission since 2007.	NHS England has mandatory national-level reporting for defined sentinel events occurring in all settings (including hospital, primary care, and social care) since 2014. All NHS England services have local reporting for incidents, typically using software for tracking and investigation. These data are aggregated by NHS England for national statistics.
Exemptions	Private hospitals are encouraged to report but not mandated.	Veterans Affairs (military) hospitals, certain oncology centers, children's hospitals, inpatient psychiatric facilities, long-term care, and subacute rehabilitation hospitals are exempt from mandatory reporting.	None found.	None found.	None found.
Risk Adjustment	Adjustment for case-mix index	Adjustment for case-mix index	Unadjusted	Risk adjustment for some measures	Unadjusted
Granularity of Publicly Available Data	National-, state-, and hospital-level data are available. Some quality measures are reported directly to consumers on Care Compare (Medicare) website.	National-level and state/territory-level data. Some quality measures are reported directly to consumers on a patient/consumer-focused Safety in Health Care website.	National level	National-, state-, and hospital-level data	National level

HAC, hospital-acquired complication; CMS, Centers for Medicare & Medicaid Services.

index used in the United States and Australia.²⁶ The NZ data are risk adjusted on the patient level for postoperative deep vein thromboembolisms, and both expected and observed counts are provided. Data from England and Canada are reported as unadjusted counts.

Data transparency also varies. US and NZ data are available at the hospital and district level, respectively. English and Canadian data are provided at the national level, and

Australia releases national and state/territory level data. Datasets are publicly available but can be difficult to find within the national healthcare sites. The US Medicare system also reports quality data directly to consumers.^{27,28} The "Care Compare" website helps patients compare local hospitals on quality. It uses a large font and lay person language and allows people to compare local hospitals on some HACs such as surgical site infections, catheter-associated urinary

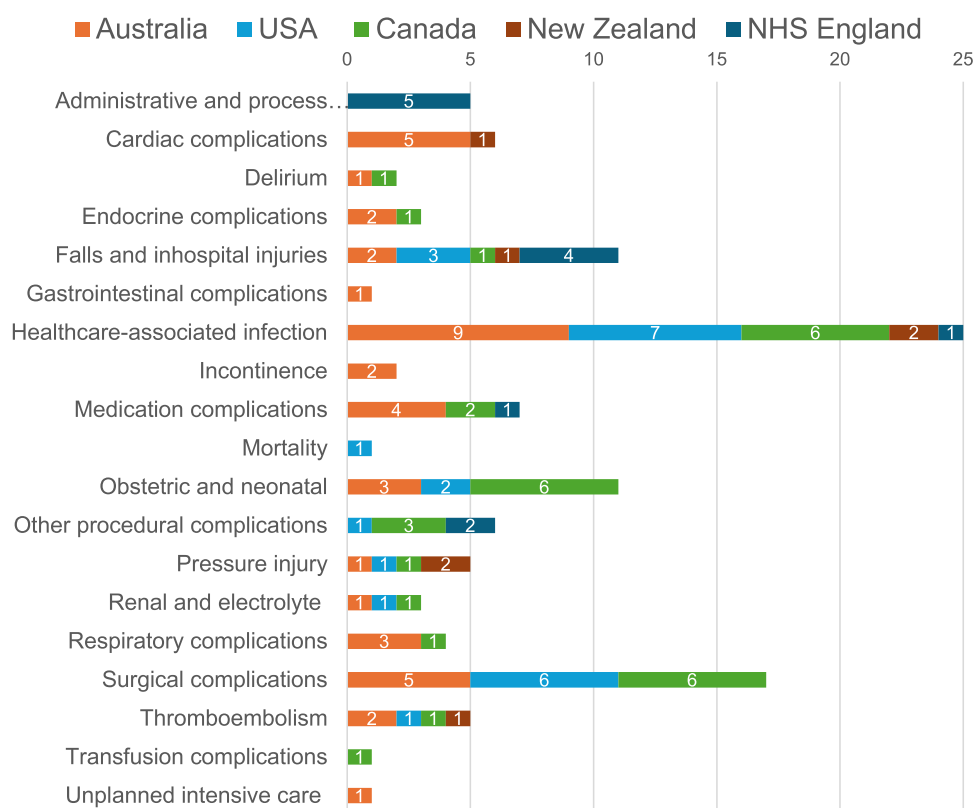


Figure 1: Shown here is a comparison of national quality metrics for hospital-acquired complications across Australia, the United States, Canada, New Zealand, and the National Health Service England.

