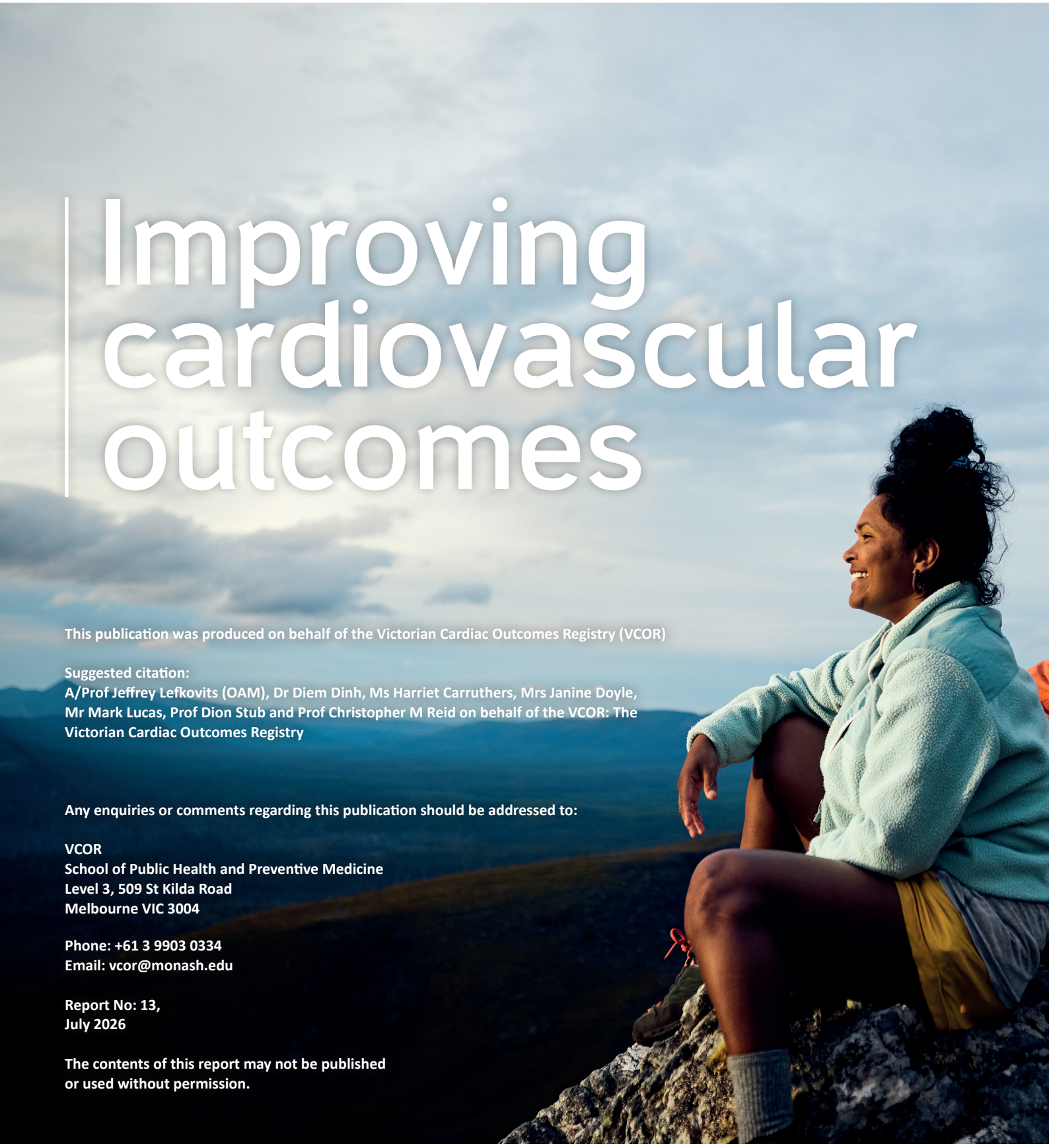
VCOR

VICTORIAN CARDIAC OUTCOMES REGISTRY

ANNUAL PUBLIC REPORT

2025

Improving cardiovascular outcomes



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Acknowledgements

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We extend our sincere appreciation to the members of the VCOR Steering Committee, the VCOR Clinical Quality Committee, and the VCOR Data Research and Publications Committee for their continued leadership, expertise, and commitment throughout the reporting period.

We acknowledge the contribution of the registry's senior leadership:

- Professor Dion Stub, VCOR Registry Custodian
- Associate Professor Jeffrey Lefkovits OAM, VCOR Clinical Director
- Professor Chris Reid, Co-Director, Centre of Cardiovascular Research and Education in Therapeutics

We also recognise the dedicated efforts of the VCOR Data and Project Management team within SPHPM:

- Dr Diem Dinh
- Ms Harriet Carruthers
- Mrs Janine Doyle
- Mr Mark Lucas

Professor Dion Stub is supported by National Heart Foundation and NHMRC Investigator Grants, which provide essential salary support for his work contributing to VCOR initiatives.

Finally, we express our deep gratitude to the clinicians, nurses, data managers, and hospital personnel across all participating hospitals who contribute to data collection and quality improvement activities. The sustained engagement and leadership of clinical teams at each hospital remain fundamental to the registry's ongoing development, impact, and success.

Foreword

It is my privilege to herald this year's Victorian Cardiac Outcomes Registry (VCOR) Annual Report and provide a Tasmanian perspective. Since its establishment in 2013, VCOR has played a vital role in strengthening the safety, quality, and equity of cardiovascular care. Our collaborative journey with Victoria began in June 2019, when the Tasmanian public hospitals joined VCOR submitting their data on percutaneous coronary intervention (PCI) and Cardiac Implantable Electronic Devices (CIED). The Tasmanian footprint expanded further in August 2021 when Hobart Private Hospital (Healthscope) came onboard, solidifying our state-wide commitment to robust, transparent clinical quality reporting.

Our integration into VCOR has significantly enhanced our clinical governance in Tasmania. A standout achievement from the Tasmanian perspective is the successful implementation of pre-hospital notification (PHN) at Launceston General Hospital. VCOR data elegantly demonstrates the significant system-wide value impact of PHN in streamlining acute pathways, achieving a median door-to-balloon time of 49 minutes in all participating hospitals. Consequently, 66.1% of patients with pre-hospital notification achieved optimal reperfusion of the culprit artery within 60 min, whereas only 29.8% of those presenting without PHN met this benchmark: "Time is STILL myocardium".

VCOR provides us with the clinical data to track contemporary trends and recognise procedural complexity. This is particularly evident in our public sector, which has an immense burden of high-acuity patients.

This year's report introduces risk-adjusted in-hospital major bleeding as a critical new quality indicator, sitting alongside established benchmarks such as procedural success and unplanned cardiac readmissions within 30-days. Our participating Tasmanian hospitals continue to fare exceptionally well against national benchmarks, demonstrating a high level of adherence to international best-practice.

As we celebrate these results, our focus in the future is continuous quality improvement. We strive to minimise unwarranted variations in clinical practice. We hope to extend safe, same-day discharge pathways for elective cases. We seek to support lower-volume regional centres in optimising their emergency reperfusion pathways.

I congratulate the Victorian Department of Health, our participating Tasmanian Health Services, and the exceptional VCOR Management Team at Monash University on their contribution to date in establishing VCOR. I sincerely thank our dedicated clinicians, data managers, and patients for their participation. Through our continued partnership with VCOR and the National Cardiac Registry (NCR), Tasmania remains firmly positioned at the forefront of safe, evidence-based, and world-class cardiac care.

Dr Paul D MacIntyre MBChB, MSc, MD, FRACP, AFRACMA

Statewide Clinical Lead for Cardiac Services
Chair of Tasmanian Cardiac Network

Introduction

This report delivers a comprehensive overview of percutaneous coronary intervention (PCI) activity together with a detailed assessment of cardiac implantable electronic device (CIED) practice across Victoria and Tasmania. In the current reporting cycle, all PCI-capable hospitals in Victoria and three in Tasmania, along with a substantial proportion of centres undertaking CIED implantation, contributed data to VCOR. The analyses presented explore contemporary patterns in patient demographics, procedural approaches, institutional performance, and key quality metrics.

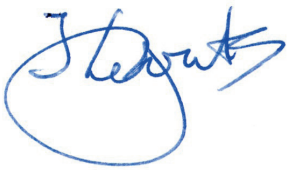
Aligned with the priorities articulated in the National Strategic Action Plan for Heart Disease and Stroke and the National Heart Foundation's long-term vision for cardiovascular health in Australia, this report provides an extensive evaluation of care processes and outcomes for patients presenting with acute coronary syndromes (ACS). Particular focus is directed toward hospital performance in the treatment of ST-elevation myocardial infarction (STEMI) and non-ST-elevation acute coronary syndromes (NSTE-ACS), clinical scenarios in which timely revascularisation is critical to improving patient outcomes.

During the development of this report, the revised Australian Clinical Guideline for Diagnosing and Managing Acute Coronary Syndromes was released, endorsing a more stringent benchmark of ≤60 minutes from arrival at a PCI-capable facility to balloon inflation for STEMI management. This recommendation replaces the previously accepted ≤90-minute target. Consequently, institutional performance is assessed solely against the updated ≤60-minute standard. As anticipated, achieving this accelerated timeframe presents operational challenges; therefore, both state-wide and hospital-level analyses are presented in detail. The report further highlights the important contribution of pre-hospital notification by ambulance services in reducing treatment delays. In patients with NSTE-ACS, hospital efficiency continues to be evaluated using time-to-procedure indicators, with particular emphasis on revascularisation within 24–48 hours of presentation, consistent with current best-practice guidance.

Within the CIED module, the report outlines patient characteristics, procedural indications, device utilisation patterns, compliance with evidence-based recommendations, and both patient- and hospital-level outcomes.

As in previous years, VCOR remains dedicated to providing rigorous, data-informed analyses to support benchmarking, quality improvement, and shared learning across the cardiovascular sector. Ongoing efforts to detect and address unwarranted variation in cardiac care are closely aligned with the strategic objectives of the Victorian Agency for Health Information and Safer Care Victoria.

With the release of this report, VCOR acknowledges the continued support of the Victorian Department of Health and participating Tasmanian hospitals, whose commitment underpins the registry's capacity to promote safe, effective, and equitable cardiovascular care. I also extend my sincere appreciation to the VCOR Management Team at Monash University for their expertise, diligence, and sustained leadership in managing the registry's complex operational and analytical functions.

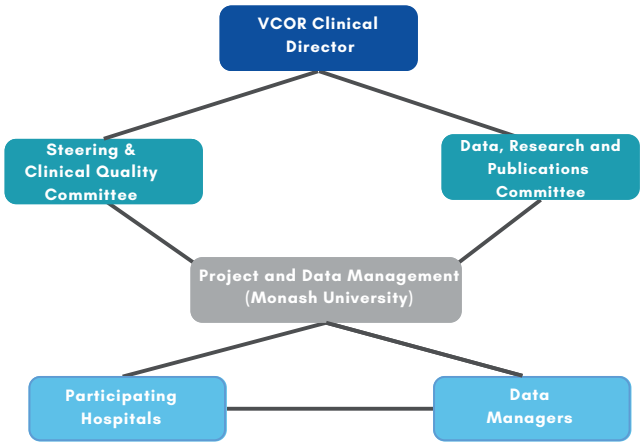


A/Prof Jeffrey Lefkovits OAM
VCOR Clinical Director

Registry Governance and Structure

VCOR's governance structure and operational processes have been formally documented and communicated to stakeholders. The registry maintains alignment with the two key national frameworks guiding clinical quality registries: the Framework for Australian Clinical Quality Registries and the National Operating Principles for Clinical Quality Registries. All applicable data security and privacy standards are fully adhered to, ensuring the integrity, confidentiality, and protection of the information collected, stored, and managed by VCOR.

Figure 1: VCOR Governance Structure



Steering Committee

The Steering Committee (SC) convened on four occasions during 2025. The SC includes representatives from all participating hospitals, alongside representation from Safer Care Victoria and the School of Public Health and Preventive Medicine at Monash University. The Committee is chaired by A/Prof Jeffrey Lefkovits OAM.

Clinical Quality Committee

The Clinical Quality Committee (CQC) is responsible for the oversight, analysis, interpretation, and dissemination of hospital performance data. It plays a pivotal role in maintaining the integrity and impact of VCOR as a clinical quality registry. Within the PCI module, the CQC conducts quarterly and biannual reviews of hospital Key Performance Indicators (KPIs) and other relevant clinical metrics. Outcomes related to the CIED module are similarly reviewed and presented to the CIED Expert Working Group. Findings are formally reported to participating health services and to the Victorian Department of Health (Victorian Hospital results only).

Data, Research and Publications Committee

The Data, Research and Publications Committee (DRP) provides complementary governance oversight, with responsibility for reviewing and approving research proposals utilising VCOR data. The DRP includes representatives from participating health services, Ambulance Victoria, and the School of Public Health and Preventive Medicine, ensuring multidisciplinary input into registry-based research activities.

Data Quality

In 2025, data quality assessment was completed across all VCOR hospitals. 5% of case records were randomly selected for comparison with the hospital medical records. Hospital records were reviewed by a trained auditor with a cardiac clinical background not aligned with the hospital being audited. The fields for audit encompass those used for risk-adjustment models and associated with outcome reporting. The overall agreement rate between VCOR data and the hospital medical record was 99.1% at 37 sites, reflecting high quality data collection.

With respect to case ascertainment, sites are encouraged to perform regular self-audits to ensure the completeness of data collection. Of the total number of procedures entered in 2025, 100% of cases were considered complete.

This level of data completeness and accuracy represents a benchmark achievement among state-based PCI registries nationally. A comprehensive list of contributing hospitals and participating modules is provided in Table 1.

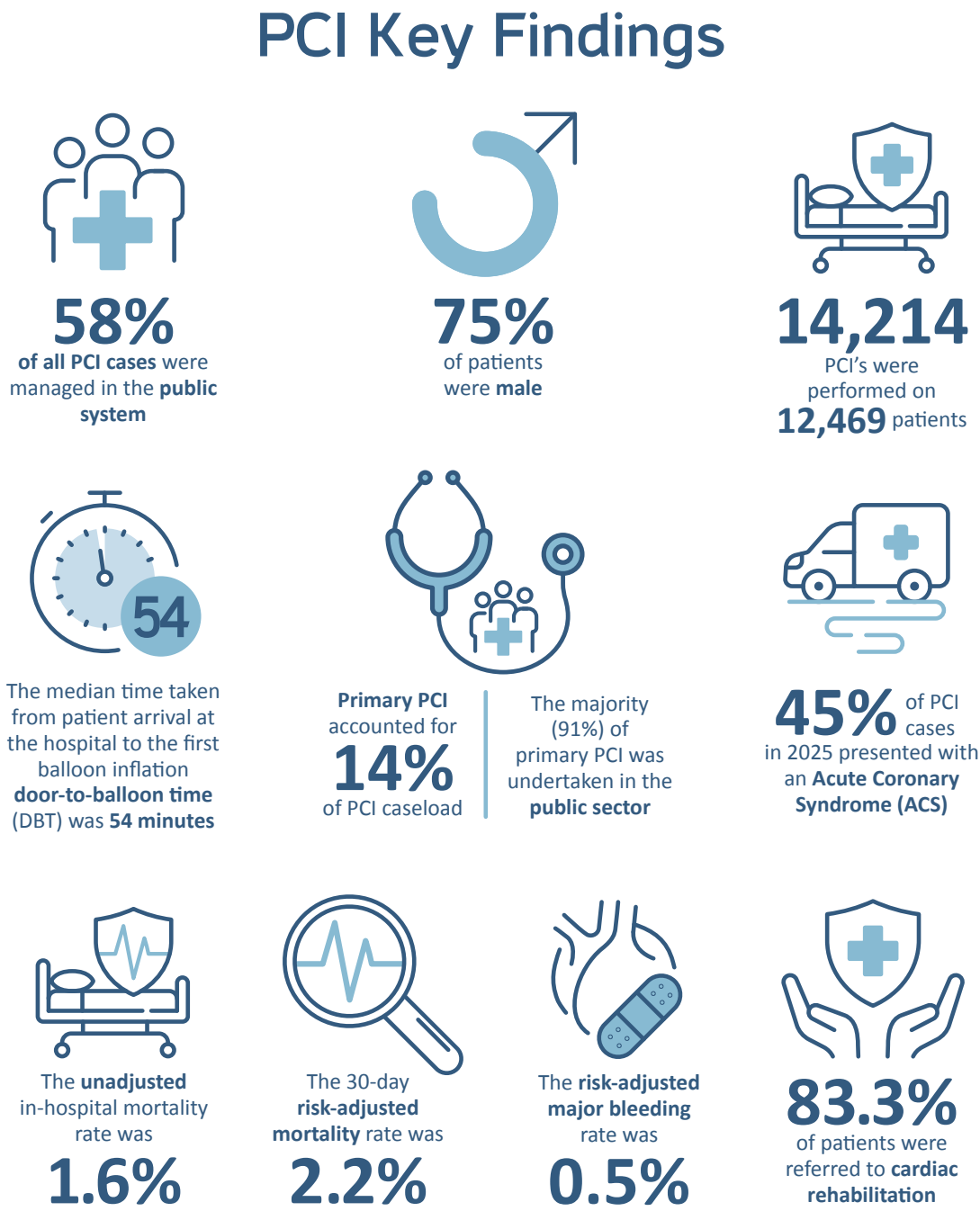
Table 1: Hospitals contributing to VCOR

Participating Hospitals	Hospital type	PCI Module	CIED Module
Albury Hospital	Public	•	
Alfred Hospital	Public	•	
Austin Hospital	Public	•	•
Ballarat Base Hospital	Public	•	•
Bendigo Hospital	Public	•	•
Box Hill Hospital	Public	•	•
Cabrini Hospital Malvern	Private	•	•
Epworth Hospital Eastern	Private	•	
Epworth Hospital Geelong	Private	•	
Epworth Hospital Richmond	Private	•	
Footscray Hospital	Public	•	•
Frankston Hospital	Public	•	•
Hobart Private Hospital	Private	•	
Holmesglen Private Hospital	Private	•	
Jessie McPherson Private Hospital	Private	•	•
Knox Private Hospital	Private	•	
Latrobe Regional Hospital	Public	•	
Launceton General Hospital	Public	•	
Melbourne Private Hospital	Private	•	
Monash Heart (Victorian Heart Hospital)	Public	•	•
Mulgrave Private Hospital	Private	•	•
The Northern Hospital	Public	•	
Northern Private Hospital	Private	•	
Peninsula Private Hospital	Private	•	
Royal Hobart Hospital	Public	•	•
St John of God Hospital (Ballarat)	Private	•	
St John of God Hospital (Bendigo)	Private	•	
St John of God Hospital (Berwick)	Private	•	
St John of God Hospital (Geelong)	Private	•	•
St Vincent's Hospital Melbourne	Public	•	•
St Vincent's Private Hospital	Private	•	
St Vincent's Private Hospital (Werribee)	Private	•	
The Royal Melbourne Hospital	Public	•	•
Sunshine Hospital	Public	•	•
The University Hospital, Geelong	Public	•	•
Warringal Private Hospital	Private	•	
Western Private Hospital	Private	•	•

Percutaneous Coronary Intervention (PCI)

Key Findings PCI Module

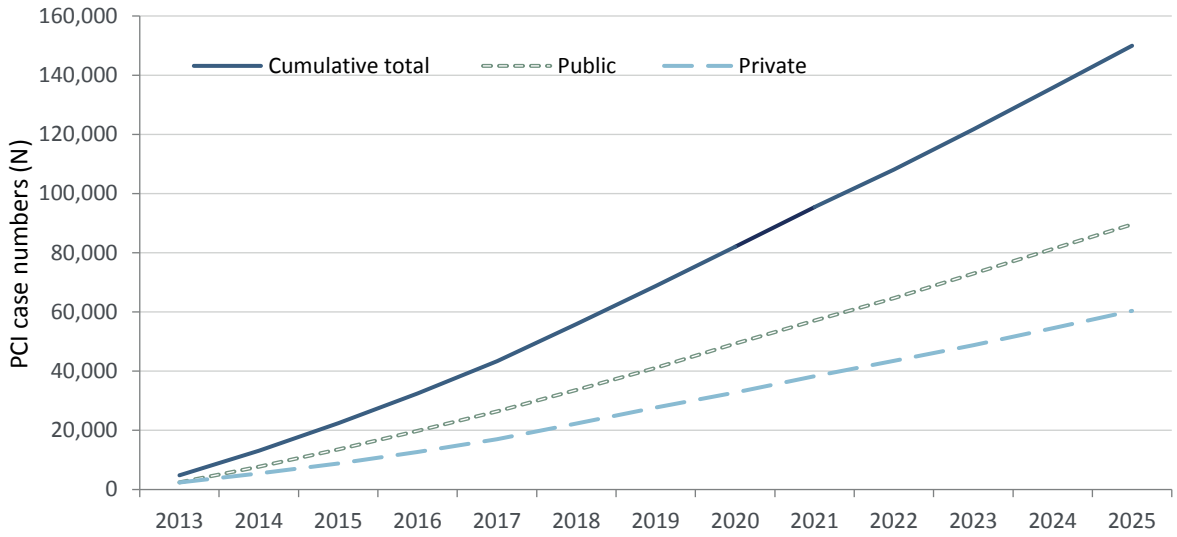
Figure 2: PCI Key Findings



Registry Module Activity

This report summarises percutaneous coronary intervention (PCI) activity across Victoria and Tasmania for the 2025 calendar year, covering the period from January 1st to December 31st. All 34 PCI-capable hospitals within Victoria, comprising 15 public and 19 private institutions have contributed. For the first time, the Annual Report will include data from the three contributing Tasmanian hospitals (2 public and 1 private). The total number of PCI cases entered into VCOR in 2025 was 14,214.

Figure 3: Cumulative case numbers by year: 2013 - 2025



As at December 31st, 2025, the cumulative number of cases captured in VCOR reached 149,965. Of these, 89,588 procedures were undertaken in the public sector and 60,377 in the private sector. Annual cumulative recruitment trends by hospital sector are illustrated in Figure 3. Figures 4 and 5 show the rates of PCI per 1,000 population by local government areas in Victoria and Tasmania. As in previous years, the proportion of patients electing not to participate in the registry in 2025 remained low, with an opt-off rate of 0.17%. Since the inception of the registry, the overall opt-off rate was 0.16%.

