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Statewide Cardiac Clinical Network

Queensland Cardiac Outcomes Registry
2017 Annual Report

Cardiac Rehabilitation Audit

Clinical Excellence Division
Creating solutions for better healthcare

Queensland
Government

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Cardiac Rehabilitation Audit

This report is available online at:

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For all enquiries, please contact the Statewide
Cardiac Clinical Informatics Unit at:

scciu@health.qld.gov.au

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1   Message from the SCCN Chair

Introducing this third annual Queensland Cardiac Outcome Registry Report, I am pleased to announce comprehensive engagement across all 8 public cardiac units in Queensland. This report also profiles the addition of two additional modules to the outcomes registry, electrophysiology, and cardiac rehabilitation.

It is the aim of the registry to provide a comprehensive, quality, patient-based profile of cardiac care in Queensland. The benefits of this registry are becoming clear – not only is the registry seeking to provide data, engagement, and confidence to the physicians, surgeons, and clinicians providing care, but it is also providing clear information to administrators, service planners and consumers of health care that first-rate cardiac processes are "standard care". The critical element contributing thus far to the success of this project is that it is clinician-led, and broad. Continuing clinician engagement in supply of data, assessment, and interpretation of data and results of treatment is required for ongoing participation in the registry. The project has also facilitated service collaboration and support for the developing non-metropolitan units and early career practitioners.

In evaluating outcomes, it is now commonly acknowledged that short-term (30-day) outcomes are a very incomplete assessment of the adequacy and quality of medical care. In this report, we have begun to examine more extended follow up of heart failure, structural heart and TAVR patients, for the first time reporting 12-month mortality. It is planned to extend these longer-term outcome profiles to angioplasty and cardiac surgery patients. The registry is also actively investigating the addition of patient-reported outcomes as well as parameters such as length of stay, readmission and repeat presentations for care to supplement the panel of quality outcomes.

With data from consecutive years across all cardiac modalities, it will also now be possible to track multiple patient interventions e.g. revascularisation with both angioplasty and cardiac surgery as well as other cardiac procedures and presentation with subsequent events.

During 2017, the adequacy of outreach services has been a focus for the Queensland Cardiac Clinical Network. QCOR data has allowed us to profile the fact that for the larger metropolitan hospital and health services, 40%–50% of the patients treated live outside the boundaries of the metro health services. This has emphasised the need for the Clinical Network to participate in the provision of pathways for time-critical transfer, referral, and assessment as well as the provision of follow up care to consolidate the results of medical intervention.

2017 has been a very successful year in consolidating the efforts of the Queensland Cardiac Outcomes Registry and the report clearly documents the provision of high-quality safe interventions, very comparable with the results of national and international leaders in cardiac care.

In closing, I give my thanks and congratulations to the clinicians who are maintaining the enthusiasm for this important work, in addition to the QCOR technical and administrative staff without whose assistance this work would not be possible.

Dr Paul Garrahy
Chair
Statewide Cardiac Clinical Network

2   Introduction

The Statewide Cardiac Clinical Network's, Queensland Cardiac Outcomes Registry (QCOR) provides clinicians high quality, valuable clinical data. QCOR draws on multiple data sources to offer superior levels of analysis for stakeholders to use in both clinical decision-making and service improvement within cardiac services in Queensland.

QCOR data collections are governed by clinical committees which report to a central Advisory Committee. This provides direction to the QCOR business unit, the Statewide Cardiac Clinical Informatics Unit (SCCIU). All processes and groups report to the Statewide Cardiac Clinical Network, sponsored by the Clinical Excellence Division within Queensland Health.

A high level of clinical engagement ensures the quality and relevance of the data and, more broadly the Registry itself. QCOR committees are continually evolving and have recently moved to more structured operation and governance.

The SCCIU is responsible for the operation and data management of the QCOR, including data reporting and analysis for clinicians. It also offers data quality and audit functions. A clinician-led unit, the SCCIU coordinates individual QCOR committees.