tract infections, and mortality rates for different diagnostic codes. The Australian Commission on Safety and Quality in Health Care also has a consumer/patient-focused site at <https://www.safetyinhealthcare.gov.au/>. This site reports bloodstream infection rates in a lay person–friendly format.

HACs

The US, Australian, NZ, English, and Canadian quality systems all report HACs (Figure 1). Reported data for the most recent year available are displayed in Table 2. These data should not be considered prevalence estimates and cannot be used to compare rates between countries, as they are reported and defined differently and, as above, may not include all hospitals/events. Data are presented as reported by health systems, which can be national counts, rates, and risk-adjusted rates.

Individual measures per country ranged from 7 to 42 and each measure was grouped into 19 different categories. The category of *Administrative and process incidents* was added from the English reporting system and includes complications relating to problems such as procedural consent or care processes. The most common shared measure categories were *Pressure injuries*, *Falls and in-hospital injuries*, *Healthcare-associated infections*, and *Thromboembolism*. Three of the five countries have *Obstetric and neonatal complications* and *Renal/electrolyte complications*. There were 6 categories reported only by one country, such as

the Australian measure for *Gastrointestinal Complications* and the US measure *Mortality*. England reported aggregated counts under broader categories until 2023 but has since moved to a less prescriptive response framework focused on learning and openness.

Within a category, measure definitions varied by country. The US measure definitions are more narrowly delineated than the other nations. For *Thromboembolism*, US hospitals report only on venous thromboembolisms that occur after specific orthopedic procedures. Canadian thromboembolism guidelines include further procedures, and the Australian measure is the most expansive, including any thromboembolism developed in hospital. Similarly, pressure ulcers are reported by all countries, but US hospitals report only stage III or IV (the most severe), while the other countries report the development of any pressure ulcers. Urinary tract infection (UTI) is reported by all, but US hospitals report only UTIs due to indwelling urinary catheters. The measures within *Other procedural complications* also varied and included iatrogenic pneumothorax (United States) and procedure-associated shock (Canada) among others.

Notable areas of contrast by category include the *Administrative and process incidents* category, which only England includes, and *Delirium*. Hospital-acquired delirium is reported only in Australia and Canada. In order to exclude patients who present to hospital with delirium, a present

Table 2. Comparison of Nationally Reported Hospital-Acquired Complications and Most Recently Reported Data Among Australia, the United States, Canada, and New Zealand

	AUS Hospital-Acquired Complications		USA AHRQ Patient Safety Indicators (2025) and CMS Hospital Inpatient Quality Reporting (IQR)		CAN Hospital Harm Indicators (2022)		NZ Quality and Safety Measures (2021)		NHS England National Reporting and Learning System (NRLS) (2022)	
	Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
Pressure injury	• Stage III ulcer, stage IV ulcer, unspecified decubitus ulcer and pressure area, unstageable pressure injury, and/or suspected deep tissue injury	1,684	• Stage III and IV pressure ulcers (PSI 03)	0.70/1,000	• Pressure ulcer (A08): Any stage of pressure ulcer developed during the hospital stay	7,981	• Percentage of audited patients assessed for pressure injuries	86%		
							• Percentage of audited patients with a hospital-acquired pressure injury (any stage)	35/1,000		
Falls and in-hospital injuries	• Intracranial injury	1,579	• Falls with any of intracranial injury, fractures, dislocations	0.27/1,000	• In-hospital injuries due to an accident, not directly related to medical or surgical procedures (C19)	none reported	• In-hospital falls resulting in a fractured neck of femur	94 (count), 0.09/1,000	• Patient accident	229,636
	• Fractured neck of femur		• Burns						• Self-harming behavior	10,751