Figure 4: Victorian PCI incidence rate per 1,000 population by local government area

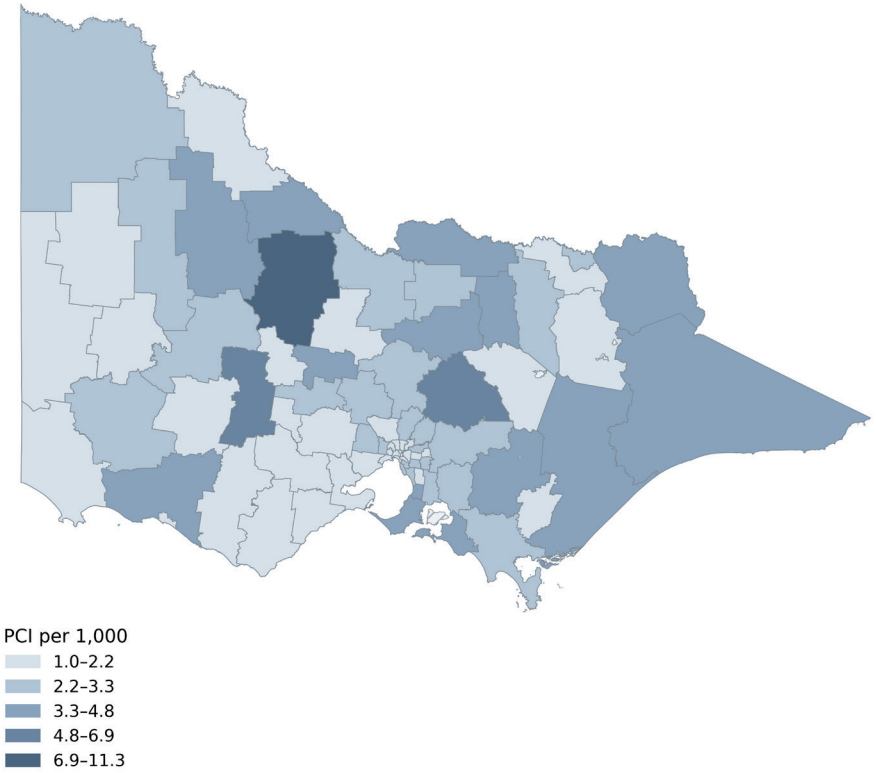
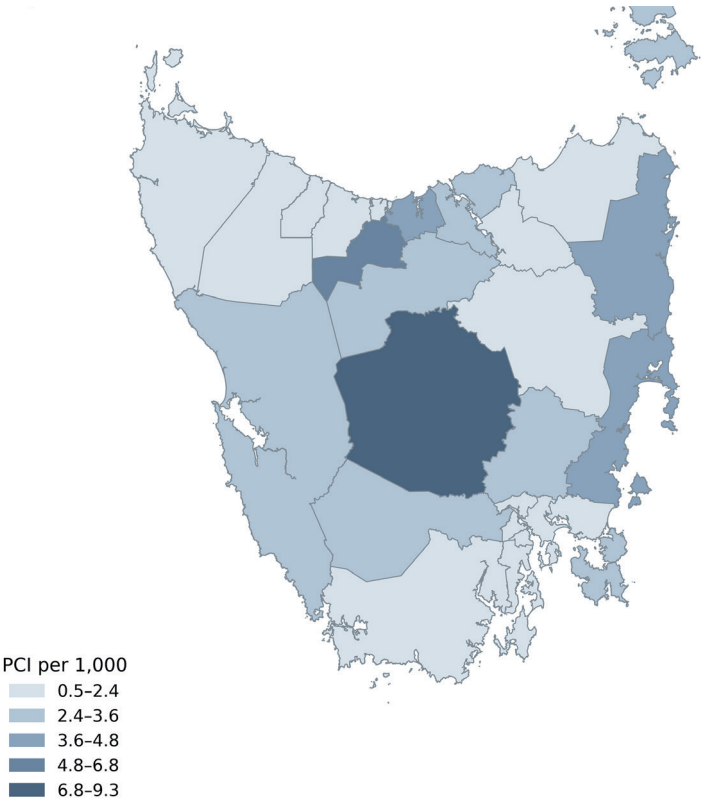


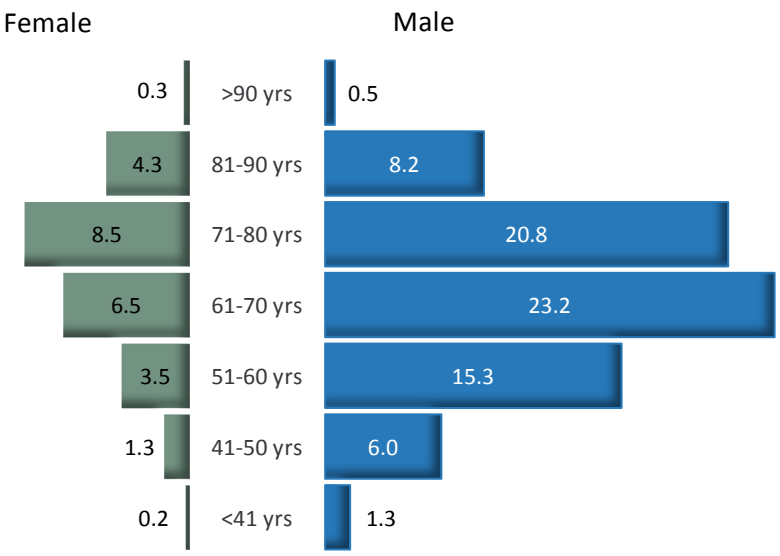
Figure 5: Tasmanian PCI incidence rate per 1,000 population by local government area



Patient Characteristics

Data were collected from 14,214 PCI procedures performed on 12,469 individual patients. Of these, 1,745 patients (12.3%) underwent more than one procedure during the reporting period. The proportion of female patients undergoing PCI was 24.7% of the total cohort. The median age of female patients was 72 years (IQR: 63, 79). In comparison, male patients were younger, with a median age of 68 years (IQR: 59, 76) (Figure 6).

Figure 6: Age and sex distribution of patients undergoing PCI



Selected demographic characteristics of the patient cohort over a five-year period are shown in Table 2. Between 2021 and 2025, only modest temporal variations were observed, although the prevalence of diabetes among patients undergoing PCI increased progressively over time.

Table 2: Comparison of selected patient characteristics: 2021 – 2025

Patient characteristics	2021 (N=12,478)	2022 (N=11,651)	2023 (N=12,564)	2024 (N=13,066)	2025 (N=14,214)
Age- years (Mean ±SD)	67.3 ±11.9	66.9 ±11.7	67.4±11.7	67.8±11.7	67.9±11.7
	%	%	%	%	%
Sex - female	25.2	22.8	24.7	24.3	24.7
Diabetes	23.6	24.1	25.2	26.4	27.6
Peripheral Vascular Disease	3.4	3.2	3.3	3.6	3.2
Cerebrovascular Disease	3.0	2.8	3.1	3.6	3.6
Previous PCI	32.7	31.3	32.3	32.6	34.1
Previous CABG	6.0	5.4	5.5	5.3	5.2

Patient characteristics stratified by hospital sector are summarised in Table 3. Patients treated in public sector hospitals were generally younger and exhibited a lower burden of cardiovascular risk factors compared with those managed in the private sector.

Table 3: Selected patient characteristics by hospital sector

Patient characteristics	Public (n=8,304)	Private (n=5,910)
Age- years (Mean ±SD)	65.2 (±12.1)	71.6 (±10.0)
	%	%
Sex - female	24.8	24.6
Diabetes	28.8	25.9
Peripheral Vascular Disease	2.9	3.7
Cerebrovascular Disease	3.6	3.7
Previous PCI	28.2	42.3
Previous CABG	4.3	6.5
Hypertension	61.4	72.4
Chronic Lung Disease	12.7	13.4
Body Mass Index (BMI) ≥35kg/cm^2	13.5	10.0
Smoking history	%	%
Current	26.0	4.2
Previous	27.8	31.9
Never	33.6	49.6

Case Presentation

The majority of PCI cases were undertaken during routine working hours, with 2,512 cases (17.7%) performed out-of-hours. The majority of after-hours activity occurred within the public sector (n=1,773, 70.6%), and most after-hours procedures were performed in the context of acute ST-elevation myocardial infarction (n=1,414, 56.3%).

Time intervals from hospital admission to PCI among patients presenting with non–ST-elevation acute coronary syndrome (NSTE-ACS) across four temporal categories are illustrated in Figure 7. Nearly half of patients with NSTE-ACS underwent PCI within 24 hours of admission, whereas approximately 15% experienced treatment delays exceeding 72 hours.

Figure 7: Time delays from hospital admission to PCI for NSTE-ACS cases

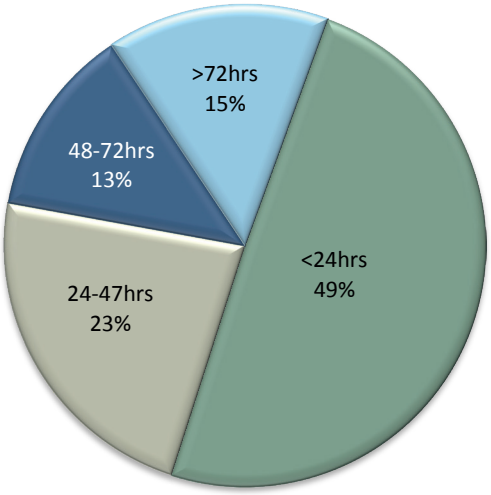


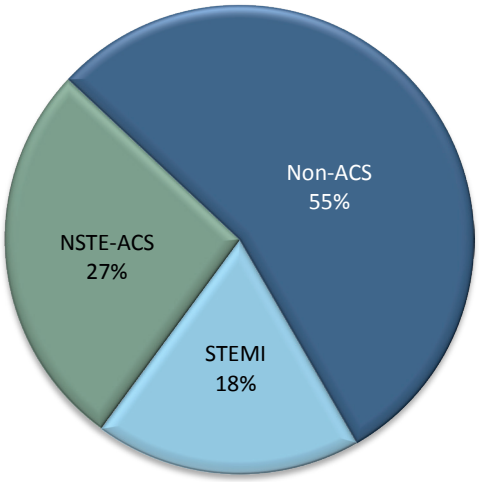
Table 4 outlines time delays to PCI for NSTE-ACS by hospital sector. The overall proportion of cases treated within 72 hours was higher in public sector hospitals, suggesting that different factors may be in play across hospital sectors that influence delays to treatment in this patient cohort.

Table 4: Time delays from hospital admission to PCI for NSTE-ACS cases by hospital sector

	All sites (N=3,828)	Public (n=2,846)	Private (n=982)
	N (%)	N (%)	N (%)
<24hrs	1,892 (49.4)	1,430 (50.2)	462 (47.0)
24-47hrs	875 (22.9)	660 (23.2)	215 (21.9)
48-72hrs	490 (12.8)	362 (12.7)	128 (13.0)
>72hrs	571 (14.9)	394 (13.8)	177 (18.0)

The proportion of cases by clinical presentation is illustrated in Figure 8. The majority of cases performed in 2025 were non-ACS indications. Marked inter-hospital variation was observed in the proportion of acute coronary syndrome (ACS) cases treated across PCI centres in Victoria and Tasmania. In 2025, the contribution of ACS to overall PCI activity varied widely between institutions, ranging from 2.9% to 76%. Overall, 11 hospitals reported ACS caseloads comprising less than 20% of total PCI volume, consistent with a predominantly elective case mix. In contrast, 13 hospitals managed a substantial ACS burden, with acute coronary syndromes accounting for more than half of all PCI procedures performed.

Figure 8: Procedures by clinical presentation



Indications for PCI

Indications for PCI among patients presenting with ACS, stratified by hospital sector, are presented in Table 5. As in previous reports, the majority of primary PCI (91.1%) and rescue PCI (97%) procedures were performed in the public sector.

Table 5: PCI indications by ACS category and hospital sector

PCI indications	All sites (N=7,019)	Public (n=5,605)	Private (n=1,414)
ACS Category	N (%)	N (%)	N (%)
Primary PCI*	2,008 (28.6)	1,830 (32.6)	178 (12.6)
STEMI PCI 12-24 hours after symptom onset	127 (1.8)	120 (2.1)	7 (0.5)
Pharmaco-invasive PCI	100 (1.4)	97 (1.7)	3 (0.2)
Rescue PCI	173 (2.5)	170 (3.0)	3 (0.2)
PCI For STEMI (1-7 Days no prior lysis)	147 (2.1)	136 (2.4)	11 (0.8)
PCI For STEMI (1-7 Days following lysis)	59 (0.8)	55 (1.0)	4 (0.3)
PCI for OHCA/shock (non-MI)	61 (0.9)	59 (1.1)	2 (0.1)
PCI for NSTE-ACS	4,344 (61.9)	3,138 (56.0)	1,206 (85.3)
NSTE-ACS sub-category	N (%)	N (%)	N (%)
NSTEMI	3,273 (75.3)	2,551 (81.3)	722 (59.9)
UAP	555 (12.8)	295 (9.4)	260 (21.6)
Recent ACS 8-30 days ago	516 (11.9)	292 (9.3)	224 (18.6)

**Primary PCI for STEMI presentations including all inter-hospital transfers and patients with onset of STEMI whilst a current in-patient.*

Table 6 presents the indications for PCI among patients without acute coronary syndrome (non-ACS), stratified by hospital sector. Across both sectors, stable angina represented the predominant indication for intervention.

Table 6: Non-ACS PCI indications

PCI indications	All sites (N=7,195)	Public (n=2,699)	Private (n=4,496)
	N (%)	N (%)	N (%)
Stable angina	4,664 (64.8)	1,856 (68.8)	2,808 (62.5)
No symptoms and positive functional test	910 (12.6)	111 (4.1)	799 (17.8)
No symptoms and no functional test	288 (4.0)	123 (4.6)	165 (3.7)
Staged PCI after ACS (≤30 days after first procedure)	613 (8.5)	398 (14.7)	215 (4.8)
Staged PCI after ACS (>30 days after first procedure)	211 (2.9)	139 (5.2)	72 (1.6)
Staged PCI after original non-ACS indication	509 (7.1)	72 (2.7)	437 (9.7)

For more than a decade, VCOR has undertaken systematic evaluation of the clinical appropriateness of PCI performed for non-ACS indications. Assessment is based on three principal criteria: the presence of anginal symptoms, objective evidence of ischaemia on functional testing and documentation of a high-grade coronary stenosis. Collectively, these parameters guide decision-making regarding revascularisation in stable patients.

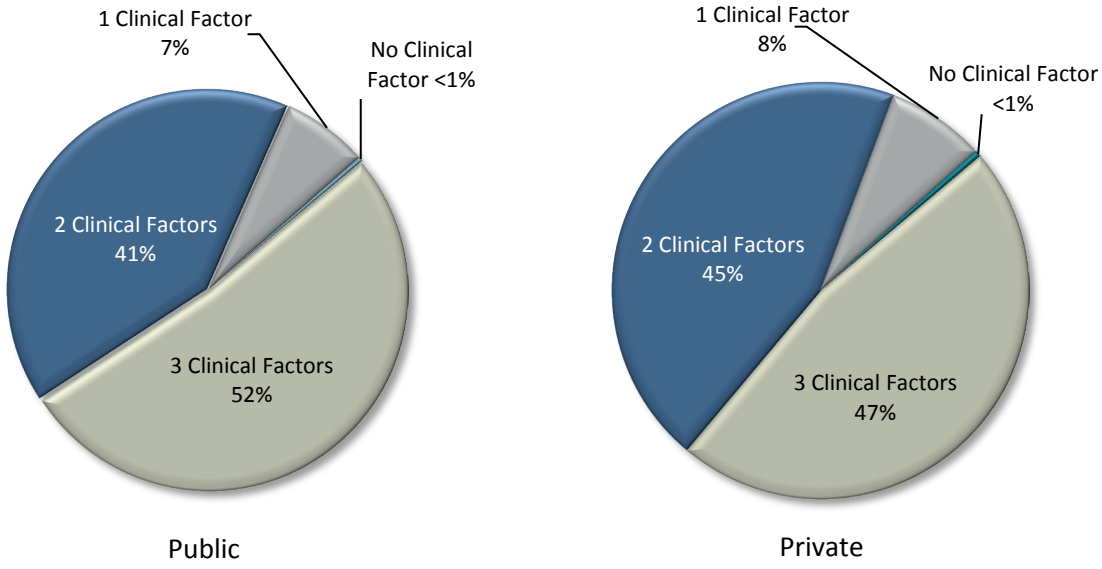
During the current reporting interval, 48.9% of non-ACS PCI cases satisfied all three criteria, representing a decline compared to previous years (53.5% in 2023 vs 49.5% in 2024). Yet, the vast majority of cases (92.1%) fulfilled at least two of the three clinical benchmarks. The proportion of patients meeting only one or none of these specified criteria was 7.9%, similar to previous reporting periods. A small number of cases (n=25) proceeded to PCI without recording any of the defined clinical indications.

Table 7: Key clinical factors pertaining to non-ACS PCI indications

Symptoms	Positive functional test	High grade stenosis	Total
			N (%)
●	●	●	2,864 (48.9)
○	●	●	803 (13.7)
●	●	○	321 (5.5)
●	○	●	1,412 (24.1)
●	○	○	67 (1.1)
○	○	●	263 (4.5)
○	●	○	107 (1.8)
○	○	○	25 (0.4)
			5,862 (100)

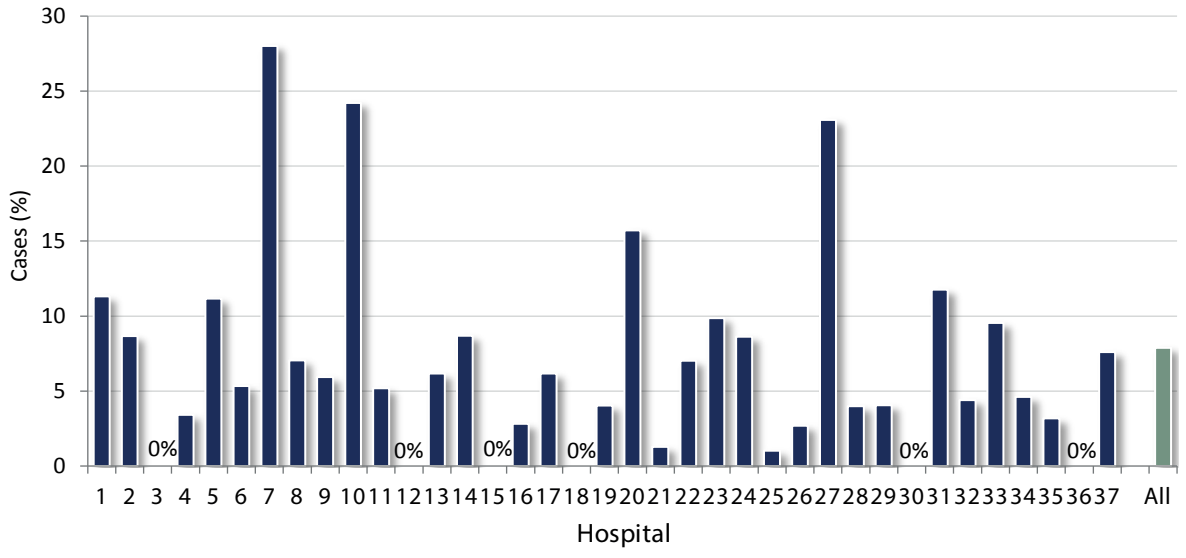
Sector-specific distribution of the key clinical appropriateness criteria among non-ACS patients is presented in Figure 9. The proportion of cases that met at least two of the predefined clinical benchmarks was similar across the public and private sectors. Looking at trends over time, there were fewer patients in the private sector with none or only one clinical factor compared with the previous year (8.2% in 2025 vs 8.7% in 2024), whereas there was an increase observed in the public sector (7.4% in 2025 vs 5.7% in 2024).

Figure 9: Key clinical factors in non-ACS patients by hospital sector



The hospital-level distribution of non-ACS cases meeting only one or none of the specified clinical criteria is illustrated in Figure 10. The observed range across institutions was 0% to 28%, consistent with previous reports' findings. In total, 462 cases were identified in which only one or no clinical factor was documented. Two-thirds of these cases were managed in the private sector.

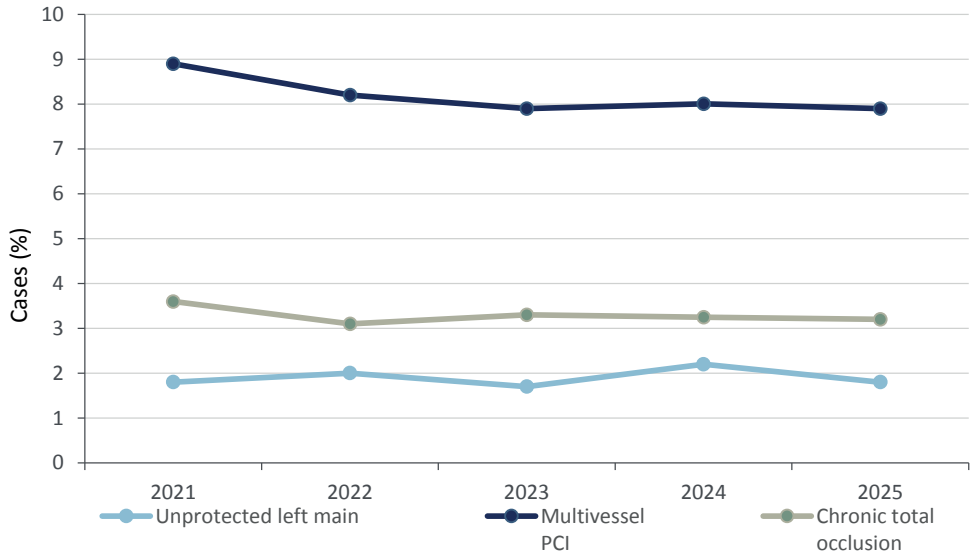
Figure 10: Proportion of non-ACS cases with 0-1 key clinical factor for PCI by hospital



Lesion and Clinical Subsets

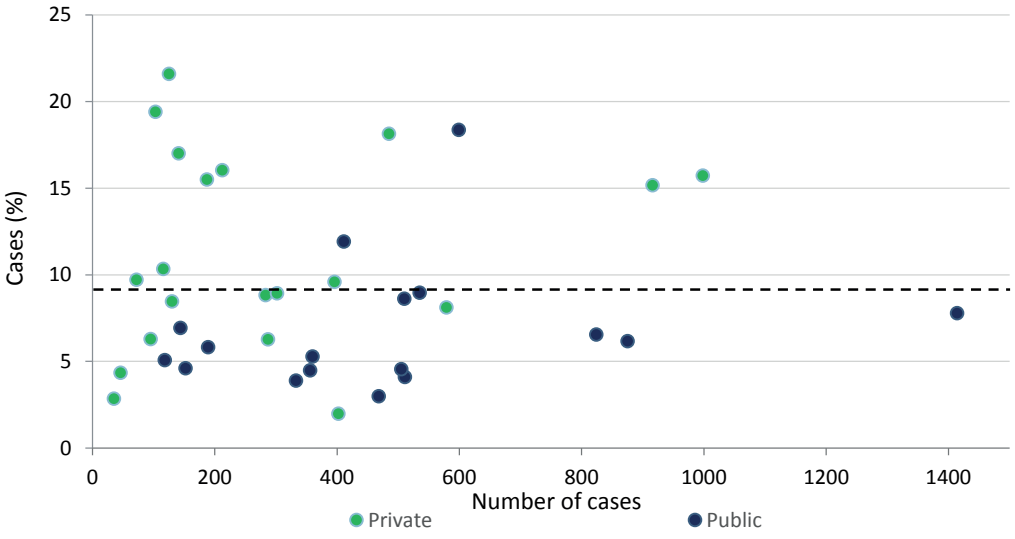
Temporal patterns in the management of selected lesion subsets from 2021 to 2025 are summarised in Figure 11. In 2025, the incidence of PCI involving unprotected left main (ULM) disease, chronic total occlusions (CTO), and multivessel intervention remained largely unchanged compared with preceding years.

Figure 11: Comparative trends in PCI for selected lesion subsets: 2021 - 2025



The use of balloon angioplasty (POBA) and drug-coated balloons (DCB) for the treatment of in-stent restenosis (ISR) remained similar to previous years, at 53.5% and 44.2%, respectively. Hospital-level utilisation of DCB is illustrated in Figure 12, demonstrating considerable variability, with rates ranging from 2.0% to 21.6%. Overall, DCB usage accounted for 9.3% of all cases, with the majority (73%) being used for the treatment of de novo lesions.

Figure 12: Drug-coated balloon (DCB) use by hospital volume and hospital sector



The proportion of patients undergoing PCI in the setting of cardiogenic shock and/or out-of-hospital cardiac arrest (OHCA) over the past 5 years is shown in Table 8. The frequency of these clinically high-risk presentations has remained relatively stable.

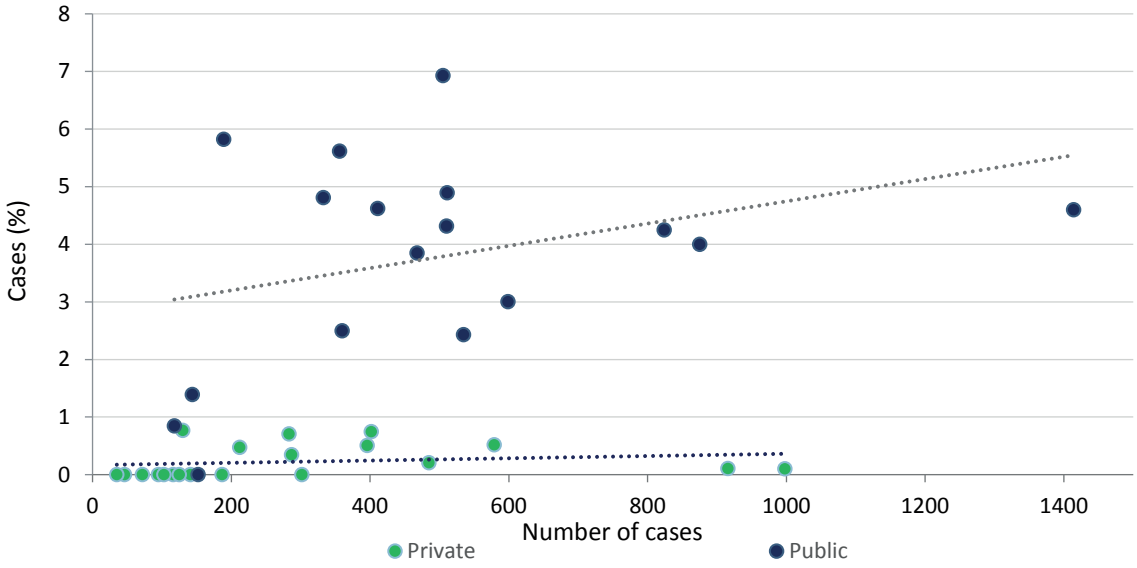
In 2025, the vast majority of these critically unwell patients (95.7%) were managed within the public hospital system, representing 3.3% of total public sector PCI activity. In contrast, high-acuity presentations comprised only 0.2% of overall PCI volume in the private sector.