The SCCIU supports administrative and mandatory reporting such as for financial incentive programs and departmental performance measures. The SCCIU is also responsible for the development and maintenance of registry applications. This QCOR 2017 Annual Report includes two new clinical audits, cardiac rehabilitation and electrophysiology and pacing, with a total of five audits encompassing cardiology and cardiothoracic surgery. With continued development, QCOR aims to support improved health care and outcomes of cardiac patients across Queensland.

Figure A: Operational structure

4,848,877
Queensland population 2016[1]

20%
Australia's total population[1]

11%
Hospital spending on cardiovascular disease[2]

4.0%
Aboriginal and Torres Strait Islander population[3]

23%
of Queenslanders have untreated high blood pressure[2]

11%
of Queenslanders smoke daily[2]

31%
of Queenslanders have untreated high total cholesterol[2]

29%
of deaths in Queenslanders caused by cardiovascular disease[2]

4928
percutaneous coronary interventions

3134
electrophysiology and pacing procedures[4]

390
structural heart disease interventions

2364
adult cardiac surgeries

4528
new heart failure support services referrals

6368
cardiac rehabilitation referrals[4]

91%
of patients referred to a heart failure support service on an ACEI or ARB at discharge

85%
of cardiac rehabilitation assessments within 28 days of discharge

46 mins
median door to balloon time for primary PCI

86 mins
median first diagnostic ECG to reperfusion time for primary PCI

51 mins
median pre-hospital component for primary PCI

1.1%
mortality rate for coronary artery bypass surgery
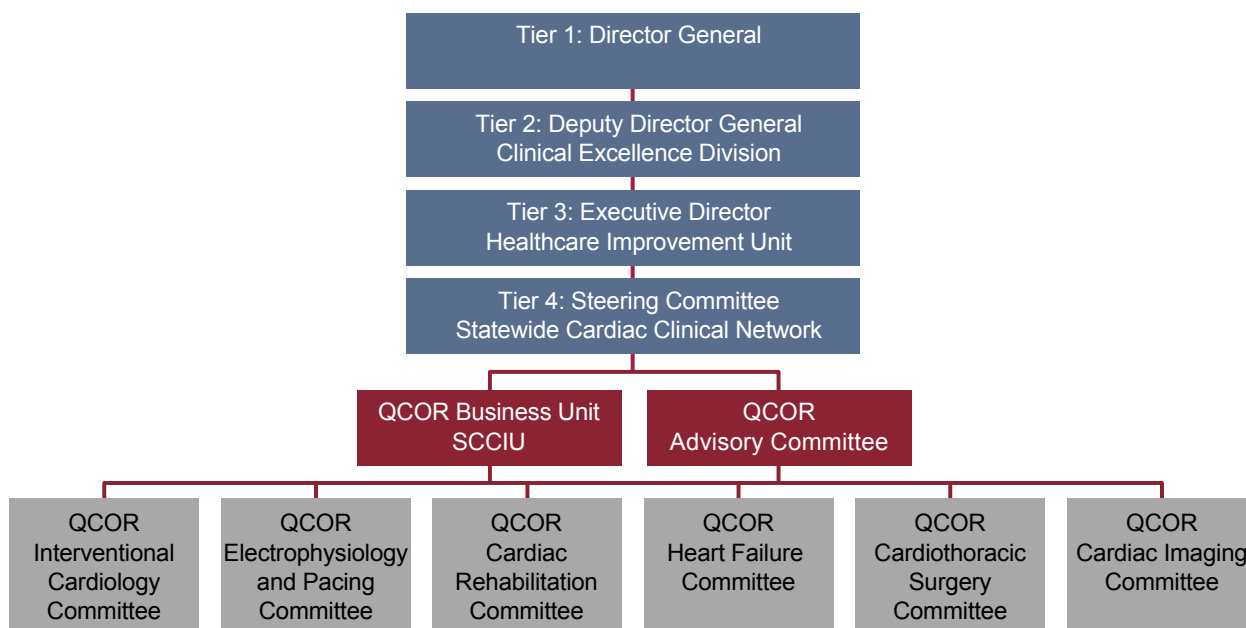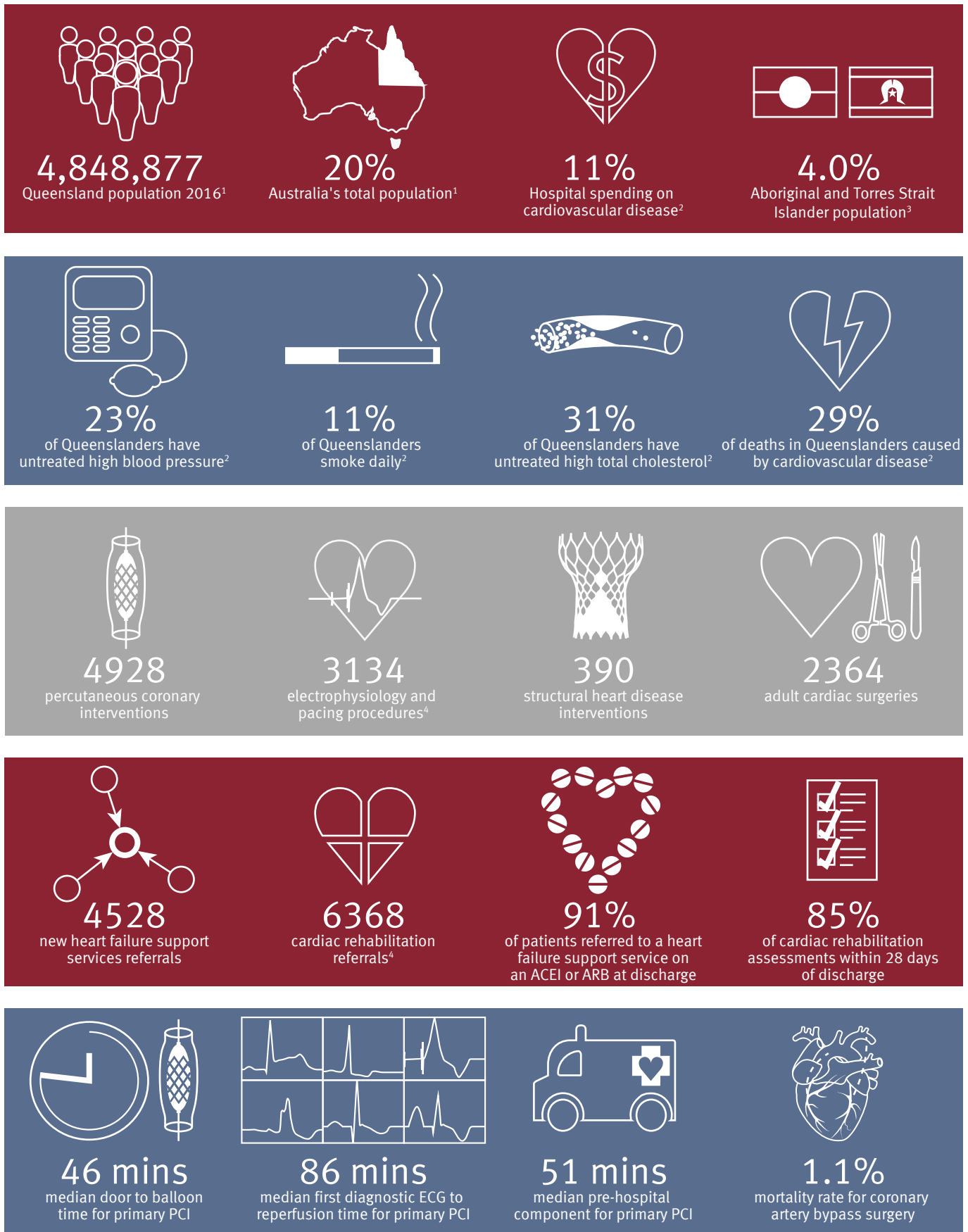
Figure B: QCOR 2017 infographic

3   Executive summary

- 15,293 diagnostic or interventional cases were performed across the 8 cardiac catheterisation laboratory facilities in Queensland public hospitals. Of these, 4,928 were percutaneous coronary intervention (PCI).