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Table 2. (continued)

AUS Hospital-Acquired Complications		USA AHRQ Patient Safety Indicators (2025) and CMS Hospital Inpatient Quality Reporting (IQR)		CAN Hospital Harm Indicators (2022)		NZ Quality and Safety Measures (2021)		NHS England National Reporting and Learning System (NRLS) (2022)	
Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
• Other fractures		• Other injuries (PSI 08)						• Disruptive, aggressive behavior (includes patient-to-patient)	9,810
								• Patient abuse (by staff/ third party)	8,238
Healthcare-associated infection								• Infection control incident	60,591
• Urinary tract infection	35,724 (all infections)	• Catheter-associated urinary tract infection (IQR)	17,370 (count)	• Urinary tract infections (B13)	24,146				
• Surgical site infection		• Surgical site infection (IQR)	23,938 (count)	• Postprocedural infections (b14): includes infections associated with a medical or surgical procedure	10,976	• Surgical site infection (cardiac or orthopedic)	14.7/1,000		
• Pneumonia		• Ventilator associated pneumonia (IQR)	27,626 (count)	• Pneumonia (B16)	17,178				
• Bloodstream infection		• Postoperative sepsis (PSI 13)	228.1/1,000	• Sepsis (B17): excluding neonatal sepsis	6,398				
• Infections or inflammatory complications associated with peripheral/central venous catheters		• Vascular catheter-associated infection (PSI 07 and IQR)	0.13/1,000 (20,032, count)						

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Table 2. (continued)

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	Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
Surgical complications	• Multiresistant organism: includes any organism with antibiotic resistance		• MRSA bloodstream infections (IQR)	8,107 (count)			• Healthcare-acquired staph aureus bacteremia	15.0/1,000		
	• Infection associated with prosthetics/implantable devices									
	• Gastrointestinal infections: includes salmonella, <i>E. coli</i> , <i>Clostridioides difficile</i> , norovirus, and others.		• <i>Clostridioides difficile</i> infections (IQR)	35,840 (count)	• Viral gastroenteritis (B15)	303				
	• Other high-impact infections: includes sepsis, salmonella, <i>Klebsiella</i> , gangrene, and others				• Infections due to <i>Clostridioides difficile</i> , MRSA, and VRE (B18)	6,220				
	• Postoperative hemorrhage/hematoma requiring transfusion and/or return to theater		• Postoperative hemorrhage or hematoma (PSI 09)	2.33/1,000	• Anemia-hemorrhage (D01)	6,153				

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Table 2. (continued)

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Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
• Surgical wound dehiscence		• Postoperative wound dehiscence (PSI 14)	1.58/1,000	• Wound disruption (D23)	5,478				
• Anastomotic leak		• Abdominopelvic accidental puncture or laceration (PSI 15)	0.69/1,000						
• Vascular graft failure		• Postoperative respiratory failure (PSI 11)	7.32/1,000	• Device failure (D20)	4,089				
• Other surgical complications requiring unplanned return to theatre	14,083	• Foreign object retained after surgery (PSI 05)	1,571 (count)	• Selected serious events (D26)	23				
		• 30-day risk-standardized death rate among surgical inpatients with complications (PSI 04)	151.17/1,000	• Retained foreign body (D24)	103				
				• Procedure-associated shock	1,856				
Unplanned intensive care Respiratory complications	• Unplanned admission to ICU • Respiratory failure including acute respiratory distress syndrome requiring ventilation								
	12,001 (all)								

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Table 2. (continued)