Table 8: Rates of cardiogenic shock and/or intubated OHCA: 2021 - 2025

Presentation type	2021 (N=12,478)	2022 (N=11,651)	2023 (N=12,564)	2024 (N=13,066)	2025 (N=14,214)
	N (%)	N (%)	N (%)	N (%)	N (%)
Cardiogenic shock	246 (2.0)	305 (2.6)	277 (2.2)	303 (2.3)	282 (2.0)
Intubated OHCA	138 (1.1)	155 (1.3)	134 (1.1)	159 (1.2)	180 (1.3)
Shock and/or intubated OHCA	300 (2.4)	356 (3.1)	328 (2.6)	365 (2.8)	360 (2.5)

Figure 13 illustrates the proportion of hospital PCI activity attributable to cases complicated by cardiogenic shock and/or intubated out-of-hospital cardiac arrest (OHCA), stratified by hospital sector. In 2025, the number of hospitals in which these high-acuity presentations comprised more than 3% of total PCI volume declined to 11, compared with 13 in 2024. All these hospitals were in the public sector. At one public hospital, critically ill presentations represented nearly 7% of their total PCI activity, highlighting that some sites appear to act as major referral centres for complex and high-risk cases.

Figure 13: Cardiogenic shock and/or intubated OHCA cases by hospital volume and hospital sector



In contrast, 11 hospitals- comprising 2 public and 9 private centres- did not treat any cases of cardiogenic shock or intubated OHCA during the reporting period. Collectively, these findings demonstrate a concentration of advanced case management within a limited number of centres, predominantly within the public sector.

Coronary Device Use

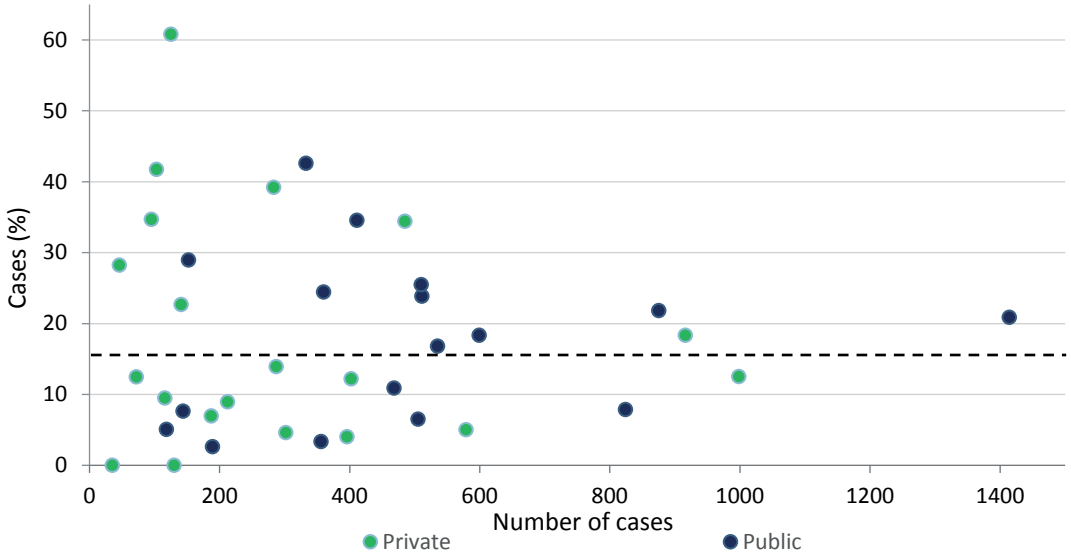
In 2025, stent implantation was undertaken in 88.7% of PCI procedures, while 8.9% of cases were managed with balloon angioplasty alone. Sector-specific utilisation of adjunctive technologies are detailed in Table 9.

Table 9: Adjunctive device use by hospital sector

Adjunctive device type	All sites (N=14,214)	Public (n=8,304)	Private (n=5,910)
	N (%)	N (%)	N (%)
Intravascular ultrasound	1,998 (14.1)	1,205 (14.5)	793 (13.4)
Optical coherence tomography	517 (3.6)	338 (4.1)	179 (3.0)
Thrombus aspiration device	260 (1.8)	247 (3.0)	13 (0.2)
Rotational atherectomy	357 (2.5)	120 (1.4)	237 (4.0)
Pressure wire	815 (5.7)	320 (3.9)	495 (8.4)
Intravascular lithotripsy	302 (5.3)	154 (4.6)	148 (6.4)
IABP	27 (0.2)	23 (0.3)	4 (0.1)
ECMO	25 (0.2)	25 (0.3)	0 (0.0)
Impella	16 (0.1)	16 (0.2)	0 (0.0)

Overall, intravascular ultrasound (IVUS) or optical coherence tomography (OCT) were employed more frequently in the public sector. The overall rate of IVUS or OCT utilisation across the entire case cohort was 17.6%, ranging from 0% to 60.8% (Figure 14).

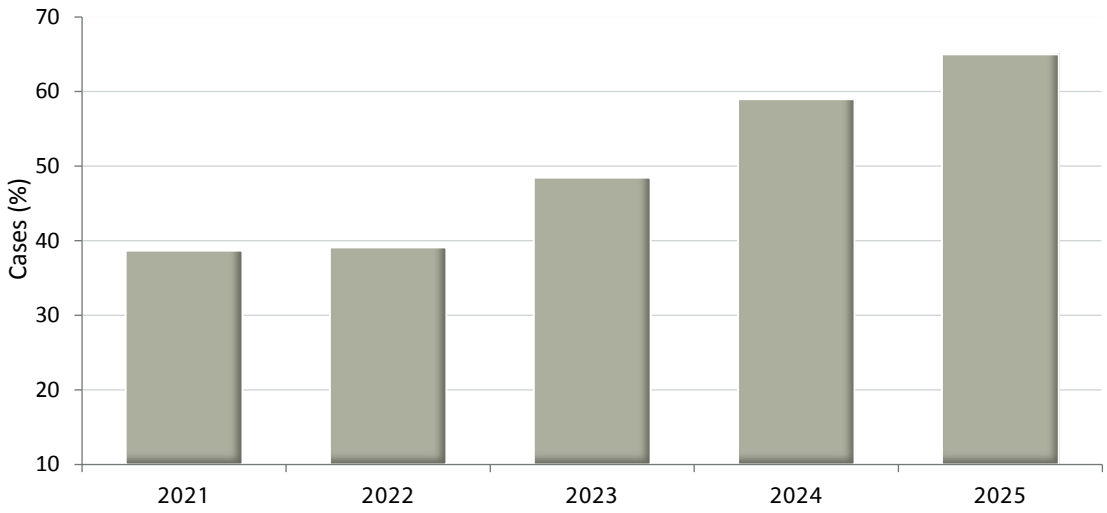
Figure 14: IVUS/OCT use by hospital volume and hospital sector

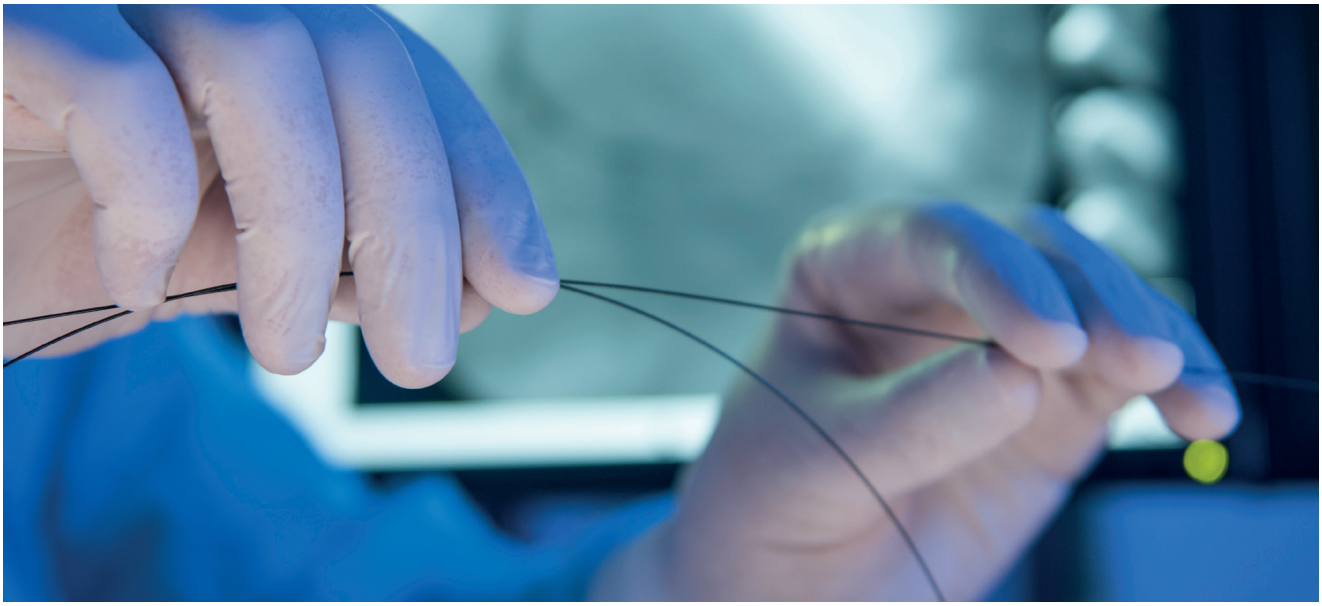


Established mechanical circulatory support devices, including intra-aortic balloon pumps, extracorporeal membrane oxygenation (ECMO) and left ventricular assist devices (LVAD) were utilised infrequently in a limited number of hospital sites. On the other hand, the Impella device is an emerging technology that is gradually being introduced to hospitals around Victoria. It has the advantage of being a percutaneously inserted left ventricular support and unloading device that can be inserted via the femoral artery in the cardiac Cath Lab. In 2025, Impella was used in 3 public hospital sites and it is likely that its uptake will increase significantly in coming years.

In 2024, the Medical Benefits Scheme (MBS) introduced reimbursement for IVUS as an adjunctive modality in the private sector. This policy change was associated with a rise in IVUS use in private hospitals, increasing from 5.6% of cases in 2023 to 13.4% in 2025. Interestingly, a comparable increase was also observed in the public sector, even though it did not specifically benefit from the change to MBS funding (public hospital IVUS utilisation 6.5% in 2023 and 14.5% in 2025).

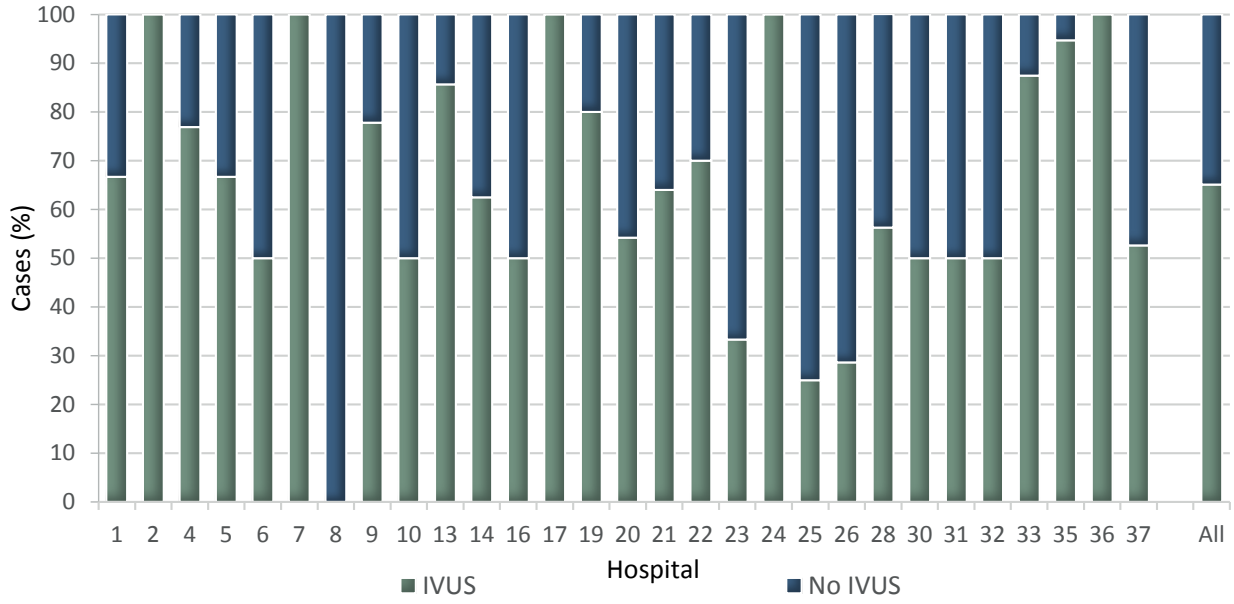
Figure 15: IVUS use in unprotected left main 2021 - 2025





Consistent with current guideline recommendations supporting adjunctive imaging for left main PCI, IVUS was utilised in 65.1% of unprotected left main (ULM) PCI procedures- a 6.0% increase compared with the previous year. Five-year trends in IVUS use for ULM PCI are presented in Figure 15, with notable inter-hospital variability demonstrated in Figure 16.

Figure 16: Rate of IVUS use in unprotected left main by hospital



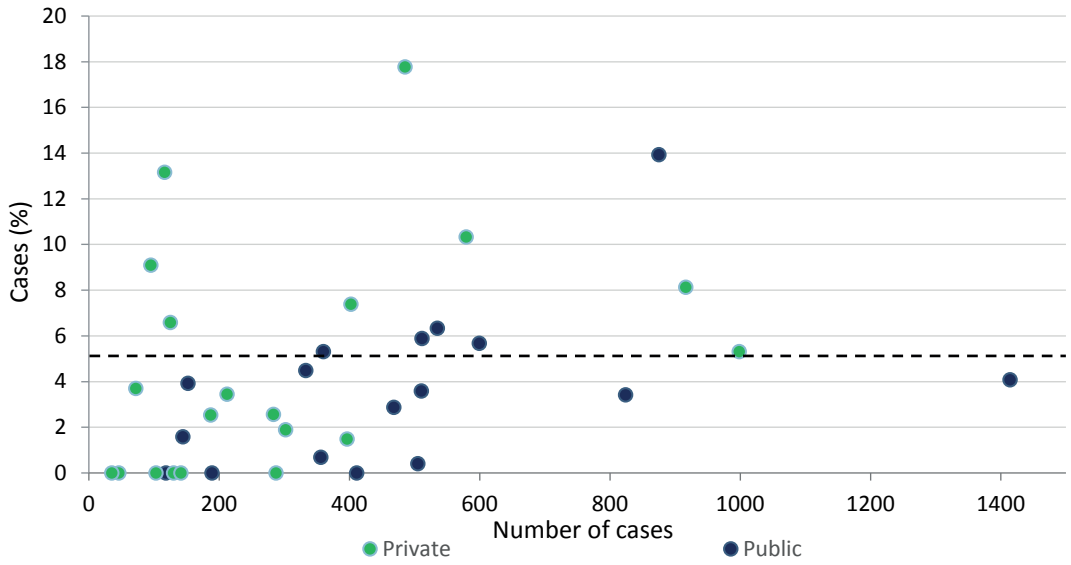
Hospital	1	2	4	5	6	7	8	9	10	13	14	16	17	19	20	21	22	23	24	25	26	28	30	31	32	33	35	36	37	All
Case N	3	4	13	6	2	1	1	18	6	7	24	4	2	5	24	25	20	3	3	4	14	16	2	2	4	8	19	2	19	**261**

Hospitals 3, 11, 12, 15, 18, 27, 29, & 34 had no ULM cases.

Use of thrombus aspiration devices and rotational atherectomy remained infrequent and was broadly consistent with rates observed in previous years. Glycoprotein IIb/IIIa receptor inhibitors were used predominantly in the context of acute STEMI, where they were administered in 17% of presentations.

Coronary intravascular lithotripsy (IVL) for calcium modification of coronary lesions has grown steadily over the past three years, almost doubling in 2025 (302 cases) compared to 2023 (155 cases). There was considerable variability in use among hospitals, ranging from 0% to 17.8% of cases (Figure 17). IVL utilisation was more frequent in private, despite the absence of specific funding for the technology in that sector and the higher percentage use of IVL was more commonly seen on low and medium volume centres rather than high volume centres shown in Figure 17.

Figure 17: Lithotripsy use by hospital volume and hospital sector



Arterial access

In 2025, radial artery access was utilised in 81.8% of all PCI procedures, representing a modest year-on-year increase of 1.6%. This finding extends the sustained upward trajectory observed since 2018, when radial utilisation was 66%. As in previous reports, public hospitals demonstrated higher rates of radial access (83.6%) compared with private institutions (79.2%). Radial access remained more frequently employed in male patients (83.4%) than in female patients (77%), consistent with historical trends.

Among patients presenting with ST-elevation myocardial infarction (STEMI), radial access was adopted in 85.2% of cases, an increase of 1.3% compared to the previous year. Considerable variation was evident at the hospital level, with utilisation ranging from 65.7% to 97.1%. Notably, 85.7% of hospitals achieved radial access in ≥75% of acute STEMI cases, a rate comparable to the previous year.

PCI for STEMI

A total of 2,614 patients underwent PCI for ST-elevation myocardial infarction (STEMI). The majority of these presentations (92.1%) were managed within the public sector. Primary PCI accounted for 76.8% of STEMI interventions. Detailed procedural subcategories for STEMI management are provided in Table 10.

There was substantial inter-hospital variability in STEMI caseload, with the proportion of PCI undertaken for STEMI ranging from 0% to 45.5% across centres. Overall, 58.5% of STEMI PCI procedures were performed outside routine working hours.

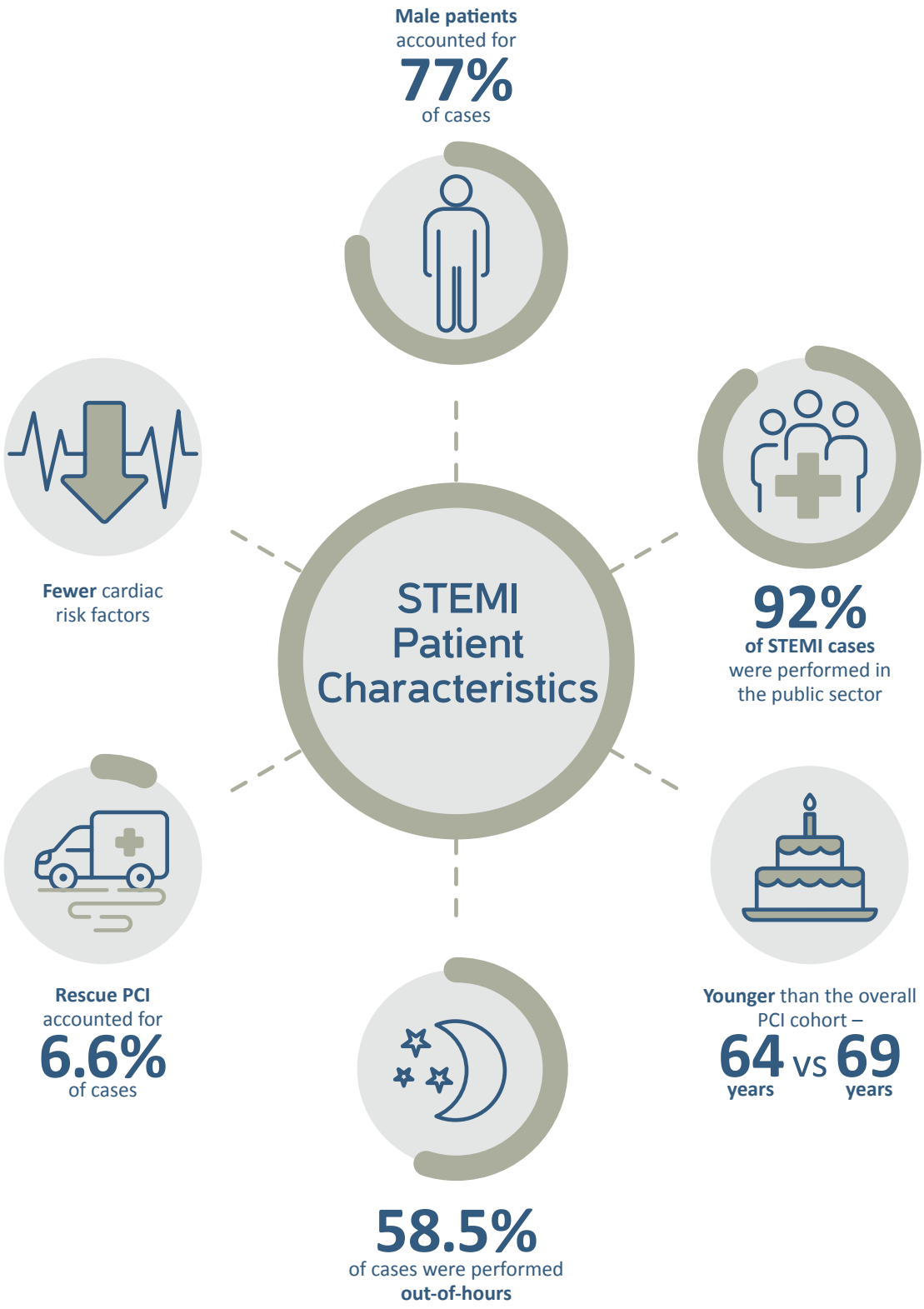
Table 10: Subcategories of patients undergoing PCI for STEMI

PCI for STEMI categories	All sites (N=2,614)	Public (n=2,408)	Private (n=206)
	N (%)	N (%)	N (%)
Primary PCI* (<12 hrs, no thrombolysis)	2,008 (76.8)	1,830 (76.0)	178 (86.4)
PCI for STEMI 12-24 hours (no thrombolysis)	127 (4.9)	120 (5.0)	7 (3.4)
Pharmaco-invasive PCI (<24 hrs, previous thrombolysis, stable)	100 (3.8)	97 (4.0)	3 (1.5)
Rescue PCI (<24 hrs, previous thrombolysis, unstable)	173 (6.6)	170 (7.1)	3 (1.5)
PCI for STEMI 1-7 days no prior lysis	147 (5.6)	136 (5.6)	11 (5.3)
PCI for STEMI 1-7 days following lysis	59 (2.3)	55 (2.3)	4 (1.9)

Patients presenting with STEMI continued to exhibit a clinical profile distinct from the overall PCI population. The mean age of STEMI patients was 64.3 ± 12.5 years, younger than the non-STEMI cohort (68.7 ± 11.4 years). STEMI patients demonstrated a lower prevalence of several established cardiovascular risk factors, including diabetes (23.3% vs 28.5%), peripheral vascular disease (2.2% vs 3.5%), prior stroke (3.1% vs 3.8%), hypertension (52.1% vs 69.1%), and chronic lung disease (9.5% vs 13.7%). A history of prior revascularisation was less frequent among STEMI presentations. Rates of previous PCI and coronary artery bypass grafting (CABG) were 15.3% and 1.9%, respectively, compared with 38.3% and 5.9% in the remainder of the cohort. However, STEMI patients were more likely to be current smokers (33.8% vs 13.4%).