- The median age of Aboriginal and Torres Strait Islander patients undergoing PCI is 11 years younger than non- Aboriginal and Torres Strait Islander patients.

- 75% of all PCI patients residing in Queensland had a place of residence within 50km of the nearest PCI capable facility. 12% of patients reside more than 150km from the nearest facility.

- Mortality within 30 days following PCI was 1.9%. Of these 91 deaths, 80% were classed as either salvage or emergency PCI.

- Statewide, a 7-minute improvement in median reperfusion time was observed compared to 2016 PCI analysis.

- Observed rates for cardiac surgery mortality and most results for major morbidities are better than risk scores predict.

- Additions to the cardiac surgery database will allow for calculation of EuroSCORE II, aetiology and microbiology of infective endocarditis, prehospital use of Statins and Anti-hypertensive agents.

- Large proportions of patients have combinations of risk factors, for example obesity and diabetes, smoking and hypertension; emphasising the need for public health programs and primary care for cardiac surgery.

- The reoperation rate for coronary artery bypass graft surgery and deep sternal wound infection in 2017 will be reviewed in detail in the 2018 QCOR annual report.

- 74% of cardiac surgery patients are overweight or obese, including morbid obesity. This will be the focus of the supplement in the next report.

- Seven sites contributed electrophysiology and pacing data with staggered commencement dates for these data collections.

- 3,134 electrophysiology and pacing cases were performed across the 7 participating public Queensland sites.

- 2,131 device procedures and 889 electrophysiology procedures were performed with 114 procedures classed as other.

- The statewide aggregate for all device procedure complications was 4.6%, while all electrophysiology procedures had a 2.6% complication rate overall.

- 6,368 cardiac rehabilitation referrals were made to participating programs in the July–December 2017 period.

- The proportion of Aboriginal and Torres Strait Islander patients receiving a cardiac rehabilitation referral was 6.6%, with wide variation across the state. This population group was more vastly represented in north Queensland.

- A timely cardiac rehabilitation referral (within three days of patient discharge) occurred in 94% of cases.

- Of the timely referrals, a timely cardiac rehabilitation assessment (within 28 days of discharge) occurred in 85% of cases.

- There were 4,528 new heart failure support service referrals in 2017 (13% increase from 2016).

- Benchmarks were achieved for clinical indicators related to timely follow-up of referrals, assessment of left ventricular function, and prescription of angiotensin-converting-enzyme inhibitor or angiotensin II receptor blockers and appropriate beta blockers (bisoprolol, carvedilol, metoprolol sustained release, or nebivolol).

- Beta blocker titration was below recommended benchmarks with only 34% achieving target doses and 70% achieving target or maximum tolerated dose within 6 months from referral.

- Outcomes for the 2016 inpatient referrals highlights substantial disease burden with 14% dying and 58% rehospitalised within 12 months.

- Days alive and out of hospital analysis reveals over 90,000 days lost due to death or hospitalisation in the 2,491 inpatient referral cohort over the following 12 months.

4 Acknowledgements and authors

Interventional Cardiology

Dr Tan Doan
- Research Fellow, Information Support, Research and Evaluation, Queensland Ambulance Service

Dr Paul Garrahy
- Director of Cardiology, Princess Alexandra Hospital
- Chair, Statewide Cardiac Clinical Network

Dr Christopher Hammett
- Interventional Cardiologist, Royal Brisbane and Women's Hospital

A/Prof Richard Lim
- Interventional Cardiologist, Princess Alexandra Hospital

Dr Rohan Poulter
- Director of Cardiology, Sunshine Coast University Hospital

Mr Marcus Prior
- Principal Project Manager, Statewide Cardiac Clinical Informatics Unit