AUS Hospital-Acquired Complications		USA AHRQ Patient Safety Indicators (2025) and CMS Hospital Inpatient Quality Reporting (IQR)		CAN Hospital Harm Indicators (2022)		NZ Quality and Safety Measures (2021)		NHS England National Reporting and Learning System (NRLS) (2022)	
Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
	• Aspiration pneumonia			• Aspiration pneumonitis (A12)	11,224				
	• Pulmonary edema								
Thromboembolism	• Pulmonary embolism (PE) 3,054 (all)	• DVT/PE following certain orthopedic procedures: total knee replacement, hip replacement (PSI 12)	3.13/1,000	• Venous thromboembolism (A06): dmbolism, thrombosis, phlebitis or thrombophlebitis of the pulmonary vein or other veins (excluding superficial veins)	6,372	• Postoperative DVT/PE	1,121 (count)		
	• Deep vein thrombosis (DVT)								
Renal and electrolyte	• Renal failure requiring haemodialysis or continuous veno-venous haemodialysis 691	• Postoperative acute kidney injury requiring dialysis (PSI 10)	0.97/1,000	• Electrolyte and fluid imbalance (A09)	36,974				
Gastrointestinal complications	• Gastrointestinal bleeding 3,320								
Medication complications	• Drug-related respiratory complications/depression 2,233			• Medication incidents (A10): incorrect administration or dosage of medications. 598				• Medication 152,673	

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Table 2. (continued)

AUS Hospital-Acquired Complications		USA AHRQ Patient Safety Indicators (2025) and CMS Hospital Inpatient Quality Reporting (IQR)		CAN Hospital Harm Indicators (2022)		NZ Quality and Safety Measures (2021)		NHS England National Reporting and Learning System (NRLS) (2022)	
Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
	• Hemorrhagic disorder due to circulating anticoagulants			• Anemia-hemorrhage (A01): hemorrhage related to the health care delivered or therapeutic use of anticoagulants	1,586				
	• Movement disorders due to psychotropic medication								
	• Serious alteration to conscious state due to psychotropic medication								
Delirium	• Delirium not induced by alcohol or other psychoactive substances		15,681	• Delirium (A05): delirium not induced by alcohol or other psychoactive substances	21,212				
Incontinence	• Urinary incontinence		1,110						
	• Fecal incontinence								

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Table 2. (continued)

AUS Hospital-Acquired Complications		USA AHRQ Patient Safety Indicators (2025) and CMS Hospital Inpatient Quality Reporting (IQR)		CAN Hospital Harm Indicators (2022)		NZ Quality and Safety Measures (2021)		NHS England National Reporting and Learning System (NRLS) (2022)	
Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
Endocrine complications	• Malnutrition • Hypoglycemia	9,990			• Hypoglycemia (A07)	2,135			
Cardiac complications	• Heart failure and pulmonary edema • Arrhythmias • Cardiac arrest	13,503 (all)							
						• Cardiopulmonary arrests, part of a clinical deterioration measure	0.97/1,000		
	• Acute coronary syndrome, including unstable angina, STEMI and NSTEMI								

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Table 2. (continued)

AUS Hospital-Acquired Complications		USA AHRQ Patient Safety Indicators (2025) and CMS Hospital Inpatient Quality Reporting (IQR)		CAN Hospital Harm Indicators (2022)		NZ Quality and Safety Measures (2021)		NHS England National Reporting and Learning System (NRLS) (2022)	
Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
Other procedural complications	• Infective endocarditis								
		• Iatrogenic pneumothorax with venous catheterization (PSI 06)	0.19/1,000	• Laceration/puncture (D21): unintentional or accidental cut, puncture or perforation during a medical or surgical procedure	7,499			• Treatment, procedure	194,020
				• Patient trauma (D19) in-hospital injuries, such as fractures, dislocations, burns, associated with a medical or surgical procedure				• Medical device/equipment	40,448
				• Procedure-associated shock (D25): hypovolemic shock associated with a procedure	7,221				
Transfusion complications				• Infusion, transfusion, and injection complications (A11)	1,361				

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Table 2. (continued)