Notable differences in demographic and clinical profiles were observed between STEMI patients treated in the public and private sectors. On average, patients managed in the private sector were older (69.1 ± 12.5 years) than those treated in public hospitals (63.9 ± 12.4 years). The prevalence of diabetes was lower in the private sector (22.3% vs 23.3%), whereas prior revascularisation was more common, with higher rates of previous PCI (30.1% vs 14%) and CABG (3.4% vs 1.7%). Private sector STEMI patients demonstrated higher rates of PVD (3.9% vs 2%), hypertension (61.7% vs 51.2%) and chronic lung disease (10.2% vs 9.5%) compared with those treated publicly. In contrast, STEMI patients treated in the private sector were less likely to be current smokers (7.8% vs 35.9%). Key demographic features and management patterns within the STEMI cohort are summarised in Figure 18.

Figure 18: STEMI patient characteristics



Time Delays to Treatment

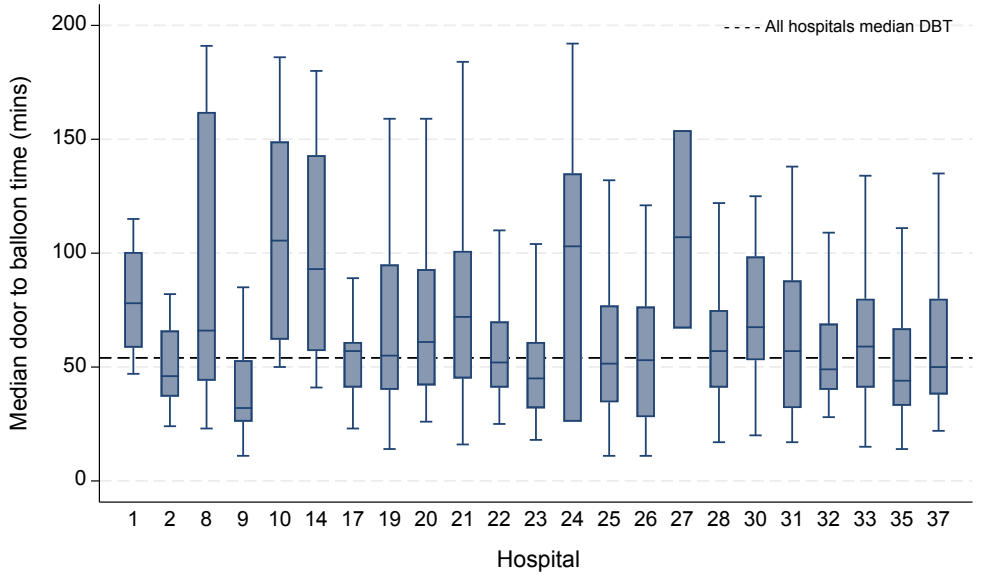
Door-to-balloon time (DBT) remains a critical performance indicator in the management of patients presenting with STEMI and serves as an established benchmark of institutional quality of care. Encouragingly, there was a 4-minute improvement in the overall median DBT of 54 minutes in 2025. As a result, there was also a marked increase in the proportion of patients receiving PCI within ≤60 minutes of hospital arrival (Figure 19, Table 11).

Table 11: Door-to-balloon times for primary PCI cases: 2020 - 2025

Door-to-balloon time	2020 (N=1,623)	2021 (N=1,565)	2022 (N=1,469)	2023 (N=1,532)	2024 (N=1,552)	2025 (N=1,654)
Median – mins (IQR)	62 (43, 91)	61 (43, 92)	62 (43, 90)	61 (42, 84)	58 (41, 83)	54 (39, 78)
Proportion of cases ≤60mins (%)	48.4	49.3	47.6	49.3	53.5	57.9

Primary PCI for STEMI presentations excluding all inter-hospital transfers and patients with STEMI onset whilst a current in-patient. 4 hospitals excluded n<3.

Figure 19: Door-to-balloon times for primary PCI cases by hospital

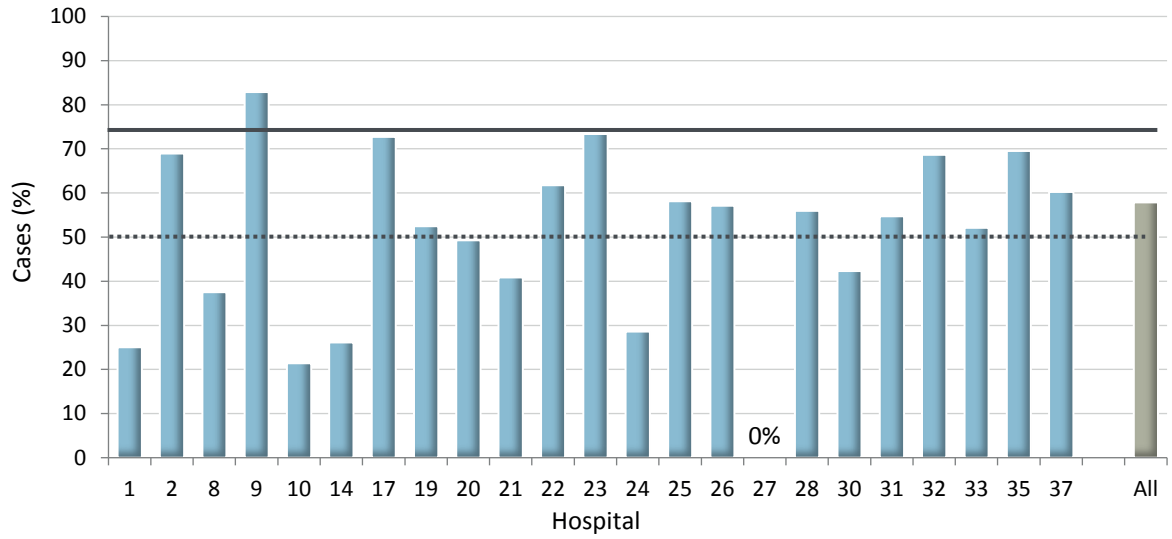


Hospital	1	2	8	9	10	14	17	19	20	21	22	23	24	25	26	27	28	30	31	32	33	35	37	All
Case N	4	29	8	35	14	23	22	103	69	93	251	109	7	136	28	3	193	52	64	102	121	105	83	1,654

Primary PCI for STEMI presentations excluding all inter-hospital transfers and patients with STEMI onset whilst a current in-patient. Hospitals 3, 4, 11 & 36 had 1 Primary PCI cases and have been excluded. Hospitals 1 & 27 had low primary PCI cases ≤5. Hospitals 5, 6, 7, 12, 13, 15, 16, 18, 29 & 34 had no primary PCI cases.

Evaluation of door-to-balloon time (DBT) performance demonstrated marked inter-hospital variability among centres undertaking primary PCI (Figure 20). Only one institution achieved the recommended benchmark of DBT ≤60 minutes in at least 75% of cases. When the performance threshold was broadened to include hospitals treating ≥50% of patients within 60 minutes, 14 of 23 centres met this criterion. Notably, one low-volume hospital did not meet the ≤60-minute DBT metric for any of their patients, and a second only managed to do so in 25% of its cases. These findings highlight the need to support lower-volume centres in optimising systems of care and adherence to STEMI management guidelines. In a recent survey examining hospital performance in relation to STEMI treatment delays, the registry identified several factors commonly observed in high-performing hospitals that could potentially be implemented by other institutions seeking to continuously improve performance and patient outcomes (Figure 21).

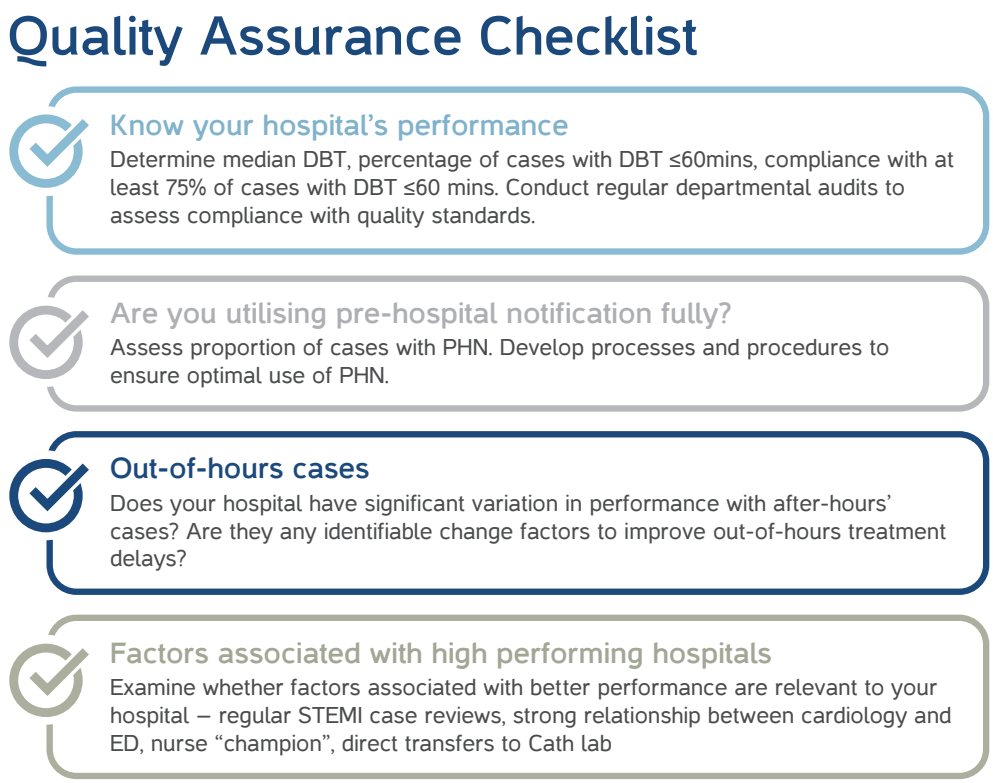
Figure 20: Proportion of primary PCI cases with door-to-balloon time ≤60 minutes by hospital



Hospital	1	2	8	9	10	14	17	19	20	21	22	23	24	25	26	27	28	30	31	32	33	35	37	All
Case N	4	29	8	35	14	23	22	103	69	93	251	109	7	136	28	3	193	52	64	102	121	105	83	1,654

Primary PCI for STEMI presentations excluding all inter-hospital transfers and patients with STEMI onset whilst a current in-patient. Hospitals 3, 4, 11 & 36 had primary PCI <3 cases and have been excluded. Hospitals 5, 6, 7, 12, 13, 15, 16, 18, 29 & 34 had no primary PCI cases.

Figure 21: VCOR In-depth STEMI review - Quality assurance checklist



A total of 201 primary PCI cases presented with cardiogenic shock and/or intubated out-of-hospital cardiac arrest, of whom 51.7% achieved a DBT ≤60 minutes, a 14% improvement compared to previous year. When these high-acuity and clinically complex presentations were excluded from the analysis, performance improved substantially, with 58.7% of remaining cases receiving treatment within ≤60 minutes.

Pre-hospital notification (PHN)

Pre-hospital notification (PHN) was provided in 77.1% of primary PCI presentations (Table 12). Consistent with prior observations, utilisation of PHN was associated with shorter median door-to-balloon times and a higher proportion of patients receiving reperfusion within ≤60 minutes. Among cases presenting without PHN, only 29.8% achieved a DBT ≤60 minutes.

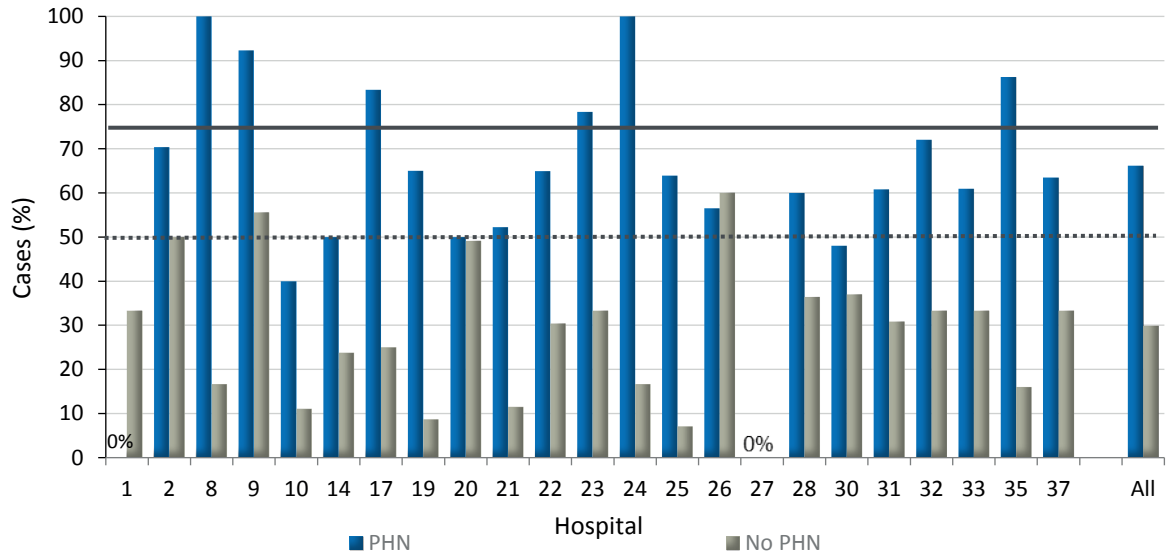
Table 12: Door-to-balloon times for Primary PCI cases by pre-hospital notification status

Door-to-balloon time	Primary PCI*	Primary PCI* (PHN†)	Primary PCI* (no-PHN†)
	(N=1,654)	(n=1,276)	(n=378)
Median – mins (IQR)	54 (38, 78)	49 (37 ,68)	84 (56, 120)
Proportion of cases ≤60mins (%)	57.9	66.1	29.8

**Primary PCI for STEMI presentations excluding all inter-hospital transfers and patients with STEMI onset whilst a current in-patient.*
†Pre-hospital notification (PHN).

Figure 22 demonstrates the influence of pre-hospital notification on hospital-level compliance with a door-to-balloon time (DBT) target of ≤60 minutes. When applying a compliance threshold of ≥50% of cases treated within this timeframe, only three hospitals achieved this benchmark without PHN, highlighting the critical contribution of early notification systems to timely reperfusion performance.

Figure 22: Proportion of primary PCI cases with door-to-balloon time ≤ 60 minutes - pre-hospital notification vs no pre hospital notification



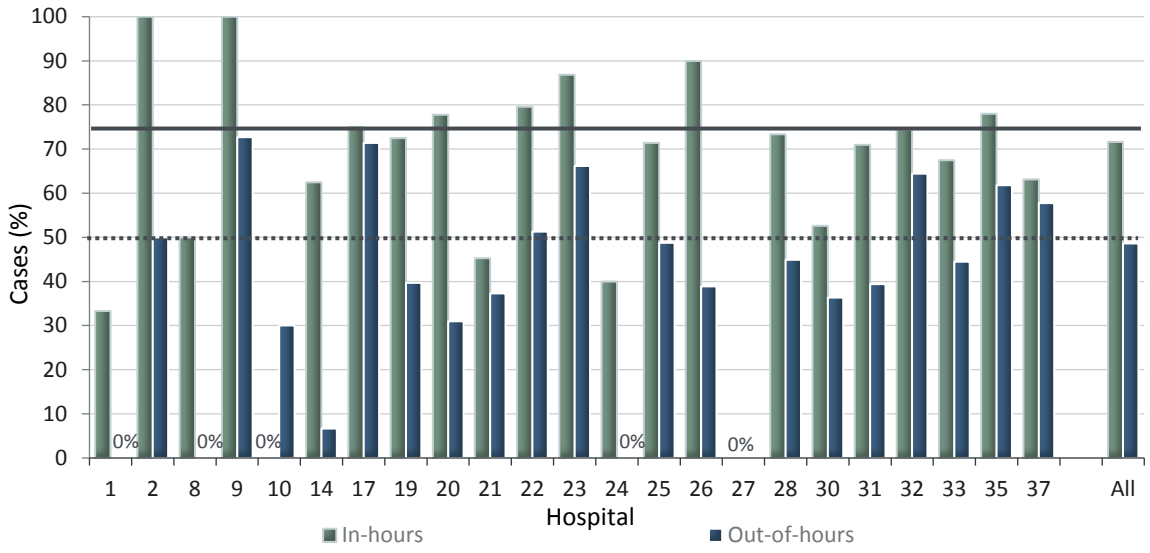
Site	1	2	8	9	10	14	17	19	20	21	22	23	24	25	26	27	28	30	31	32	33	35	37	All
Case N	1	27	2	26	5	2	18	80	12	67	228	97	1	122	23	0	160	25	51	93	82	80	74	1,276
Site	1	2	8	9	10	14	17	19	20	21	22	23	24	25	26	27	28	30	31	32	33	35	37	All
Case N	3	2	6	9	9	21	4	23	57	26	23	12	6	14	5	3	33	27	13	9	39	25	9	378

Primary PCI for STEMI presentations excluding all inter-hospital transfers and patients with STEMI onset whilst a current in-patient. Hospitals 3, 4, 11 & 36 have primary PCI<3 cases and have been excluded. Hospitals 5, 6, 7, 12, 13, 15, 16, 18, 29 & 34 had no primary PCI cases.

In-hours versus out-of-hours presentation

In 2025, 59.9% of all primary PCI procedures were undertaken outside normal working hours. However, there was marked inter-hospital variability in the proportion of out-of-hours activity, ranging from 0% to 71.4%. Analysis stratified by time of presentation demonstrated superior performance during normal working hours, with in-hours procedures more frequently achieving the recommended door-to-balloon target of ≤60 minutes. Specifically, 18 of 23 hospitals met this benchmark for in-hours cases. In contrast, only 8 hospitals achieved the same standard during out-of-hours periods (Figure 23), highlighting the ongoing challenge to delivering timely reperfusion therapy outside regular working hours.

Figure 23: Proportion of primary PCI cases with door-to-balloon time ≤60 minutes - in-hours vs out-of hours presentation



Site	1	2	8	9	10	14	17	19	20	21	22	23	24	25	26	27	28	30	31	32	33	35	37	All
Case N	3	11	6	13	4	8	9	40	27	42	93	38	5	56	10	3	75	19	31	43	40	50	38	663
Site	1	2	8	9	10	14	17	19	20	21	22	23	24	25	26	27	28	30	31	32	33	35	37	All
Case N	1	18	2	22	10	15	14	63	42	51	158	71	2	80	18	0	118	33	33	59	81	55	45	991

Primary PCI for STEMI presentations excluding all inter-hospital transfers and patients with STEMI onset whilst a current in-patient. Hospital 27 had NIL out-of-hours cases. Hospitals 3, 4, 11 & 36 have primary PCI<3 cases and have been excluded. Hospitals 5, 6, 7, 12, 13, 15, 16, 18, 29 & 34 had no primary PCI cases.
In-hours: 8.00am - 6.00pm (Mon-Fri excluding public holidays). Out-of-hours: 6.00pm - 8.00am (Mon-Fri, public holidays and weekends).

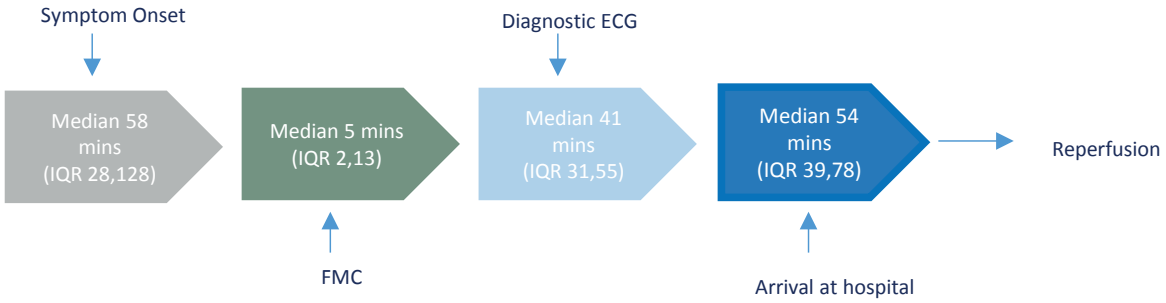
Times from symptom onset to first medical contact, diagnostic ECG and reperfusion

A key component to minimising treatment delays in STEMI is the prompt identification of the condition. In this regard, the interval from symptom onset to first medical contact (FMC)—representing patient recognition and initial engagement with healthcare services—is a major contributor to total ischaemic time. In 2025, the median time from symptom onset to FMC was 58 minutes (IQR: 28, 128) (Figure 24). This interval is influenced by patient factors, including symptom awareness and health literacy, as well as system-level influences such as emergency medical service responsiveness.

System delay, defined as the period from FMC to reperfusion, incorporates several key time components including- time from FMC to diagnostic electrocardiogram (ECG), time from ECG to arrival at a PCI-capable centre, and door-to-balloon time (arrival to device activation). Figure 24 further depicts total ischaemic time, integrating both patient and system delays to reflect the overall time interval from symptom onset till coronary reperfusion.

Current Australian guidelines for the management of acute coronary syndromes recommend that STEMI patients presenting within 12 hours of symptom onset undergo primary PCI within 120 minutes of FMC. Reassuringly, in 2025, there was a reduction in median time intervals across the entire symptom-to-reperfusion pathway, suggesting improvements in system efficiency and heightened public responsiveness to STEMI symptoms.

Figure 24: Median times from symptom onset to reperfusion



The individual components of total ischaemic time, presented overall and stratified by hospital sector, are summarised in Table 13. The median interval from first medical contact (FMC) to balloon inflation was 99 minutes. Overall, 69.2% of primary PCI procedures were performed within ≤120 minutes of FMC, with hospital-level performance ranging from 33.3% to 86.4%.

The median time from FMC to hospital arrival (door) was 48 minutes (IQR: 37, 64). In total, 90.7% of primary PCI cases reached a PCI-capable facility within ≤90 minutes of FMC, with institutional performance ranging from 70% to 100%.

Table 13: Median times from symptom onset to reperfusion - public/private and PHN and No PHN

	All	Public	Private	PHN	No PHN
All Primary PCI*	(N=1,625)	(n=1,486)	(n=139)	(n=1,255)	(n=370)
Median Symptom onset to FMC- mins (IQR)	58 (28,128)	56 (26,126)	72 (38,141)	50 (25,106)	90 (42,192)
Median FMC to Diagnostic ECG- mins (IQR)	5 (2,13)	5 (2,13)	5 (2,10)	4 (2,10)	9 (3,24)
Median Diagnostic ECG to door- mins (IQR)	41 (31,55)	41 (32,55)	43 (30,58)	42 (32,56)	39 (26,51)
Median Diagnostic ECG to Balloon/Device time- mins (IQR)	88 (70,114)	89 (71,114)	85 (65,106)	90 (73,114)	83 (61,108)
Median FMC to Balloon/Device time - mins (IQR)	99 (80,128)	99 (80,129)	91 (74,121)	98 (81,125)	100 (77,145)

**Primary PCI for STEMI presentations excluding all inter-hospital transfers and patients with STEMI onset whilst a current in-patient.*

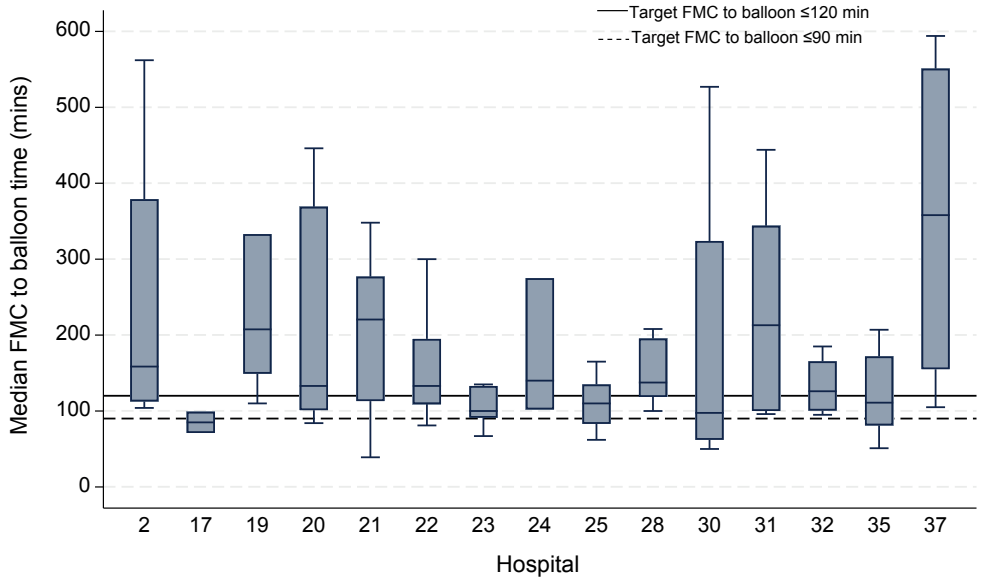
Time delays for patients presenting with acute STEMI to non-PCI capable centres

For patients presenting with acute STEMI to a non-PCI-capable facility, Australian clinical guidelines endorse primary PCI as the preferred reperfusion strategy, provided that transfer and reperfusion can be achieved within 120 minutes of first medical contact (FMC). This recommended interval incorporates delays inherent to interhospital transfer. Where timely PCI cannot be delivered, thrombolytic therapy is advised.