A/Prof Atifur Rahman
- Interventional Cardiologist, Gold Coast University Hospital

Mr Brett Rogers
- Statewide Reperfusion Coordinator, Queensland Ambulance Service

Mr Michael Savage
- Consultant Cardiac Physiologist, The Prince Charles Hospital

Dr Ian Smith
- Biostatistician, Statewide Cardiac Clinical Informatics Unit

Dr Gregory Starmer
- Director of Cardiology, Cairns Hospital
- Chair, QCOR Interventional Cardiology Committee

Mr William Vollbon
- Manager, Statewide Cardiac Clinical Informatics Unit

Cardiac Surgery

Dr Christopher Cole
- Cardiothoracic Surgeon, Princess Alexandra Hospital
- Chair, QCOR Cardiothoracic Surgery Committee

Mr Marcus Prior
- Principal Project Manager, Statewide Cardiac Clinical Informatics Unit

Dr Ian Smith
- Biostatistician, Statewide Cardiac Clinical Informatics Unit

Mr William Vollbon
- Manager, Statewide Cardiac Clinical Informatics Unit

Electrophysiology and Pacing

Mr John Betts
- Consultant Cardiac Physiologist, The Prince Charles Hospital

Mr Andrew Claughton
- Advanced Cardiac Physiologist, Princess Alexandra Hospital

Dr Russell Denman
- Director, Electrophysiology and Pacing, The Prince Charles Hospital

Ms Sanja Doneva
- Consultant Cardiac Physiologist, Princess Alexandra Hospital

A/Prof John Hill
- Director, Electrophysiology and Pacing, Princess Alexandra Hospital
- Chair, QCOR Electrophysiology and Pacing Committee

Dr Paul Martin
- Electrophysiologist, Royal Brisbane and Women's Hospital

Mr Marcus Prior
- Principal Project Manager, Statewide Cardiac Clinical Informatics Unit

Mr William Vollbon
- Manager, Statewide Cardiac Clinical Informatics Unit

Cardiac Rehabilitation

Mr Gary Bennett
- Nurse Unit Manager, Chronic Disease, The COACH Program, Health Contact Centre

Dr Johanne Neill
- Staff Specialist, Cardiology, Ipswich Hospital

Ms Kathy O'Donnell
- Clinical Nurse Consultant, Heart Health and Cardiac Rehabilitation Program, Gold Coast Hospital and Health Service

Ms Samara Phillips
- Project Manager, Statewide Cardiac Rehabilitation Project, Statewide Cardiac Clinical Network

Mr Marcus Prior
- Principal Project Manager, Statewide Cardiac Clinical Informatics Unit

Mr William Vollbon
- Manager, Statewide Cardiac Clinical Informatics Unit

Mr Stephen Woodruffe
- Chair, QCOR Cardiac Rehabilitation Committee
- Exercise Physiologist, Ipswich Cardiac Rehabilitation Program

Heart Failure Support Services

A/Prof John Atherton
- Director of Cardiology, Royal Brisbane and Women's Hospital
- Co-chair, QCOR Heart Failure Services Committee

Ms Annabel Hickey
- Statewide Heart Failure Services Coordinator

Ms Tracey Nunan
- Nurse Practitioner, Sunshine Coast University Hospital
- Co-chair, QCOR Heart Failure Services Committee

Ms Robyn Peters
- Nurse Practitioner, Princess Alexandra Hospital

Mr Marcus Prior
- Principal Project Manager, Statewide Cardiac Clinical Informatics Unit

Mr William Vollbon
- Manager, Statewide Cardiac Clinical Informatics Unit

Dr Yee Weng Wong
- Heart Failure and Cardiac Transplant Cardiologist, The Prince Charles Hospital

5 QCOR Committees

Interventional Cardiology

Dr Christopher Hammett
- Interventional Cardiologist, Royal Brisbane and Women's Hospital