	AUS Hospital-Acquired Complications		USA AHRQ Patient Safety Indicators (2025) and CMS Hospital Inpatient Quality Reporting (IQR)		CAN Hospital Harm Indicators (2022)		NZ Quality and Safety Measures (2021)		NHS England National Reporting and Learning System (NRLS) (2022)	
	Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
Obstetric and neonatal	• Third and fourth degree perineal laceration during delivery	4,331	• Obstetric trauma rate vaginal delivery (with/without instrumentation) (PSI 18/19)	116.75/1,000 and 17.31/1,000	• Obstetric hemorrhage (A02); Obstetric hemorrhage (D02); Obstetric trauma (A03); Obstetric trauma (D03)	11,895				
	• Neonatal birth trauma		• Birth trauma injury to neonate (PSI 17)	4.68/1,000	• Birth trauma (A04), Birth trauma (D04)	2,527				
	• Hypoxic ischemic encephalopathy									
Mortality			• Death rate in low-mortality diagnosis-related groups (PSI 02)	0.55/1,000						

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Table 2. (continued)

AUS Hospital-Acquired Complications		USA AHRQ Patient Safety Indicators (2025) and CMS Hospital Inpatient Quality Reporting (IQR)		CAN Hospital Harm Indicators (2022)		NZ Quality and Safety Measures (2021)		NHS England National Reporting and Learning System (NRLS) (2022)	
Description	Rate/1,000 or Annual Counts	Description	Rate/1,000 or Annual Counts	Description	Annual Counts	Description	Rate/1,000 or Annual Count	Description	Annual Counts
Administrative and process incidents								• Implementation of care and ongoing monitoring	344,333
								• Access, admission, transfer, discharge (including missing patient)	212,002
								• Clinical assessment (including diagnosis, scans, tests, assessments)	102,848
								• Documentation (including electronic and paper records, identification and drug charts)	83,782
								• Consent, communication, confidentiality	62,489
Number of measures	43	23		30		7		13	

AHRQ, Agency for Healthcare Research and Quality; CMS, Centers for Medicare & Medicaid Services; NHS, National Health Service; PSI, Patient Safety Indicator; MRSA, methicillin-resistant *Staphylococcus aureus*; VRE, vancomycin-resistant enterococci; STEMI, ST-elevation myocardial infarction; NSTEMI, non-ST-elevation myocardial infarction.

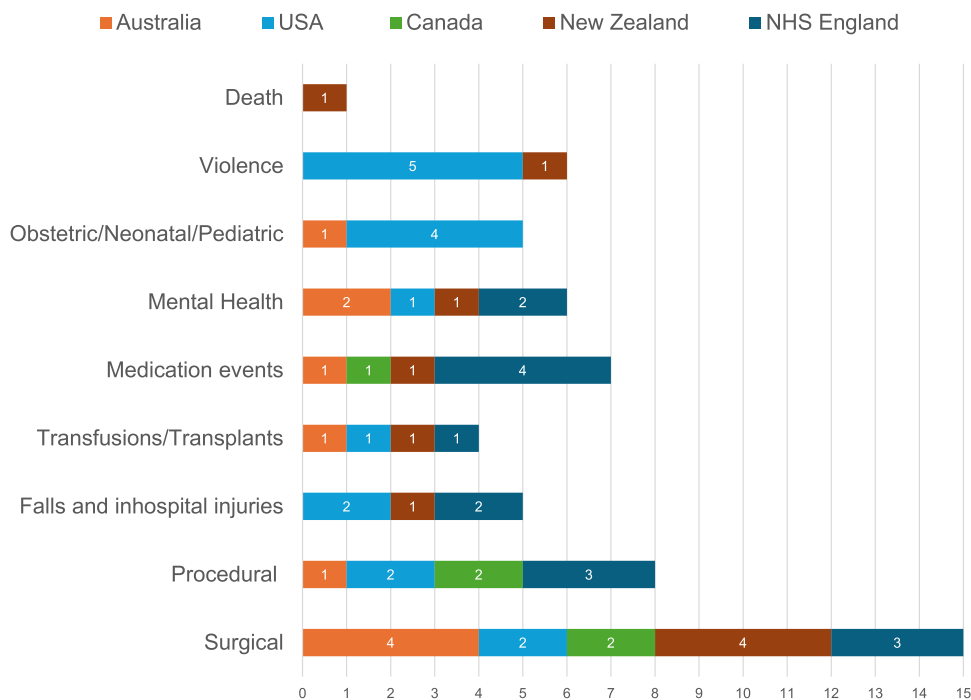


Figure 2: Shown here is a comparison of sentinel event reporting measure categories across Australia, the United States, Canada, New Zealand, and the National Health Service England.