In 2025, 219 patients presented to a non-PCI-capable hospital within 12 hours of symptom onset. The median FMC-to-reperfusion time for this cohort was 132 minutes (Figure 25). Only 5 hospitals achieved a median FMC-to-reperfusion time of ≤120 minutes, and only one centre met the more stringent ≤90-minute benchmark. Implementation of pre-hospital notification (PHN) was associated with a reduction of three minutes. Metropolitan patients experienced shorter delays compared with those from non-metropolitan regions (median 123 minutes vs 178 minutes).

Despite incremental improvements following the PHN initiative, the majority of transferred patients continued to exhibit reperfusion times exceeding guideline-recommended targets. Refinement of prehospital triage protocols, transport coordination, and interhospital transfer pathways will hopefully further optimise outcomes in this high-risk population.

Figure 25: FMC-to-balloon times for interhospital transferred primary PCI cases by hospital



Hospitals 4, & 8 had n<2 primary PCI cases and were excluded from analysis.

Table 14: FMC-to-balloon times for primary PCI patients presenting to non-PCI centres in 2025

First medical contact to Balloon/Device time	All	PHN	No-PHN	Metro	Non-Metro	Public	Private
	(N=219)	(n=131)	(n=88)	(n=154)	(n=62)	(n=211)	(n=8)
Median – mins (IQR)	132 (104,207)	130 (102,201)	133 (107,207)	123 (102,167)	178 (111,336)	133 (104,207)	113 (78,237)
Proportion of cases ≤90 mins (%)	11.9	13.7	9.0	12.3	11.3	11.4	25.0
Proportion of cases ≤120 mins (%)	40.6	42.0	38.6	46.1	27.4	40.3	50.0

Outcomes

Lesion and procedure success rates

Procedural success remains a cornerstone indicator of PCI quality and effectiveness. Defined as successful treatment of all intended target lesions without major in-hospital complications. In 2025, the overall procedural success rate was 92.2%, similar to previous years and reflective of consistently high performance. Outcomes were comparable across public and private sectors, with success rates of 90.9% in the public system and 94.1% in the private sector. At an institutional level, success rates ranged from 81.9% to 98.1%.

Sex-specific analyses demonstrated similar outcomes, with procedural success achieved in 92.3% of males and 91.9% of females. Notably, the disparity between sexes narrowed further in 2025, and overall success rates for both groups remained high to date.

Reduced procedural success was associated with interventions performed outside normal working hours, patients with severely impaired left ventricular function, and procedures involving complex lesion subsets such as chronic total occlusions. Patients presenting with cardiogenic shock or requiring intubation following out-of-hospital cardiac arrest remained the highest-risk cohort, with a procedural success rate of 50.3% in 2025 compared with 55.6% in the preceding year (Table 15).

At a lesion level, success is defined as residual stenosis <10% following stent deployment and <50% following balloon angioplasty. The overall mean lesion-level success rate in 2025 was 94.9%, although inter-hospital variability was present, with rates ranging from 82.6% to 98.1%. Collectively, these findings demonstrate sustained delivery of high-quality PCI care.

Table 15: Comparison of clinical features among successful PCI cases

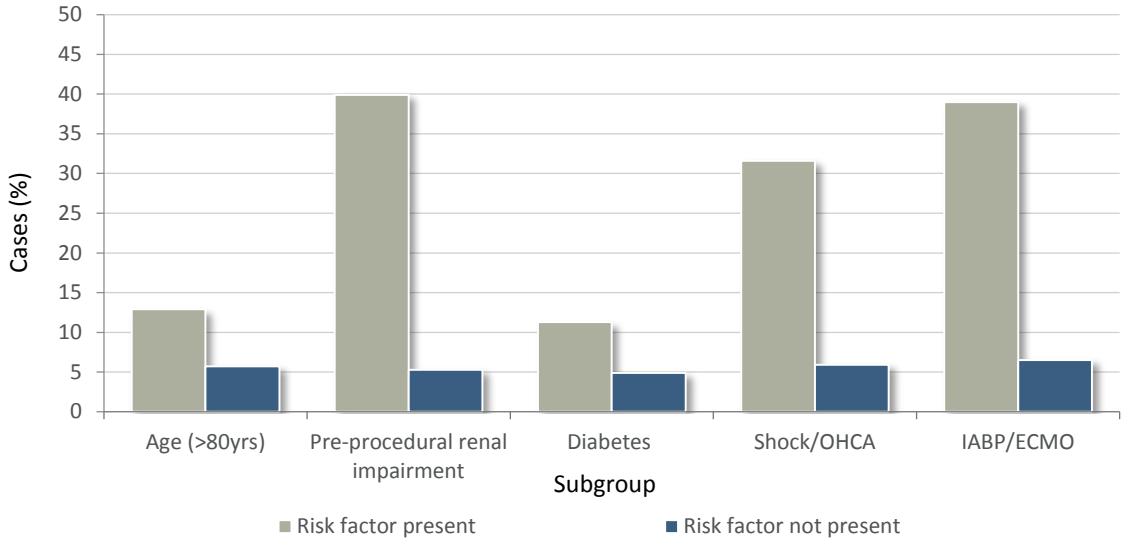
Clinical characteristics	Characteristic present	Characteristic NOT present
	Procedure success (%)	Procedure success (%)
Cerebrovascular Disease	90.3	92.3
Chronic total occlusion	62.7	93.2
Severe LVEF (<35%)	78.5	93.7
Shock and/or intubated OHCA	50.3	93.3
ACC/AHA B2/C lesion	90.0	95.8
Out-of-hours	88.3	93.1

New renal impairment

Post-procedural renal function was evaluated in 8,050 patients, representing 57% of the total cohort. New renal impairment (NRI) occurred in 6.7 % of cases. In keeping with prior observations, the highest incidence of NRI was observed among patients undergoing PCI for ST-elevation myocardial infarction, at 10.4%. This was followed by those treated for non–ST-elevation acute coronary syndromes, with an NRI rate of 6.1%.

Renal outcomes in high-risk subgroups- including individuals with pre-existing significant renal dysfunction and those requiring mechanical circulatory support, are presented in Figure 26. Among patients presenting with cardiogenic shock and/or intubated out-of-hospital cardiac arrest, the incidence of NRI increased from 30.5% in 2024 to 31.6% in 2025.

Figure 26: New renal impairment in selected high-risk subgroups



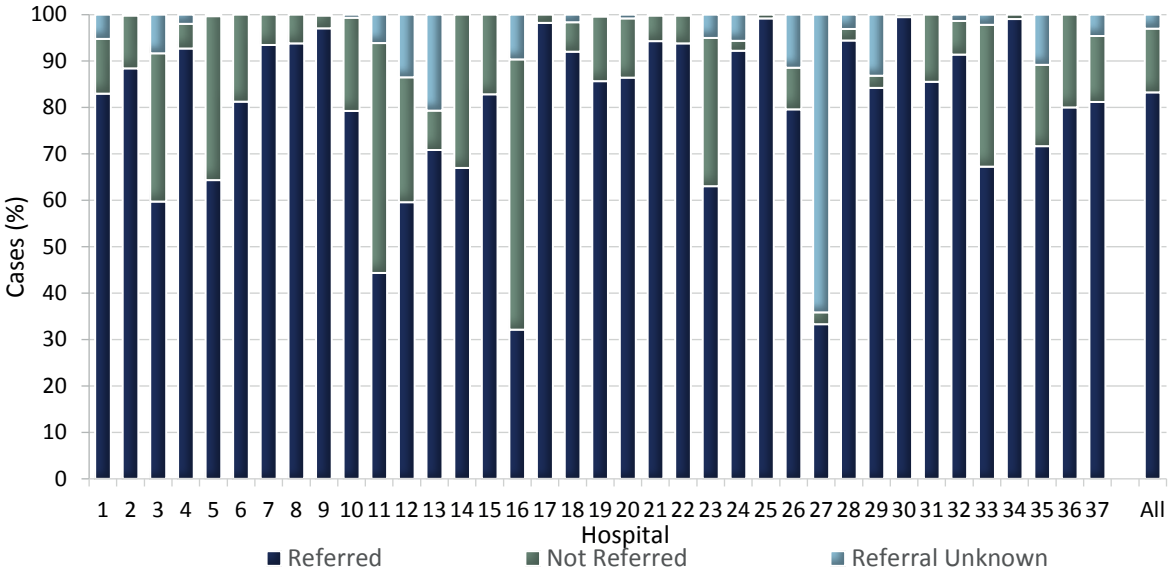
Data available for 8,050 cases.

Referral to cardiac rehabilitation

Australian guidelines strongly recommend routine referral of all patients undergoing PCI to structured cardiac rehabilitation (CR) programs. In 2025, the cardiac rehabilitation referral rate of 83.3% was marginally lower than the rate of 85.1% in the previous year. The proportion of patients not referred was 13.7%, while referral status was documented as "unknown" in 3.0% of cases. Referral practices differed by sector, with higher rates observed in the public system (85.9%) compared with the private sector (79.6%). At the hospital level, substantial variability persisted, with referral rates ranging from 32.1% to 99.4% across participating centres (Figure 27).

Referral was most frequent among patients presenting with acute coronary syndromes (ACS), particularly those treated for STEMI (90%) and NSTE-ACS (85.9%). Among individuals undergoing PCI for non-ACS indications, 79.8% were referred to CR. Although inter-institutional variation remains evident, the overall disparity appeared to be less marked than in previous years, reflecting progressive alignment with guideline-directed secondary prevention strategies.

Figure 27: Referral to cardiac rehabilitation at discharge by hospital



Compliance with guideline-recommended medications at discharge

Guideline-directed pharmacotherapy following PCI includes dual antiplatelet therapy (DAPT) and statins for all suitable patients, with additional consideration of beta blockers (BB) and angiotensin-converting enzyme inhibitors or angiotensin receptor blockers (ACE-I/ARB), particularly in the setting of acute coronary syndromes. Utilisation of these therapies according to clinical presentation is summarised in Table 16.

Overall, prescribing patterns for DAPT, statins, ACE-I/ARB, and BB remained broadly stable compared with prior years. However, a further reduction in beta blocker use was observed among patients presenting with non–ST-elevation acute coronary syndromes (NSTE-ACS), declining from 64.8% in 2024 to 60.8% in 2025. This trend likely reflects recently published trial evidence demonstrating a lack of benefit with beta blocker therapy in post-ACS patients with preserved left ventricular ejection fraction. The lowest rates of beta blocker and ACE-I/ARB prescription were observed in the non-ACS cohort undergoing PCI.

Table 16: Rates of prescription of selected medications at discharge by clinical presentation

	DAPT	Statin	BB	ACE-I/ARB
	%	%	%	%
STEMI	95.0	96.3	78.4	78.0
NSTE-ACS	95.2	94.2	60.8	70.2
Non-ACS	93.6	91.7	48	62.4

A proportion of patients undergoing PCI require concomitant oral anticoagulation (OAC), most commonly with warfarin or a direct oral anticoagulant (DOAC), in addition to antiplatelet therapy. When OAC is combined with a single antiplatelet agent (e.g., aspirin, clopidogrel, or ticagrelor), this is termed "double therapy." The addition of a second antiplatelet agent constitutes "triple therapy," an approach associated with a heightened risk of bleeding complications.

Rates of double and triple therapy at hospital discharge and at 30 days post-discharge, stratified by clinical presentation and patient characteristics, are presented in Table 17. The overall use of double therapy at discharge remained stable compared with the preceding year and continued to represent the more frequently prescribed strategy. Triple therapy was more commonly utilised among patients with non-acute coronary syndromes (non-ACS), consistent with patterns observed in previous reports.

Table 17: Rates of double and triple therapy at discharge and 30-days

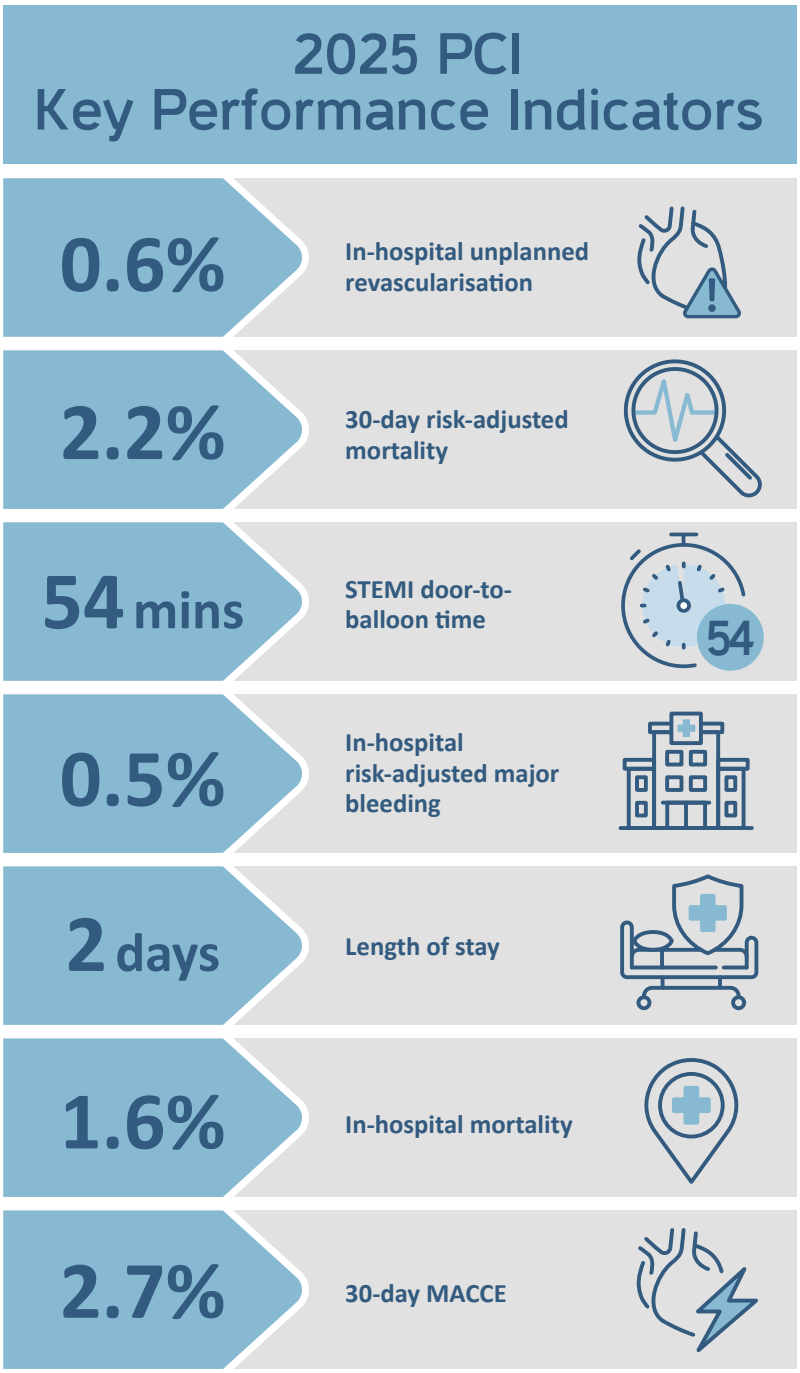
Characteristics	Discharge		30-Day	
	Double Therapy	Triple Therapy	Double Therapy	Triple Therapy
	%	%	%	%
Sex- male	12.9	9.5	12.5	4.6
Sex- female	12.3	8.4	12.2	4.6
	%	%	%	%
Age <60 years	4.6	3.6	5.1	2.2
Age 60-69 years	8.6	6.8	9.2	4.0
Age 70-79 years	17.4	12.7	16.6	5.8
Age >79 years	22.7	15.0	20.7	6.9
	%	%	%	%
STEMI	11.1	8.2	11.2	4.8
NSTE-ACS	11.7	8.7	11.3	3.9
Non-ACS	13.8	9.8	13.4	4.9
	%	%	%	%
Public	11.1	8.7	10.9	4.2
Private	15.0	10.0	14.6	5.2

With respect to comprehensive secondary prevention, 89.2% of patients presenting with ST-elevation myocardial infarction were discharged on at least four of the five guideline-recommended pharmacotherapies—namely aspirin, a second antiplatelet agent, statin, beta blocker, and an ACE inhibitor or ARB. This reflects a modest decline of 1.5% compared with the prior reporting period. Rates of optimal medical therapy were lower among patients with NSTE-ACS and non-ACS presentations, at 81% and 71.7%, respectively.

Key Performance Indicators

The key performance indicators (KPIs) are shown in Figure 28.

Figure 28: VCOR PCI Key Performance Indicators



In-hospital mortality

In 2025, the overall unadjusted in-hospital mortality rate was 1.6%. When cases complicated by cardiogenic shock and/or intubated out-of-hospital cardiac arrest (OHCA) were excluded, the in-hospital mortality rate decreased to 0.7%. Among patients presenting with ST-elevation myocardial infarction, the in-hospital mortality rate was 6.2%. Exclusion of STEMI presentations and cases involving cardiogenic shock and/or intubated OHCA further reduced the mortality rate to 0.3%, reflecting the substantial contribution of these high-acuity subgroups to overall mortality risk. Five-year trends in in-hospital mortality across key patient subgroups are summarised in Table 18.

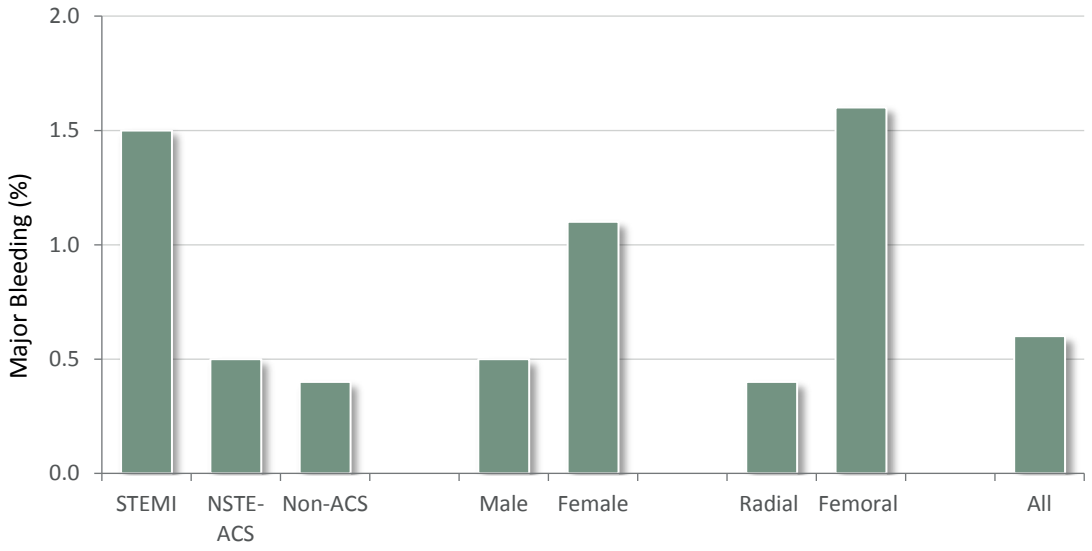
Table 18: Trends in in-hospital mortality rates for selected clinical presentations: 2021 - 2025

Patient category	2021 (N=12,478)	2022 (N=11,651)	2023 (N=12,564)	2024 (N=13,066)	2025 (N=14,214)
	N (%)	N (%)	N (%)	N (%)	N (%)
All PCI patients	180 (1.4)	197 (1.6)	203 (1.6)	196 (1.5)	233 (1.6)
STEMI	118 (4.8)	135 (5.7)	133 (5.4)	144 (6.0)	163 (6.2)
Shock and/or intubated OHCA	113 (37.7)	127 (35.7)	119 (36.3)	105 (28.8)	137 (38.1)
NSTE-ACS	32 (0.9)	37 (1.2)	33 (1.0)	34 (1.0)	36 (0.9)
Non-ACS	30 (0.5)	25 (0.4)	37 (0.5)	18 (0.3)	34 (0.4)

In-hospital major bleeding

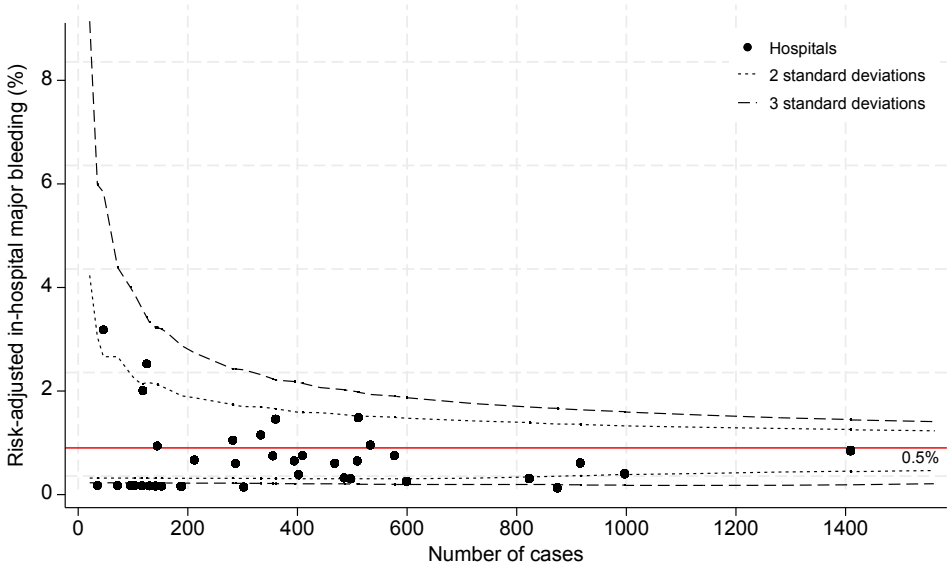
Rates of in-hospital major bleeding across a spectrum of clinical presentations and procedural characteristics are summarised in Figure 29. Lowest bleeding rates were seen in the non-ACS population and in those with radial access PCI. Among patients requiring extracorporeal membrane oxygenation (ECMO), the incidence of major bleeding was 20.8% (n=24). Although the number of patients supported with ECMO in 2025 was comparable to previous years, the frequency of bleeding complications in this high-risk subgroup decreased (26.9% in 2024).

Figure 29: In-hospital major bleeding rates for selected patient groups



Risk-adjusted in-hospital major bleeding rates at an institutional level are shown in Figure 30. Across participating centres, rates ranged from 0% to 3%. No hospitals were identified as an outlier following risk adjustment for in-hospital major bleeding outcomes.