on admission modifier is used. This encourages screening and recognition of delirium on admission to the hospital. Although not part of the American HAC list, the United States recently approved a new measure for 2025, the CMS Age-Friendly Hospital measure.²⁹ This measure requires hospitals to attest to having a policy to screen for delirium and is anticipated to lead to delirium reporting in future years. England and New Zealand do not currently have nationwide reporting of delirium.

Sentinel Events

All five countries encourage safety reporting of sentinel events through a Web-based submission system (Figure 2). In the American system, sentinel event reporting (Joint Commission) is separate from quality payment system reporting (which goes to CMS). The sentinel event lists for all five countries are provided as Supplemental Data B. Countries ranged from 5 to 17 measures, and these were grouped into 9 categories. Every country had a measure for surgical events, but no other category was in consistent use across all systems. Transfusion complications are a sentinel event for all except Canada, which includes this as a HAC. Medication errors leading to harm are also reportable for all but the United States; however, each country uses different definitions.

Areas of contrast include a violence measure in the US sentinel event list. Violence toward patients or staff is reportable as physical or sexual assault. Physical assault against staff is reported only if it results in death, permanent harm,

or severe harm. In the United Kingdom, the NHS England safety reporting system includes a category for patient violence, but this is in HAC reporting rather than sentinel events.

The system in NHS England is also different in that it focuses on processes rather than outcomes. It is designed to encourage the behaviors that can stop sentinel events from happening. While death by suicide or self-injury is a sentinel event for Australia, the United States, and New Zealand, the English measure is “Failure to install functional collapsible shower or curtain rails,” as collapsible rails reduce the risk of a completed suicide attempt by hanging. Another example is the English sentinel event “Overdose of insulin due to abbreviations or incorrect device.” This was classified under the medication events category but is specific to reducing the use of unclear abbreviations in dosing. In comparison, the Australian and NZ medication events measure is “Medication error resulting in serious harm or death,” which is more broadly defined.

Finally, in addition to the above discrepancies we identified ambivalence between the definitions of HACs and sentinel events. The Canadian Hospital Harm list includes transfusion complications as a HAC, while the United States, United Kingdom, and Australia include this only as a sentinel event. Falls with injury feature on HAC and sentinel event lists in the United Kingdom, United States, and New Zealand but are only on the HAC list for Australia and Canada.

DISCUSSION

This comparison of hospital quality measures demonstrates variability in measurement design and implementation. We found categories of measures that were consistent across countries, but we did not find any one measure that was similarly defined across all nations. This affects our ability to both compare hospital quality and safety and translate effective quality improvement programs across countries.

These differences provide an opportunity to learn from each other's practices. For example, each country has a pressure injury measure, but the definitions vary. New Zealand and Canada report hospital-acquired pressure ulcers of all stages. The US and Australian measures report only the most severe ulcers, stages III and IV. Does a focus on severe ulcers improve care, or does it tacitly permit the development of lower-severity injuries? We do not know. Prior studies estimate that 70% of hospital-acquired pressure ulcers are stage I or II, which currently go unreported in the United States and Australia.³⁰ A longitudinal report of US data found stable rates of hospital-acquired ulcers but increasing severity, suggesting that this measure is not functioning well to decrease overall number or severity of pressure injuries.³¹ Adjusting this measure to report all pressure injuries (aligning with Canada and New Zealand) could improve care. Future work could evaluate the effectiveness of different measure definitions in the same category by examining HAC trends over time.