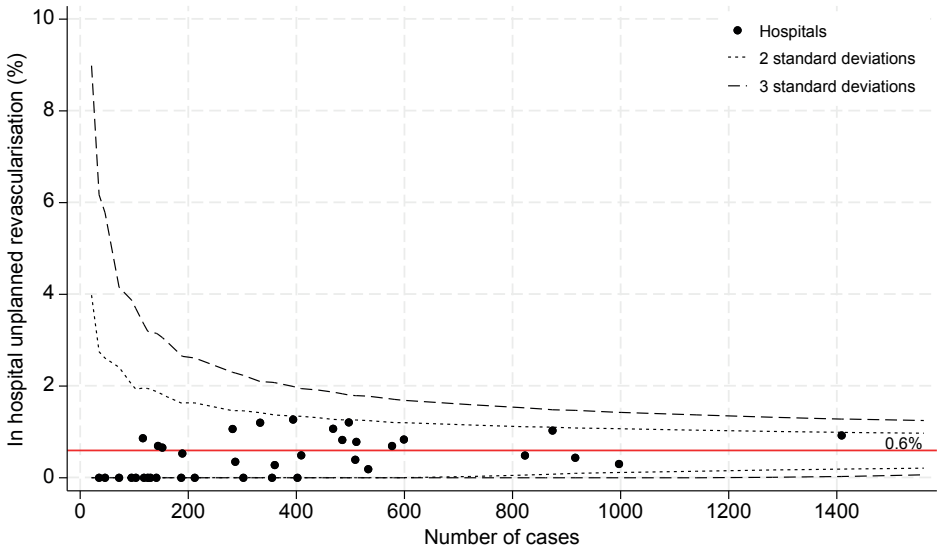
Figure 30: Risk-adjusted in-hospital major bleeding by hospital



In-hospital unplanned revascularisation

Unplanned revascularisation defined as an unexpected, non-scheduled PCI or coronary artery bypass grafting (CABG) procedure following the index intervention, was observed in 0.6% of cases during the 2025 reporting period. Across participating centres, rates ranged from 0% to 1.3%. All participating centres remained within established control limits for this performance indicator, as demonstrated in Figure 31.

Figure 31: In-hospital unplanned revascularisation by hospital



In 2025, a total of 37 unplanned coronary artery bypass graft (CABG) procedures were undertaken following the index PCI (Table 19). Eleven of these cases necessitated inter-hospital transfer to a facility with on-site surgical capability.

Table 19: In-hospital CABG by clinical presentation

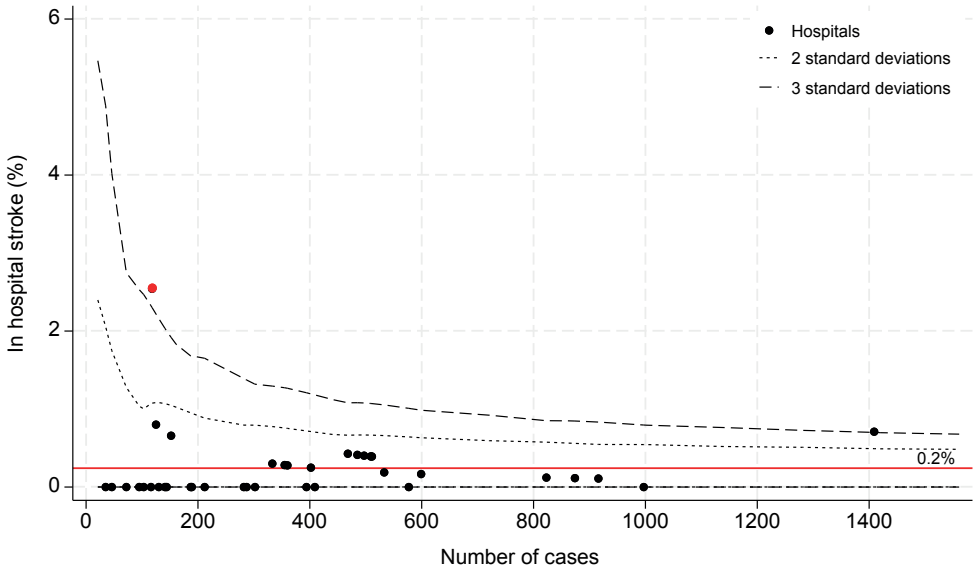
In-hospital CABG	All patients (N=14,214)	Planned CABG (n=54)	Unplanned CABG (n=37)
	N	N (%)	N (%)
Non-ACS	7,772	10 (0.1)	12 (0.2)
NSTE-ACS	3,828	16 (0.4)	4 (0.1)
STEMI	2,614	28 (1.1)	21 (0.8)

Fifty-four patients underwent planned coronary artery bypass grafting (CABG) following PCI, including 28 individuals who initially presented with STEMI. Just over two-fifths of planned CABG cases required inter-hospital transfer. The in-hospital mortality rate among patients undergoing planned CABG was 3.7%. In comparison, those requiring emergency (unplanned) CABG experienced an in-hospital mortality rate of 14.3%, reflecting the increased risk associated with urgent, unplanned surgical revascularisation.

In-hospital stroke

In-hospital stroke was documented in 0.2% of patients, with rates across institutions ranging from 0% to 2.5%. One low-volume hospital was identified with an in-hospital stroke rate greater than 3 standard deviations beyond the mean (Figure 32).

Figure 32: In-hospital stroke by hospital



Outcomes for drug-coated balloons

Drug-coated balloons (DCB) are considered safe and reasonable alternatives to drug-eluting stents (DES) for specific conditions, notably in-stent restenosis (ISR) and small-vessel disease. Overall, the outcomes for patients with DCB were favourable (Table 20).

Table 20: Outcomes for drug-coated balloons

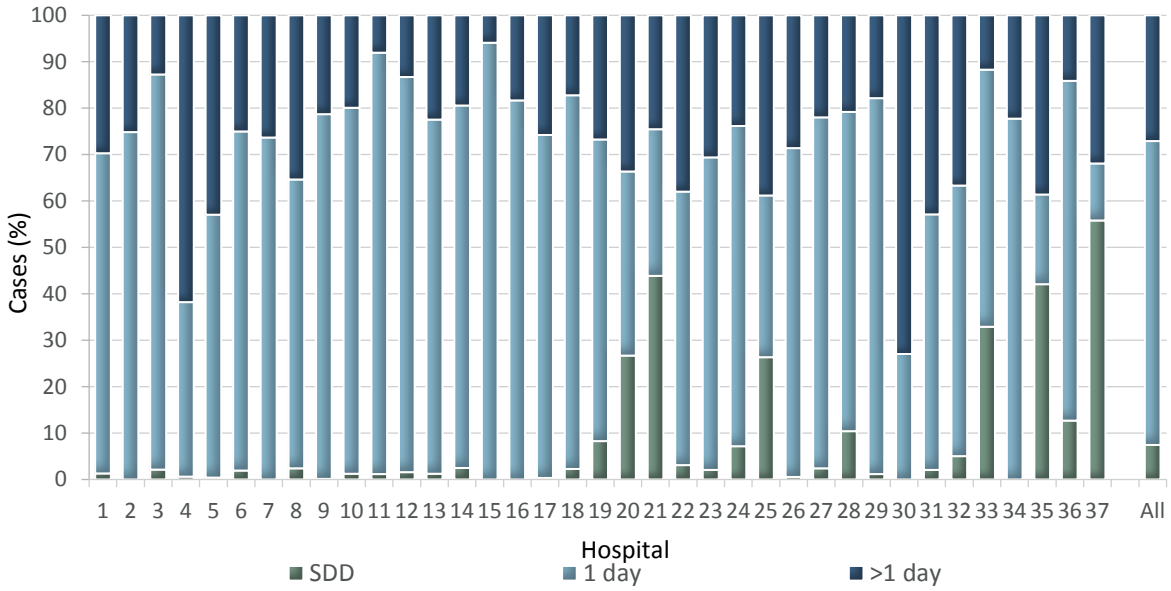
Outcomes	DES	DCB
	(n=12,592)	(n=858)
	%	%
In-hospital mortality	1.4	0.6
In-hospital stroke	0.2	0.0
In-hospital unplanned revascularisation	0.5	0.6
In-hospital major bleeding	0.6	0.5
30-day mortality	1.9	0.7
30-day stent thrombosis	0.3	0.1
30-day MACCE	2.4	1.6

Length of stay

As in previous years, the median length of stay following PCI in 2025 was 2 days (IQR: 1, 4), with variation according to clinical presentation. Patients presenting with an acute coronary syndrome experienced an average admission of 4.2 days, increasing to 4.7 days in the STEMI subgroup. Among those with NSTE-ACS, the mean stay was 3.9 days, while patients with a non-ACS indication for PCI had a shorter average stay of 2.6 days.

Same-day discharge (SDD) after elective PCI continues to gain traction as a safe, efficient, and cost-effective strategy in appropriately selected patients. In 2025, SDD rates increased modestly compared with previous years (7.4% in 2025 vs 5.7% in 2024). Uptake remained higher in the public sector, where 17.4% of elective cases were discharged on the day of procedure, compared with 1.2% in the private sector. Just over two-thirds of elective PCI patients were discharged within 24 hours, with a greater proportion observed in private hospitals (74.9%) relative to public institutions (69.9%). The hospital-level distribution of SDD rates is shown in Figure 33.

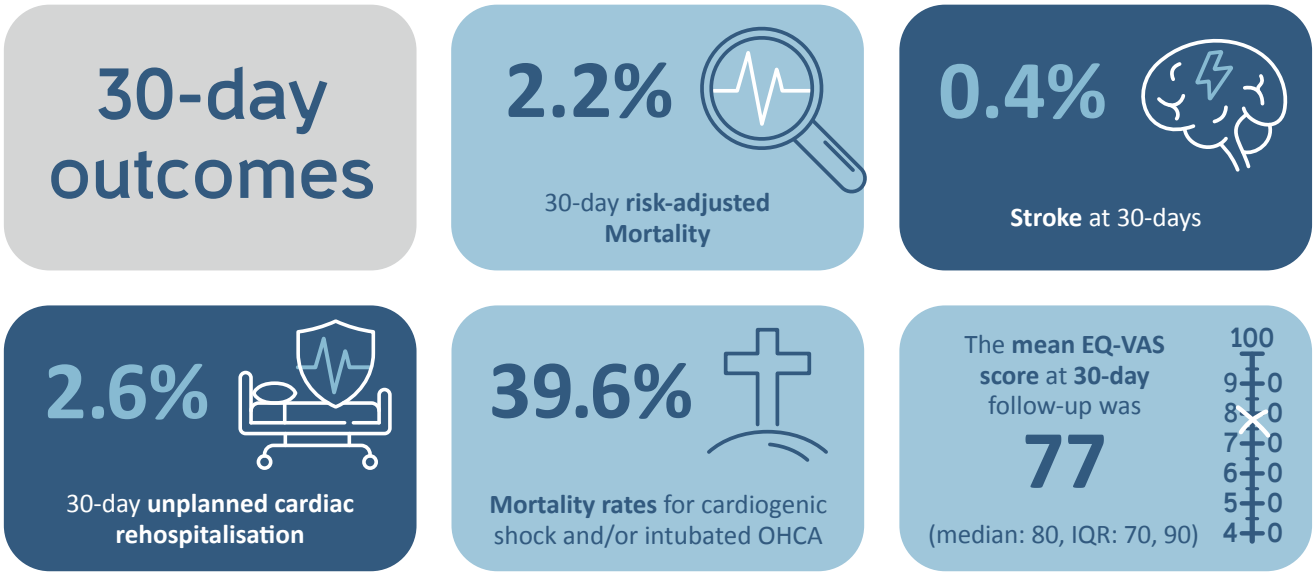
Figure 33: Discharge to home in elective patients by hospital



30-Day Outcomes

An overview of 30-day outcomes is shown in Figure 34.

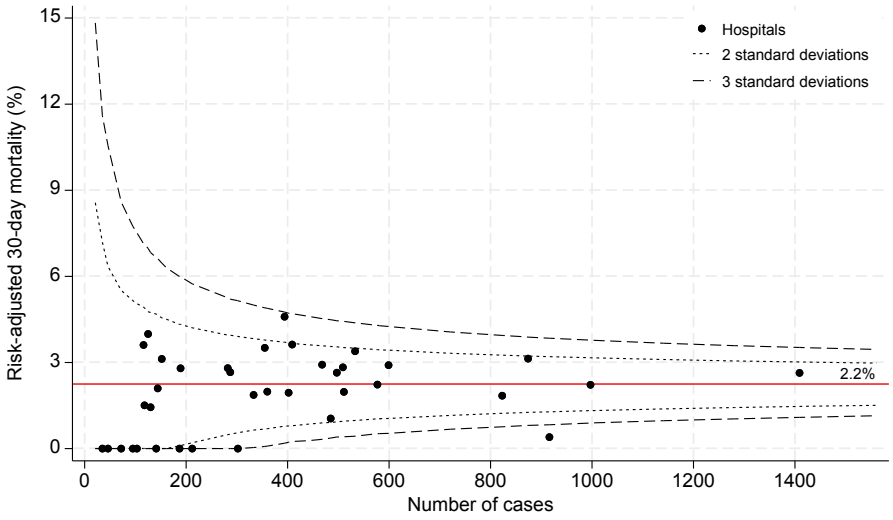
Figure 34: 30-day outcomes



Risk-adjusted mortality at 30-days

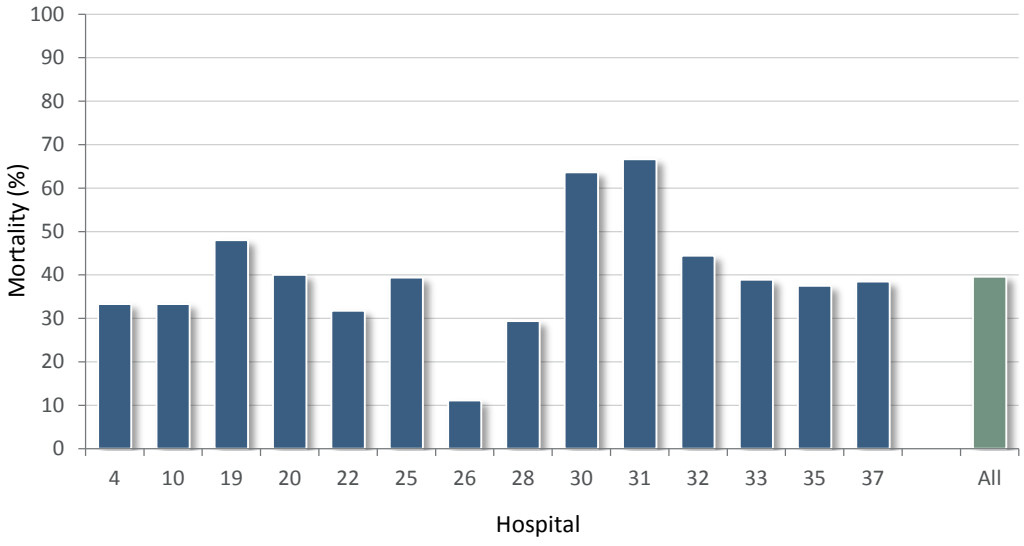
The overall 30-day risk-adjusted mortality rate was 2.2% and all participating centres remained within control limits for this outcome measure (Figure 35).

Figure 35: Risk-adjusted mortality by hospital at 30-days



For patients presenting with cardiogenic shock and/or intubated out-of-hospital cardiac arrest (OHCA), unadjusted 30-day mortality outcomes are shown in Figure 36. Of the 351 cases, the mean 30-day mortality rate was 39.6%, representing an increase compared with previous year (31.3%). Twelve hospitals did not manage any patients within this high-acuity subgroup, and a further nine centres treated <3 cases. These institutions were excluded from comparative analyses because of their low case volumes. Among the remaining hospitals in this analysis, no clear association was identified between hospital procedural volume and 30-day mortality outcomes.

Figure 36: Mortality rates for cardiogenic shock and/or intubated OHCA patients by hospital at 30-days



Hospitals 3,6,7,9,11,12,15,16,18,29,34 & 36 had NIL cases with cardiogenic shock and/or intubated OHCA.
Hospitals 1,2,5,8,13,14,17,24 & 27 had <3 cases with cardiogenic shock and/or intubated OHCA and were excluded.

Major cardiac and cerebrovascular events at 30-days

The composite endpoint of major adverse cardiac and cerebrovascular events (MACCE) comprises all-cause mortality, new or recurrent myocardial infarction, stent thrombosis, target vessel revascularisation, and stroke. In-hospital and 30-day MACCE outcomes are presented in Table 21. The overall 30-day MACCE rate was 3.7%, similar to previous reporting periods. Mortality remained the principal contributor to 30-day MACCE, with an observed increase of 0.5% between hospital discharge and 30 days (1.6% at discharge vs 2.1% at 30 days).

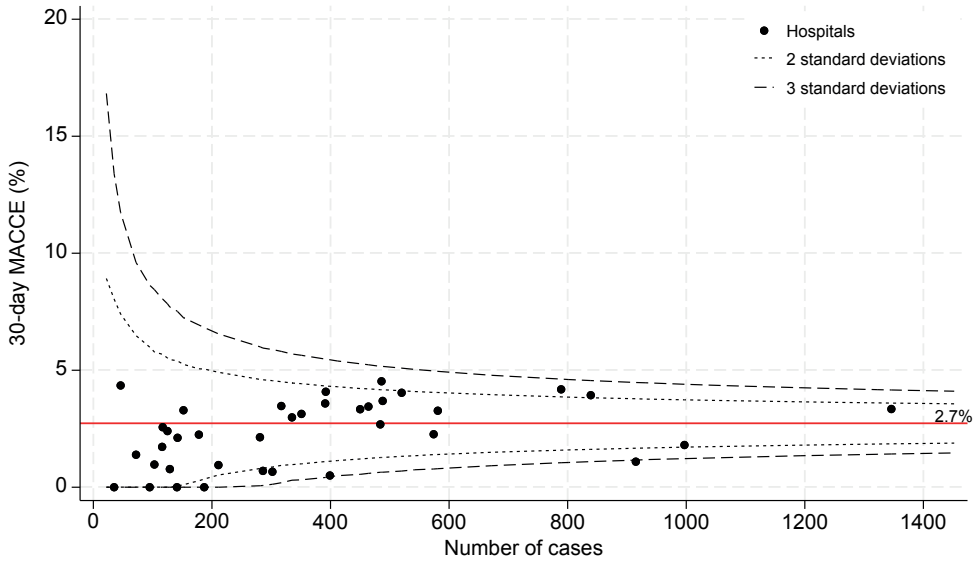
Table 21: Major adverse cardiac and cerebrovascular events at 30-days

MACCE component**	In-hospital events	30-day events*
	N (%)	N (%)
Mortality	226 (1.6)	298 (2.1)
Myocardial infarction	55 (0.4)	86 (0.6)
Stroke	34 (0.2)	51 (0.4)
Definite stent thrombosis	21 (0.1)	32 (0.2)
Probable stent thrombosis	4 (<0.1)	6 (<0.1)
Target vessel revascularisation (TVR)†	84 (0.6)	151 (1.1)
MACCE	362 (2.6)	526 (3.7)

**30-day events reported include in-hospital events.*
***Cases with multiple procedures were excluded to avoid mortality being counted more than once (n=27).*
†TVR refers to any 'unplanned' PCI or CABG revascularisation of the target vessel.
Categories are not mutually exclusive.

The 30-day MACCE rates, excluding high-acuity presentations involving cardiogenic shock and/or intubated out-of-hospital cardiac arrest, are presented in Figure 37. The overall 30-day MACCE rate for this cohort was 2.7% (hospital range 0% to 4.5%). All participating hospitals remained within established control limits for this performance indicator.

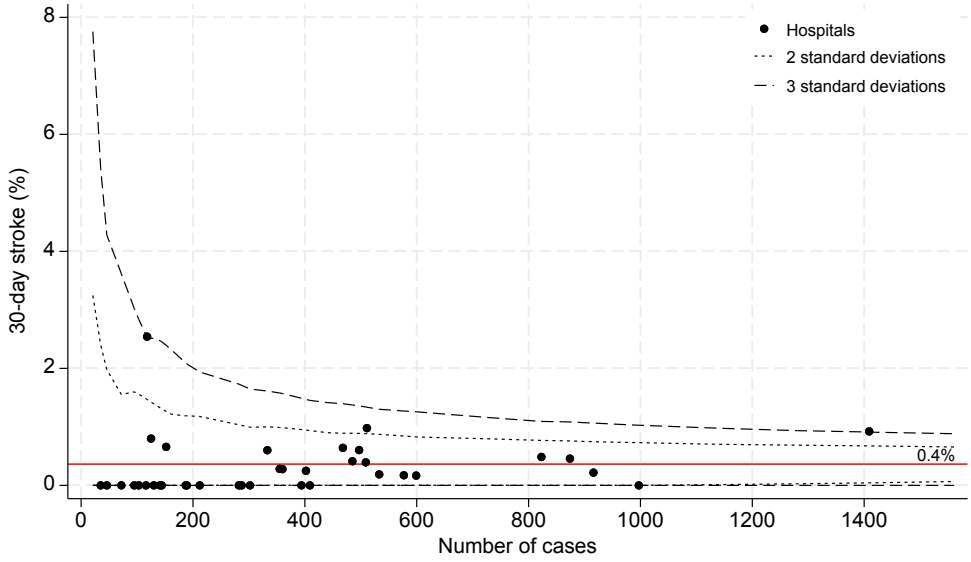
Figure 37: MACCE by hospital at 30-days



Stroke at 30-days

The overall 30-day stroke rate was 0.4%, with all participating hospitals' outcomes within control limits (Figure 38). Among individual sites, 30-day stroke rates ranged from 0% to 2.5%. During the post-discharge interval (from hospital discharge to 30 days), an additional 17 stroke events were recorded. These comprised 13 ischaemic strokes, 3 haemorrhagic strokes, and 1 event in which the stroke subtype was unspecified.

Figure 38: Stroke by hospital at 30-days



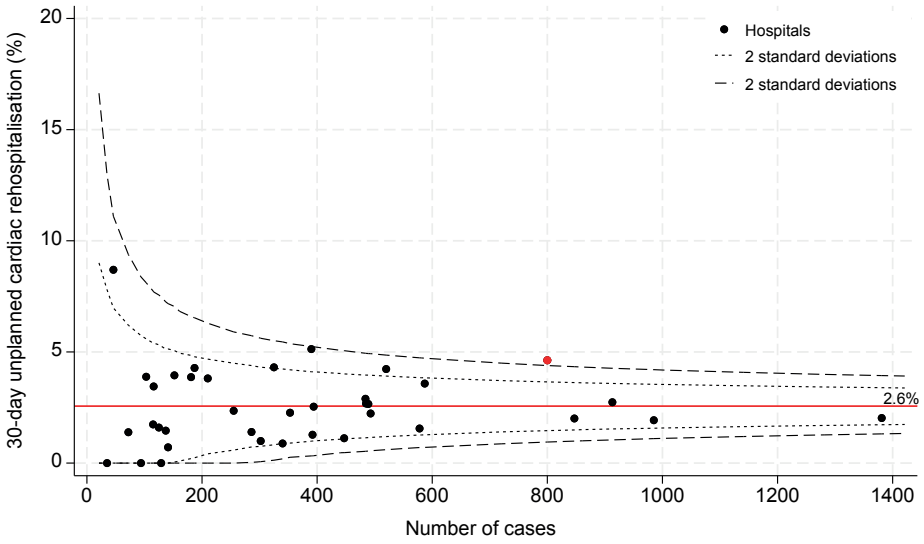
Rehospitalisation at 30-days

The rate of rehospitalisation within 30 days of discharge was 10.1% (Table 22). Unplanned cardiac readmissions accounted for 356 cases (2.6%) of all 30-day rehospitalisations. Readmission rates were higher overall in the private sector, but unplanned cardiac rehospitalisations were lower. Figure 39 displays the hospital-level distribution of 30-day unplanned cardiac rehospitalisation rates with one centre identified as outlier for this performance indicator.

Table 22: Rehospitalisation by hospital sector

	All patients (N=13,899)	Public (n=8,042)	Private (n=5,847)
	N (%)	N (%)	N (%)
Rehospitalisations	1,401 (10.1)	663 (8.2)	738 (12.6)
Non-cardiac rehospitalisations	422 (3.0)	275 (3.4)	147 (2.5)
Cardiac rehospitalisations	979 (7.1)	388 (4.8)	591 (10.1)
Unplanned cardiac rehospitalisations	356 (2.6)	232 (2.9)	124 (2.1)
Planned cardiac rehospitalisations	623 (4.5)	156 (1.9)	467 (8.0)

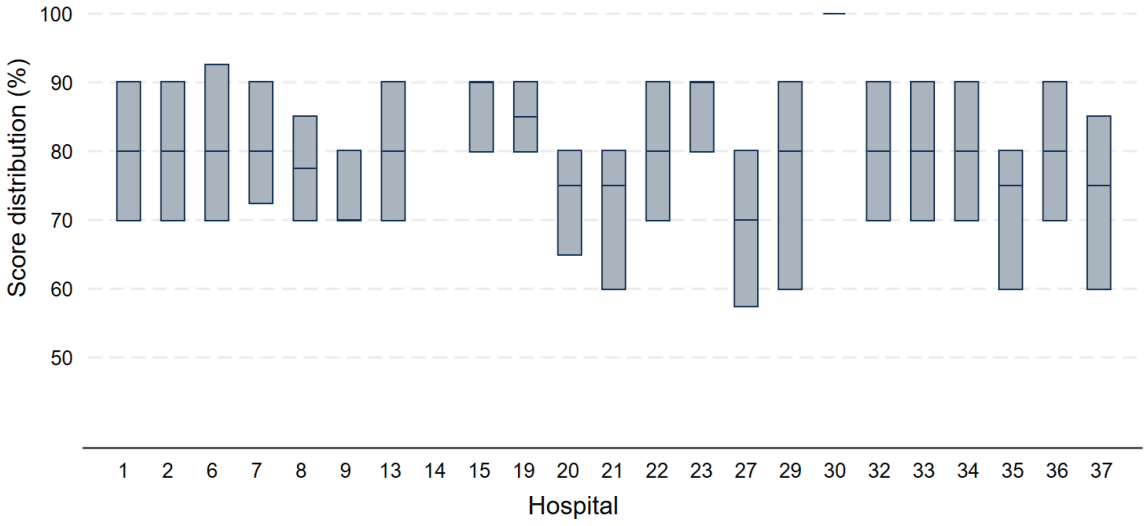
Figure 39: Unplanned 30-day cardiac rehospitalisation by hospital



Quality of life

The Euroqol visual analogue scale (EQ-VAS) was used to assess self-reported health status. It ranges from 0 (worst imaginable health state) to 100 (best imaginable health state). On a scale ranging from 0 (lowest quality of life) to 100 (highest quality of life), the overall mean EQ-VAS score at 30-day follow-up was 77 (median: 80, IQR: 70, 90). The mean EQ-VAS score was comparable across sectors, with 76.7 in the public system and 77.6 in the private sector. At an institutional level, the mean EQ-VAS score ranged from 69.2 to 96.3. These scores are presented in Figure 40.

Figure 40: EQ-VAS scores at 30 days from discharge by hospital



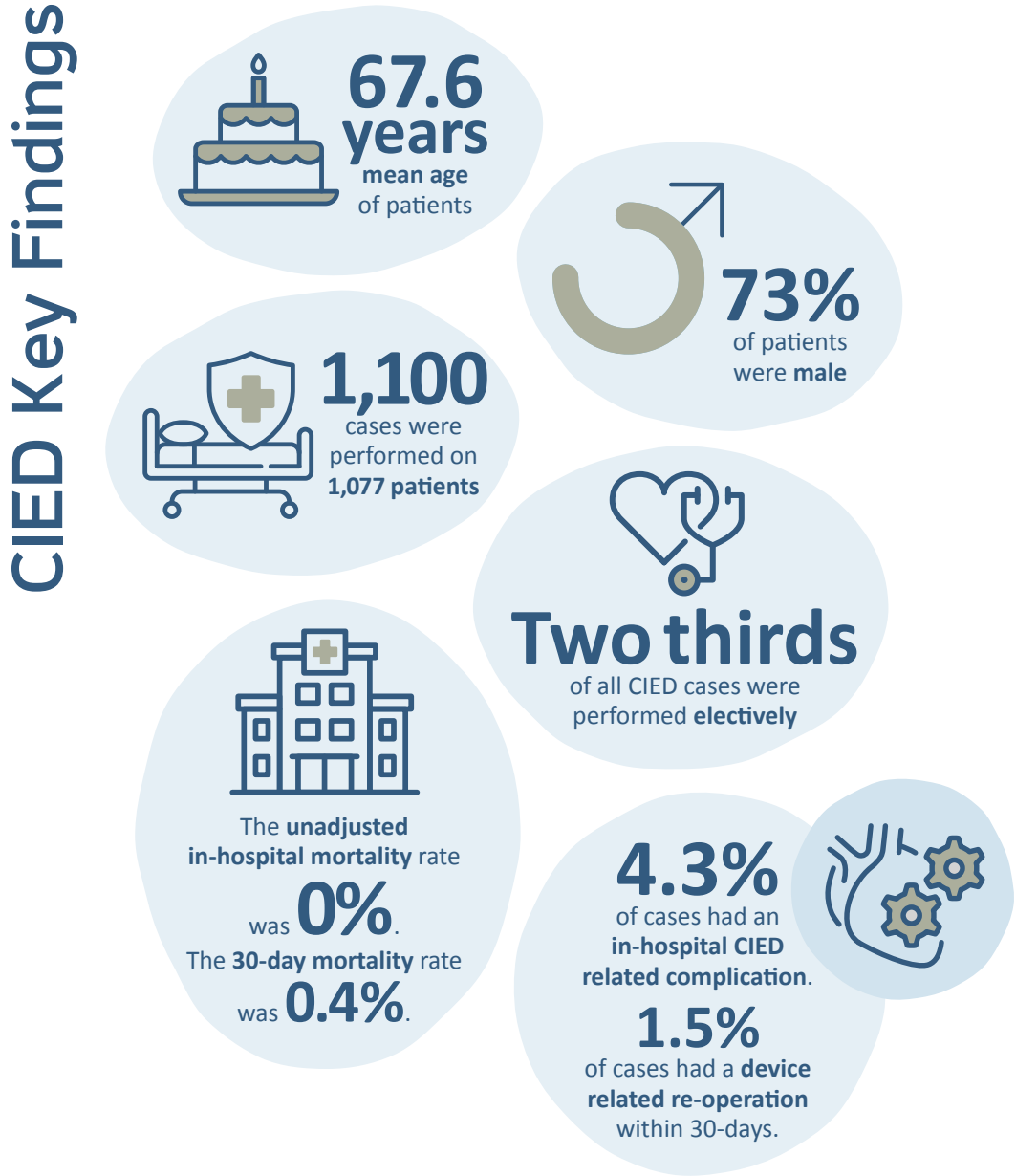
Hospital	1	2	6	7	8	9	13	15	19	20	21	22	23	27	29	30	32	33	34	35	36	37	All
N	158	367	120	36	110	938	229	30	399	517	393	888	171	112	149	178	309	399	89	270	59	350	6,271
Mean (SD)	81 (12.9)	77.8 (15.6)	81.4 (14.2)	78.5 (16.6)	78.7 (10.7)	71.6 (11.1)	75.6 (18.5)	84.5 (13)	84 (10.9)	72.1 (18.3)	71.8 (18.2)	77.8 (17.3)	84.9 (12)	69.2 (17.9)	75.1 (18)	96.3 (11.4)	77.2 (14.5)	76.8 (16.1)	77.6 (19.3)	70.9 (16)	78.1 (16)	69.6 (22.4)	**76 (16.7)**

** Hospitals 3,4,5,10,11,12, 14,16,17,18,24,25,26,28 and 31 excluded due to incomplete QOL data.*

Cardiac Implantable Electronic Devices (CIED)

Key Findings CIED Module

Figure 41: CIED Key Findings



Registry Module Activity

In 2025, the VCOR CIED registry module captured data from 16 Victorian and 1 Tasmanian hospitals (12 public and 5 private). Since the module's commencement in 2018, a cumulative total of 6,471 CIED procedures had been recorded to 31 December 2025.

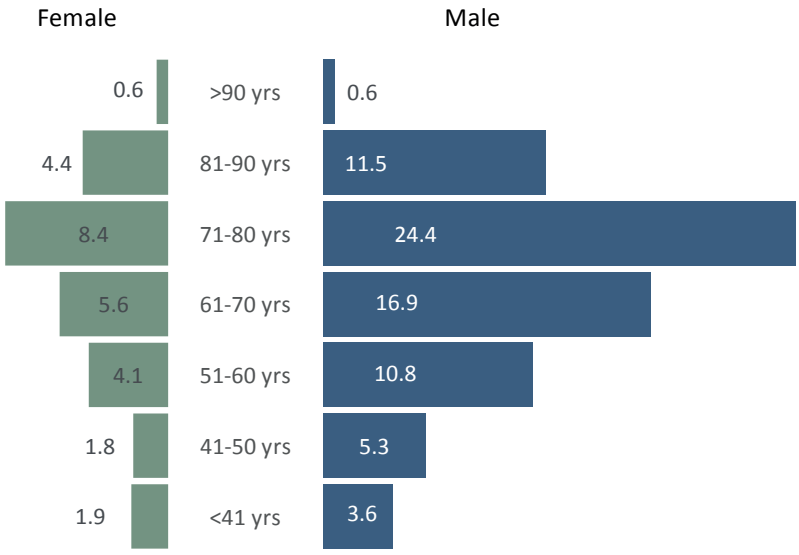
The CIED module focuses on two principal device therapies: implantable cardioverter defibrillators (ICD) and cardiac resynchronisation therapy (CRT). Ongoing surveillance of these device-based interventions enables comprehensive assessment of utilisation patterns, procedural practice, and associated clinical outcomes across participating centres.

Patients and procedures

During the 2025 reporting period, a total of 1,100 CIED procedures were recorded in 1,077 patients. The average patient age was 67.6 ± 14.1 years, with males comprising 73% of the cohort (Figure 42). Female patients were of similar age to male patients (67.2 ± 15.1 vs 67.8 ± 13.8 years).

Elective cases constituted approximately two-thirds of all procedures performed. First device implantation represented the largest procedural category, accounting for 55% of cases, followed by generator replacement procedures at 40%. System explant and revision procedures comprised 3.5% of interventions, while new lead insertions accounted for 1.5% overall.

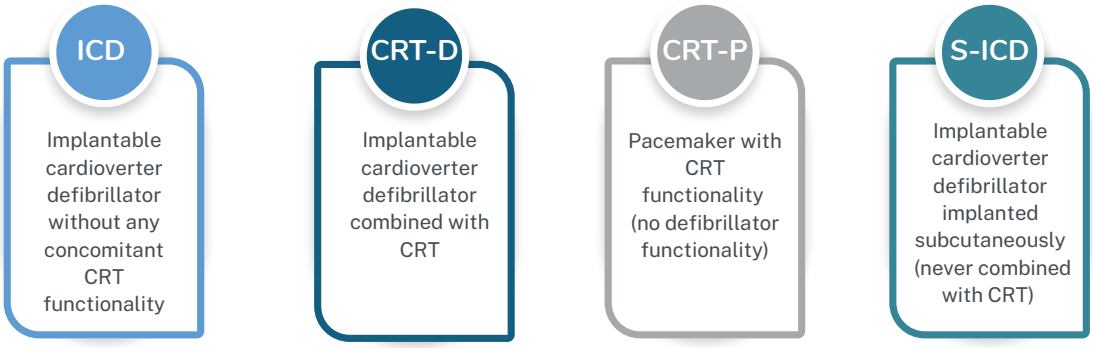
Figure 42: Age and sex distribution of patients undergoing CIED implantation



Device types

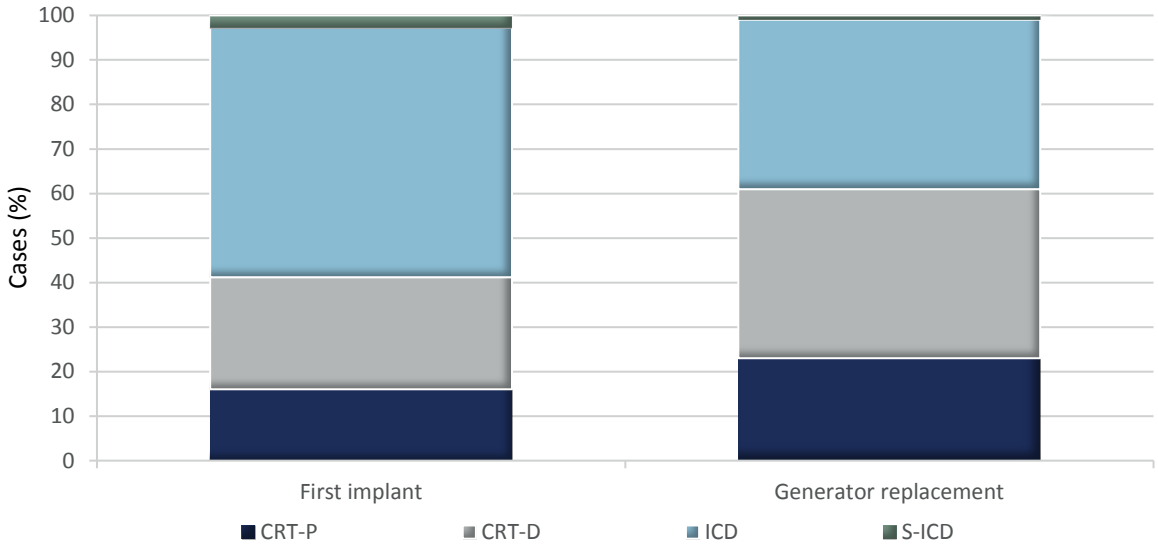
The four types of CIED devices that are monitored by VCOR are shown in Figure 43.

Figure 43: CIED Device Types



ICD devices (ICD, S-ICD or CRT-D) accounted for 84% of first implants and 77% of generator replacements (Figure 44). CIED implantation most frequently occurred in the left pre-pectoral position (CRT 86% and ICD 88%). Alternative implantation sites were less commonly used, including the left sub-pectoral region (CRT 7.7% and ICD 4.4%) and the right pre-pectoral region (CRT 4.6% and ICD 3.3%).

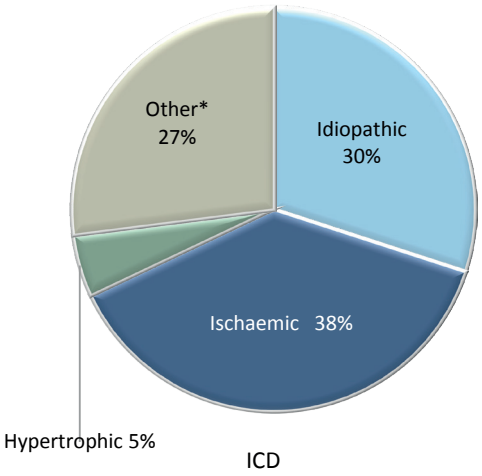
Figure 44: Device type - first implant and generator replacement



Cardiomyopathy aetiology

Figures 45 and 46 summarise the underlying cardiomyopathy aetiology among patients undergoing first CIED implantation. Ischaemic cardiomyopathy was the most frequently observed cause, accounting for 38% of implantable cardioverter defibrillator (ICD) implants. Idiopathic cardiomyopathy represented 30% of cases. Other aetiologies (as specified in the corresponding figure footnote) comprised 27% of the cohort. A small proportion of patients (5%) receiving an initial CIED had hypertrophic cardiomyopathy.

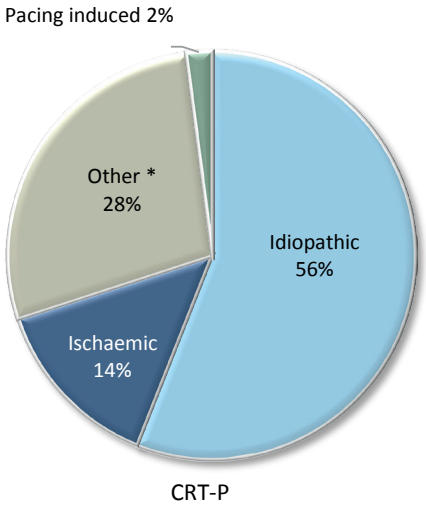
Figure 45: Aetiology in patients undergoing first CIED implant - ICD



**Includes familial/congenital & idiopathic ventricular fibrillation*

Idiopathic cardiomyopathy represented the predominant underlying cause within the CRT-P cohort, accounting for 56% of cases. Ischaemic heart disease comprised 14% of implants, while other aetiologies (as outlined in the corresponding figure footnote) were identified in 28% of patients.

Figure 46: Aetiology in patients undergoing first CIED implant - CRT-P

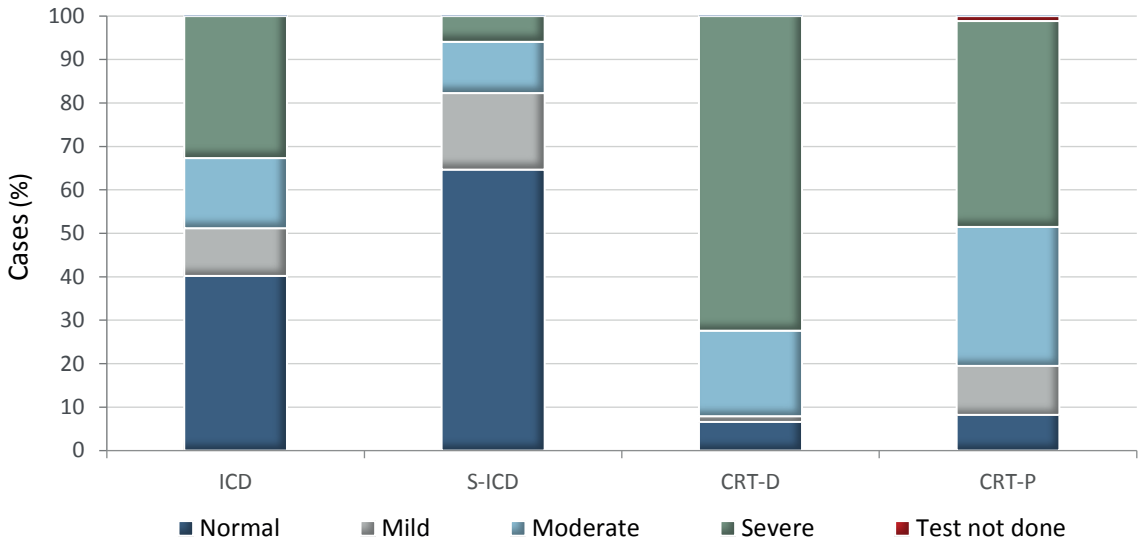


**Includes valvular, familial/congenital & structurally normal heart.*

Left ventricular function

Figure 47 depicts the distribution of left ventricular systolic function severity among patients undergoing CIED implantation. Patients receiving CRT-D therapy had the highest proportion of cases with severe left ventricular dysfunction (72%) while those who were triaged to S-ICD devices, mostly had preserved or mildly impaired left ventricular function (82%).

Figure 47: Left ventricular function by CIED type (first implants only)



Indications for CIED therapy

ICDs

Implantable cardioverter defibrillators (ICDs) are predominantly utilised for the prevention of sudden cardiac death, in both primary and secondary prevention settings. In 2025, primary prevention indications comprised 53% of all ICD implantations, with ischaemic cardiomyopathy accounting for 42% of these cases. Among the secondary prevention cohort, 54% of ICD implants were performed in patients with a documented history of ventricular tachycardia, while 39% had prior ventricular fibrillation. Less common secondary prevention indications included previous cardiac arrest (5%) and syncope (2%).

Cardiac resynchronisation therapy

Contemporary national and international guidelines for cardiac resynchronisation therapy (CRT) outline specific eligibility criteria, including a QRS duration of ≥120 milliseconds, advanced left ventricular systolic dysfunction, and New York Heart Association (NYHA) functional class II or greater symptoms. Table 23 presents the extent to which these guideline-defined criteria were met among patients undergoing implantation of CRT with defibrillator capability (CRT-D) and CRT with pacemaker capability (CRT-P). Adherence to recommended criteria was comparatively lower within the CRT-P cohort than among recipients of CRT-D devices.

Table 23: Inclusion criteria for CRT by device type

	CRT-D (N=152)	CRT-P (N=97)
	N (%)	N (%)
QRS width ≥120 msec	125 (82)	78 (80)
Severe left ventricular dysfunction (LVEF<35%)	110 (72)	46 (48)
NYHA Class II or greater	136 (90)	88 (91)

Assessing the strength of recommendation for CIED therapy

Although decisions regarding cardiac implantable electronic device (CIED) implantation require an individualised and comprehensive clinical evaluation encompassing the full spectrum of patient-specific considerations, contemporary clinical practice guidelines remain central to informing evidence-based care. To support clinicians and provide structured performance feedback at both operator and institutional levels, VCOR has implemented a series of evidence-informed clinical algorithms designed to appraise the strength of indication for CIED implantation. This type of analysis encourages compliance with national and international best practice standards and facilitates operator and institution-based continuous quality improvement efforts.

Figure 48 illustrates the distribution of recommendation strength for defibrillator-based therapies, categorised as +, ++, or +++. Among the 499 cases involving implantable cardioverter defibrillator (ICD), cardiac resynchronisation therapy with defibrillator (CRT-D), or subcutaneous ICD (S-ICD) devices, the majority (68%) were assigned a strong recommendation grade (+++), with a further 20% classified as moderate (++). Collectively, these findings demonstrate a high degree of alignment between contemporary clinical practice and established guideline-based indications for defibrillator therapy.

Figure 48: Strength of recommendation for ICD therapy

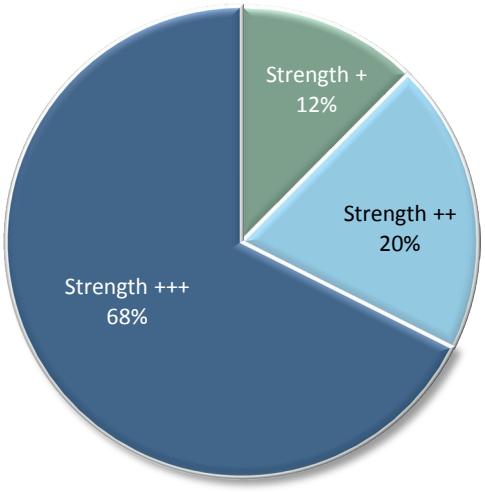


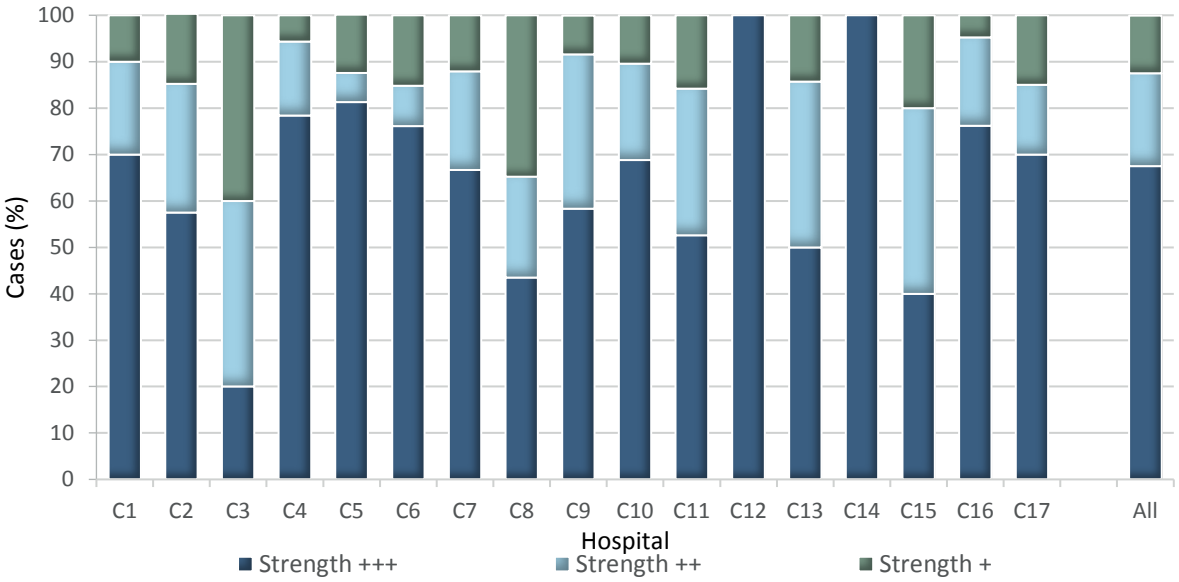
Table 24 provides a detailed breakdown of recommendation strength according to ICD device subtype. A strong recommendation rating (+++) was assigned to the majority of ICD cases, although there was some variation in rates among the sub-types- CRT-D (72%), ICD (67%) and S-ICD (53%).

Table 24: Strength of recommendation for ICD therapy by form of therapy

Strength of Indication	CRT-D (N=146)	ICD (N=336)	S-ICD (N=17)
	N (%)	N (%)	N (%)
Strength +++	104 (72)	224 (67)	9 (53)
Strength ++	21 (14)	73 (22)	6 (35)
Strength +	21 (14)	39 (11)	2 (12)

Figure 49 illustrates hospital-level benchmarking of recommendation strength for defibrillator therapy. All but one institution reported a strong (+++) recommendation in at least 40% of cases, with proportions across sites ranging from 20% to 100%. Overall, these findings demonstrate substantial compliance with evidence-based guideline criteria across the majority of participating hospitals.