There is some evidence that countries may be moving toward harmonization. Pressure injuries are one of the five most common HAC categories, along with *Falls and in-hospital injuries*, *Healthcare-associated infections*, *Thromboembolism*, *Obstetric and neonatal complications*, and *Renal/electrolyte complications*. In 2024 the United States broadened its falls measure to all falls with any injuries, in line with the Canadian measure. The New Zealand fall measure still reports only falls resulting in a femur fracture. The United States is also moving toward a delirium reporting measure. Another area of potential harmonization is UTIs. The US measure applies only to catheter-associated infections. This encourages a reduction in urinary catheter use, which is good, but ignores the high mortality rates from non-catheter-associated urinary infections.³² A broader UTI prevention measure could result in better attention to hydration, hygiene, and blood sugar control in older patients, which reduce UTIs and also improve patient comfort and safety.^{33,34} We acknowledge that full alignment of quality measures is difficult due to differences in clinical coding practice, healthcare organization, and data quality across nations and health systems.

Some best practices noted by our team include sentinel event reporting of violence against hospital staff. Violence against hospital staff is linked with staff burnout and decreased psychological safety, which is in turn associated with lower adherence to quality measures.^{35–38} Conceptualized

in this fashion, violence against staff could be a process or interim measure of care quality. Decreased violence against staff may be the result of hospitals investing in security measures and/or improved communication with patients. As violence in hospitals is a problem globally, we recommend this measure be considered by other health systems.

Data transparency is another area where best practices can be shared. The United States provides a website specifically designed for patient use, while the other countries use data visualization tools focused on assisting hospitals and states with quality improvement. Both these methods have merit. Allowing researchers and public health experts to download full datasets for secondary use could also help improve care. This would allow for more comparisons between countries and allow researchers to more easily leverage the natural experiments caused by differing policies. Or large international health agencies could consider a centralized database to which all countries could contribute data for secondary analysis.

A shared challenge is data quality for sentinel event reporting systems. The onus is on clinicians or service managers to identify and report safety events. None of the observed systems had national sharing of patient-reported safety or outcome data, and therefore current safety reporting might be considered as lacking comprehensiveness. Future work could link reporting to automated electronic health record (EHR) tools to alleviate the burden on hospital staff to report. Another option is patient reporting, which is used in primary care settings in multiple countries and so could be a feasible form of data collection for hospital quality.^{39–42} Data quality for HACs is also variable. Most often data are pulled from billing datasets or EHR diagnostic codes. Future work could evaluate the impact of collating hospital complications from notes and health records themselves using artificial intelligence or machine learning. One group in Canada found that delirium is underdiagnosed using diagnostic codes vs. chart review.⁴³ This could be true for other HACs as well.

For countries developing hospital quality monitoring systems, we recommend the following:

1. Aligning with existing measures in other countries, which will provide an external data quality check/comparator. We recommend including measures in the most common quality groupings of *Pressure injuries*, *Falls and in-hospital injuries*, *Healthcare-associated infections*, *Thromboembolism*, *Obstetric and neonatal complications*, and *Renal/electrolyte complications* to achieve this goal.
2. Considering how inclusion/exclusion criteria at the hospital level and incentives or disincentives may contribute to bias or underreporting.
3. Integrating data quality checks or audit systems.

4. Considering goals for data transparency and secondary uses of these data for patients, health systems, and researchers.
5. Ensuring that sentinel event reporting leverages EHR tools to reduce manual reporting burden.

Limitations of this work include that it is consensus-based among clinical experts. Others might categorize or compare the quality measures differently. Also, there is a possibility that we misinterpreted systems of reporting and data transparency. Health systems could have other reports available to providers/health systems used internally and not publicly reported, or local quality groups/networks led by medical specialty organizations, which were not included in this study. Finally, this is a snapshot of quality measures at a specific time and so does not account for changes over time.

CONCLUSION

HAC and sentinel event reporting varies considerably from country to country, which currently complicates comparisons of prevalence and sharing of successful improvement strategies. However, we found great potential for harmonization across nations, as there are several commonly used measure groups.

Disclaimer. No statement in The Joint Commission Journal on Quality and Patient Safety should be construed as an official position of Joint Commission or Joint Commission Resources unless otherwise stated. In particular, there has been no official review about matters of standards compliance.

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SUPPLEMENTARY MATERIALS

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