Figure 49: Strength of recommendation for ICD therapy by hospital



Among patients who received a CRT device (n=246), there was a strength of recommendation +++ in 40% of cases and ++ in 22%, as shown in Figure 50. Notably, there was an 8% improvement in the strong (+++) recommendation compared to 2024 (32%).

Figure 50: Strength of recommendation for CRT therapy

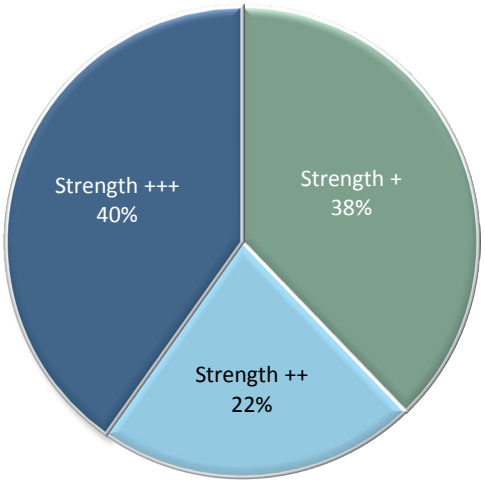


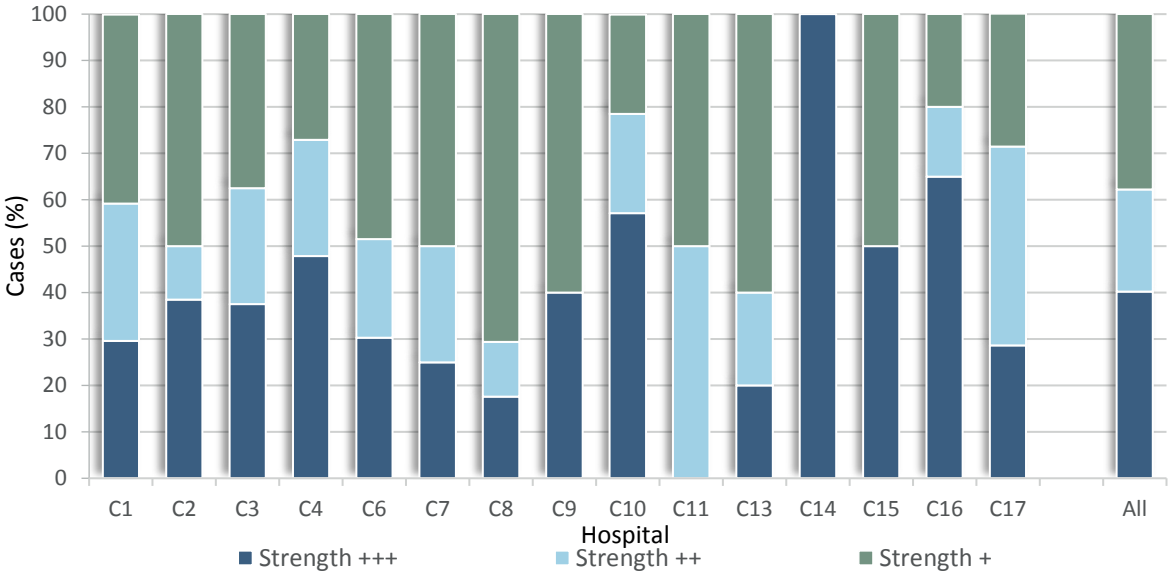
Table 25 presents a comparative analysis of recommendation strength for cardiac resynchronisation therapy with pacemaker (CRT-P) and cardiac resynchronisation therapy with defibrillator (CRT-D) devices. Observed variation in recommendation grading between these groups likely reflects differences in baseline clinical profiles and indication patterns. Overall, a greater proportion of CRT recipients were assigned a single-strength (+) recommendation compared with patients undergoing implantable cardioverter defibrillator (ICD) implantation, indicating a more selective application of CRT in specific clinical scenarios.

Table 25: Strength of recommendation for CRT by device type

Strength of Indication	CRT-D (N=151)	CRT-P (N=95)
	N(%)	N(%)
Strength +++	69 (46)	30 (32)
Strength ++	25 (16)	29 (30)
Strength +	57 (38)	36 (38)

Figure 51 depicts marked hospital-level variation in the strength of recommendation assigned to CRT device implantation. However, given the relatively low procedural volumes at several centres, the proportion of single-strength (+) recommendations in these hospitals warrants cautious interpretation.

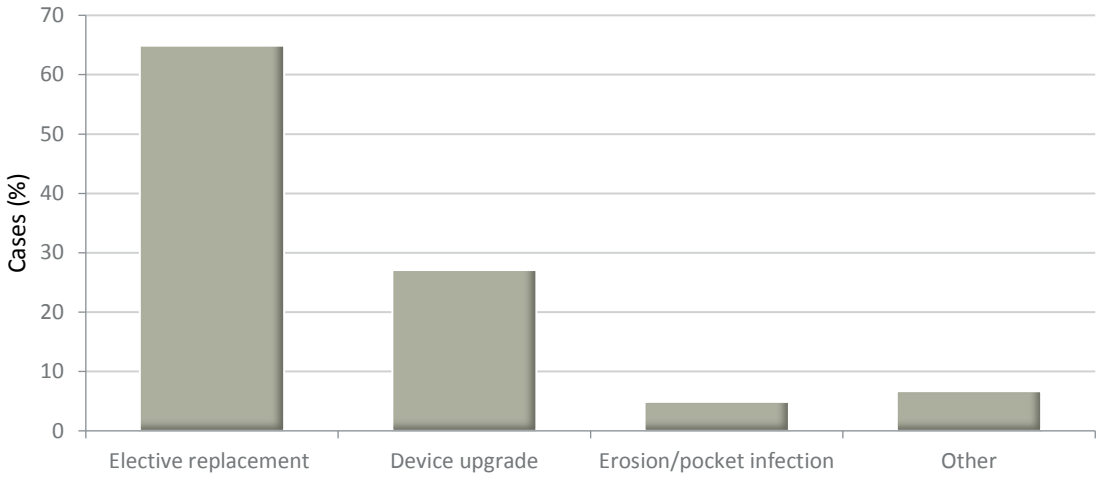
Figure 51: Strength of recommendation for CRT by hospital



Replacements and revisions

Generator replacement procedures for CIEDs were undertaken predominantly due to elective replacement at end-of-service, accounting for 65% of cases. Device upgrades comprised 27% of generator exchanges, while indications such as device erosion, pocket infection, and other causes collectively represented 8% of replacements (Figure 52).

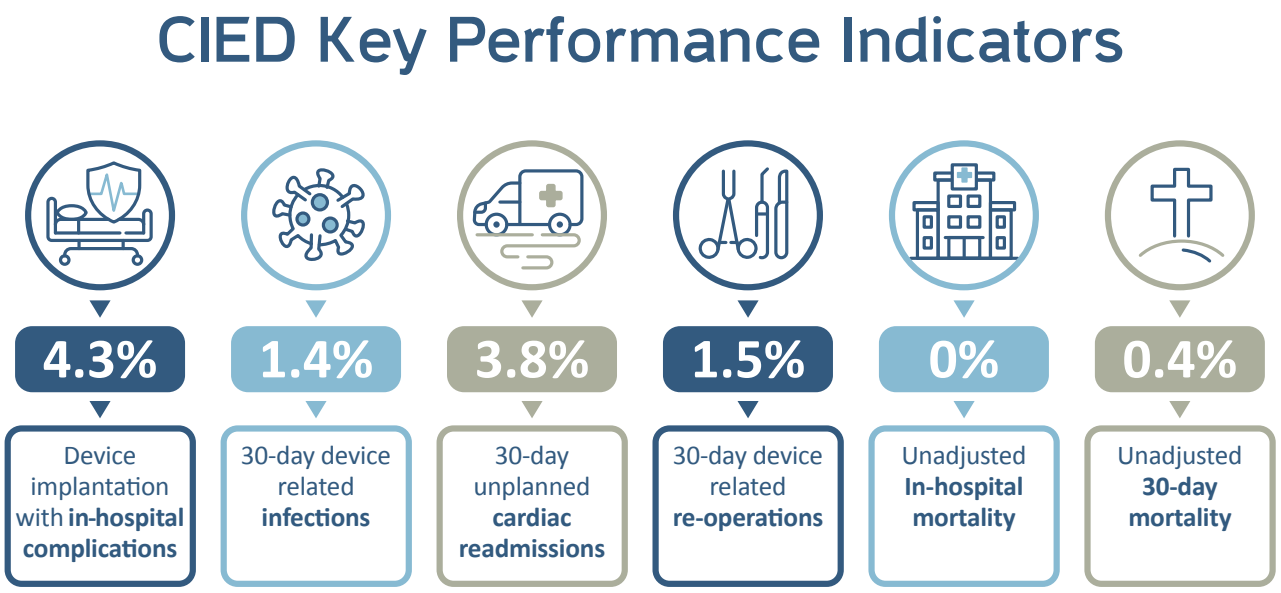
Figure 52: Indications for generator replacement, explant or revision



Outcome measures

The key performance indicators (KPIs) used to monitor and benchmark hospital performance in relation to CIED therapy are shown in Figure 53.

Figure 53: CIED Key Performance Indicators



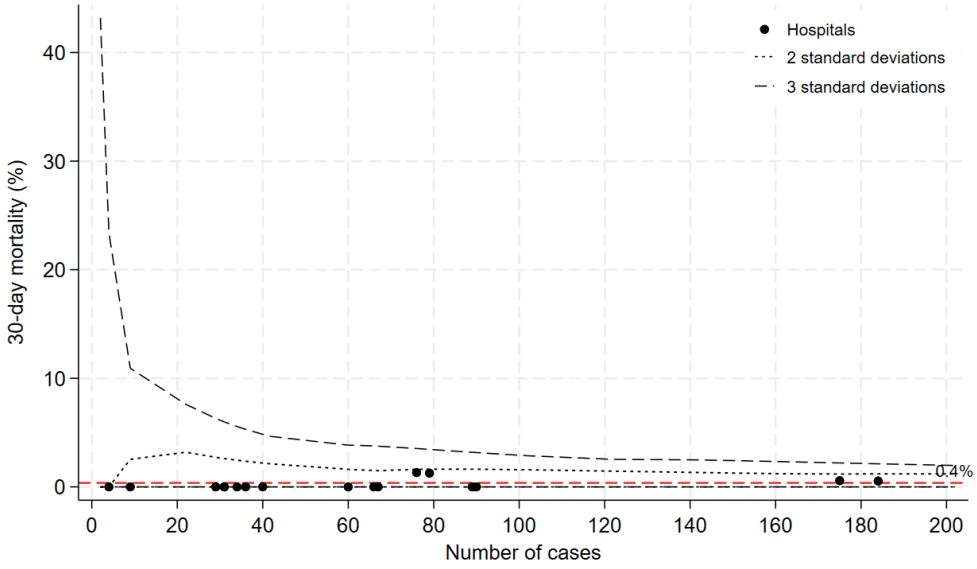
In-hospital mortality

There were no in-hospital deaths among the CIED cohort recorded in 2025.

30-day mortality

The overall 30-day mortality rate following device implantation was 0.4%. Two out of the four deaths were attributed to cardiac causes unrelated to the implanted device, one was a non-cardiac cause (unrelated to the device), while the cause of death in the remaining case was not determined. As illustrated in Figure 54, all participating hospitals remained within established control limits for this outcome measure.

Figure 54: CIED Mortality at 30-days



Successful device implantation without in-hospital complications

Table 26 summarises in-hospital complications according to hospital and device category.

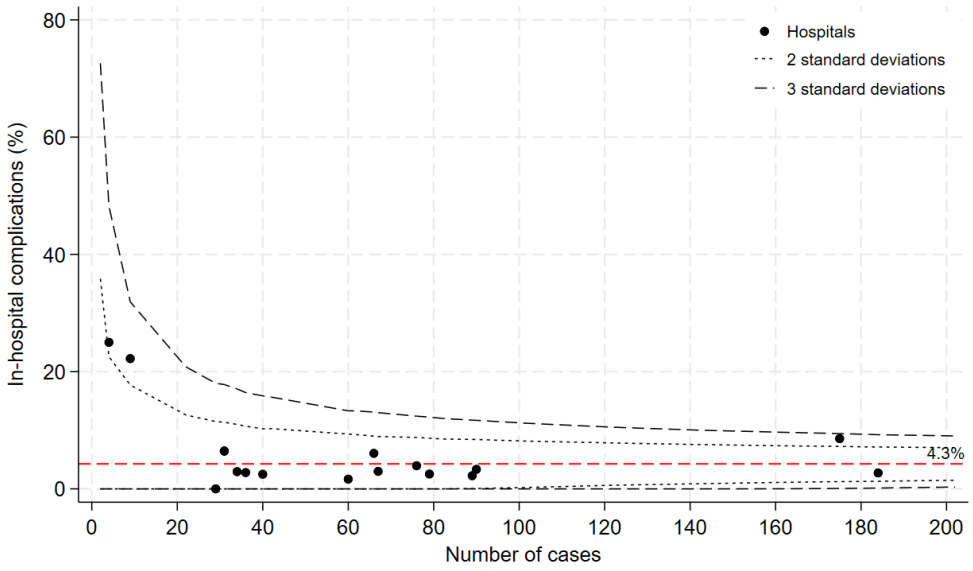
Documented in-hospital adverse events included severe hypotension, wound haematoma, pain necessitating clinical intervention, phrenic nerve stimulation, cardiac arrest, cardiac perforation, unsuccessful lead placement, and pericardial effusion. In 2025, 95.7% of all CIED procedures were completed without any in-hospital complications, reflecting a high overall procedural safety profile.

Table 26: In-hospital complications by hospital and device type

Hospital	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	Total
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N (%)
CRT-P	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	5 (2.5)
CRT-D	2	7	1	2	1	1	0	0	0	2	0	0	1	2	0	2	0	21 (6.6)
ICD	1	4	0	2	1	2	1	1	1	2	1	0	0	0	0	0	1	17 (3.4)

Hospitals were benchmarked by frequency of complications as shown in Figure 55. There were no outliers for this outcome measure.

Figure 55: In-hospital rates of CIED related complications



Unplanned cardiac readmissions, device-related reoperations and infections at 30-days

The rate of 30-day unplanned cardiac readmission was 3.8% and 30-day device-related reoperations was 1.5%. No institutions were identified as outliers for either of these performance indicators (Figures 56 and 57).

Figure 56: CIED related unplanned cardiac readmissions at 30-days

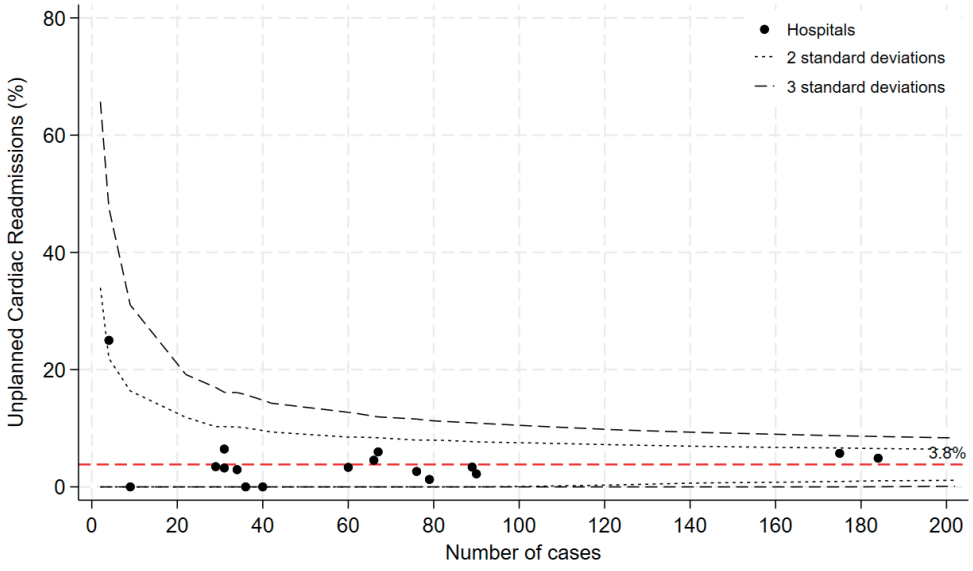
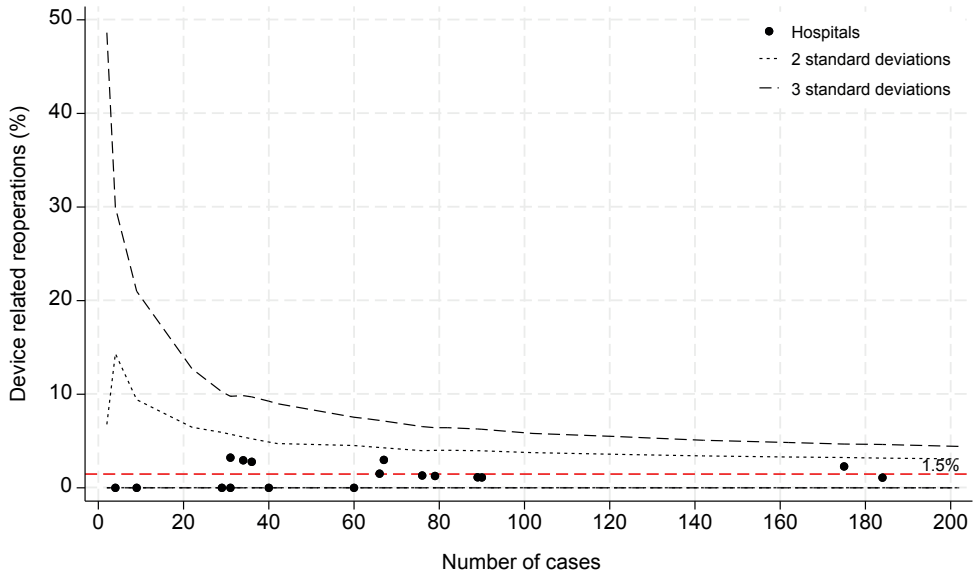
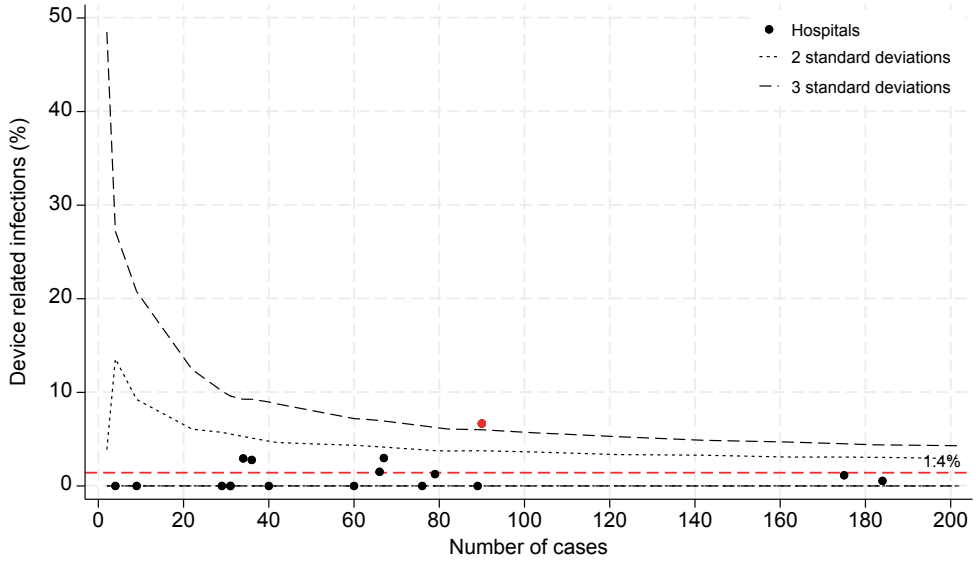


Figure 57: CIED device-related reoperations at 30-days



The incidence of device-related infection within 30 days from discharge of the index procedure was 1.4%. Reported events comprised superficial wound infections, pocket infections, and cases of endocarditis or septicaemia. As demonstrated in Figure 58, one hospital was identified as an outlier, with a device-related infection rate of 6.7%. However, all six cases were for the least serious finding of superficial wound infection.

Figure 58: CIED device-related infections at 30-days



Future directions

Over the next one to three years, the registry is focused on consolidating its established role in monitoring PCI outcomes and support continuous quality improvement among its participating sites. A key priority will be to strengthen the timeliness and completeness of registry data, including ongoing improvements in data capture and case ascertainment. With the inclusion of Tasmanian sites from 2025, more robust and statistically meaningful benchmarking between services will be possible, enabling hospitals to more accurately identify unwarranted variation in outcomes and processes of care.

Potential initiatives that are under development include feedback reports with clearer visualisation of key quality indicators such as mortality, major bleeding, vascular complications, acute kidney injury, door-to-balloon times and use of evidence-based pharmacotherapy. We are also exploring the opportunity to expand patient-centred outcome measures, including patient-reported health status and measures of quality of life.

The registry has flagged further consideration of the use of artificial intelligence to support more efficient and accurate data collection, particularly through integration with electronic medical records. Carefully designed and governed AI tools may assist with pre-populating registry fields, extraction of relevant procedural and outcome data, and flagging missing or inconsistent information for review. The hope is that this could reduce administrative burden and costs on participating sites while improving data completeness and timeliness.

A further priority is to continue targeted quality improvement projects in areas where variation or opportunities for improvement are identified, such as radial access uptake, outcomes following NSTEMI and complex PCI and optimisation of discharge medications. Enhanced linkage with administrative datasets, mortality data and longer-term follow-up sources remains a longer-term goal that would improve understanding of outcomes beyond the index admission, including readmissions, repeat revascularisation and longer-term survival.

Finally, the registry is well placed to support research, clinician engagement and policy development. Over the coming years, greater collaboration with hospitals, clinicians, consumers and health services may help translate registry findings into practical initiatives that improve the safety, equity and quality of PCI care.

Glossary

ACEI	Angiotensin Converting Enzyme Inhibitors
ACS	Acute Coronary Syndrome
ARB	Angiotensin Receptor Blockers
BB	Beta adrenergic Blockers
BMI	Body Mass Index
CABG	Coronary Artery Bypass Graft
CIED	Cardiac Implantable Electronic Devices
CRT	Cardiac Resynchronisation Therapy
CTO	Chronic Total Occlusion
DAPT	Dual Anti platelet Therapy
DBT	Door-to-balloon time
ECG	Electrocardiograph
ECMO	Extracorporeal Membrane Oxygenation
IABP	Intra-Aortic Balloon Pump
ICD	Implantable Cardiac Defibrillator
IQR	Interquartile Range
IVUS	Intravascular Ultrasound
KPI	Key Performance Indicator
LOS	Length of stay
LVEF	Left Ventricular Ejection Fraction
MACCE	Major Adverse Cardiac and Cerebrovascular Event
MACE	Major Adverse Cardiac Event
MI	Myocardial Infarction
NHMRC	National Health & Medical Research Council
NRI	New Renal Impairment
NSTE-ACS	Non-ST elevation acute coronary syndrome
NSTEMI	Non-ST Elevation Myocardial Infarction
NYHA	York Heart Association
OCT	Optical Coherence Tomography
OHCA	Out of Hospital Cardiac Arrest
PCI	Percutaneous Coronary Intervention
PHN	Pre-hospital notification
POBA	Balloon Angioplasty
PVD	Peripheral Vascular Disease
SD	Standard Deviation
STEMI	ST-elevation myocardial infarction
TVR	Target Vessel Revascularisation
UAP	Unstable Angina Pectoris
VCOR	Victorian Cardiac Outcomes Registry

Publications

Chowdhury MRK, Stub D, Dinh D, Karim MN, Chowdhury HA, Billah B. Preoperative Factors Associated With In-Hospital Major Bleeding After Percutaneous Coronary Intervention: A Systematic Review. *Heart Lung and Circulation.* 2025 Jun;34(6):566-584. doi: 10.1016/j.hlc.2024.12.001. Epub 2025 Apr 2. PMID: 40175207.

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