A/Prof Richard Lim
- Interventional Cardiologist, Princess Alexandra Hospital

Dr Rohan Poulter
- Director of Cardiology, Sunshine Coast University Hospital

A/Prof Atifur Rahman
- Interventional Cardiologist, Gold Coast University Hospital

Dr Niranjan Gaikwad
- Interventional Cardiologist, The Prince Charles Hospital

Dr Ryan Schrale
- Interventional Cardiologist, The Townsville Hospital

Dr Gregory Starmer (Chair)
- Director of Cardiology, Cairns Hospital

Dr Michael Zhang
- Director of Cardiology, Mackay Base Hospital

Cardiac Surgery

Dr Christopher Cole (Chair)
- Cardiothoracic Surgeon, Princess Alexandra Hospital

Dr Anand Iyer
- Cardiothoracic Surgeon, The Townsville Hospital

Dr Morgan Windsor
- Director of Thoracic Surgery, Royal Brisbane and Women's Hospital and The Prince Charles Hospital

Dr Anil Prabhu
- Cardiothoracic Surgeon, The Prince Charles Hospital

Dr Andrie Stroebel
- Cardiothoracic Surgeon, Gold Coast University Hospital

Electrophysiology and Pacing

A/Prof Ravinder Batra
- Electrophysiologist, Gold Coast University Hospital

Mr John Betts
- Consultant Cardiac Physiologist, The Prince Charles Hospital

Mr Andrew Claughton
- Advanced Cardiac Physiologist, Princess Alexandra Hospital

Dr Russell Denman
- Director, Electrophysiology and Pacing, The Prince Charles Hospital

Ms Sanja Doneva
- Consultant Cardiac Physiologist, Princess Alexandra Hospital

Ms Kellie Foder
- Advanced Cardiac Physiologist, Royal Brisbane and Women's Hospital

A/Prof John Hill (Chair)
- Director, Electrophysiology and Pacing, Princess Alexandra Hospital

Dr Paul Martin
- Electrophysiologist, Royal Brisbane and Women's Hospital

Dr Robert Park
- Electrophysiologist, The Townsville Hospital

Ms Leanne Slater
- Clinical Nurse Consultant EP, Princess Alexandra Hospital

Dr Steve Sutcliffe
- Cardiologist, Cairns Hospital

Cardiac Rehabilitation

Mr Godfrey Martis Ajgaonkar
- Nurse Practitioner (Cardiac), Mt Isa Hospital

Mr Gary Bennett
- Nurse Unit Manager, Chronic Disease, The COACH Program, Health Contact Centre

Ms Jacqueline Cairns
- Cardiac Rehabilitation Coordinator, Cairns Hospital

Ms Yvonne Martin
- Clinical Nurse Consultant, Chronic Disease Brisbane South

Dr Johanne Neill
- Staff Specialist, Cardiology, Ipswich Hospital

Ms Samara Phillips
- Project Manager, Statewide Cardiac Rehabilitation Project, Statewide Cardiac Clinical Network

Mr Ben Shea
- A/Clinical Nurse Consultant, Princess Alexandra Hospital

Ms Deborah Snow
- Clinical Nurse Consultant, Heart Health and Cardiac Rehabilitation Program, Gold Coast Hospital and Health Service

Ms Marie Steer
- Physiotherapist, Complex Chronic Disease Team, Metro North Hospital and Health Service

Mr Stephen Woodruffe (Chair)
- Exercise Physiologist, Ipswich Cardiac Rehabilitation Program

Heart Failure Support Services

Ms Julie Adsett
- Physiotherapist, Royal Brisbane and Women's Hospital

Mr Godfrey Martis
- Nurse Practitioner (Cardiac), Mt Isa Hospital

A/Prof John Atherton (Co-chair)
- Director of Cardiology, Royal Brisbane and Women's Hospital

A/Prof Charles Denaro
- Director of Internal Medicine and Aged Care, Royal Brisbane and Women's Hospital

Ms Tina Ha
- Pharmacist, Princess Alexandra Hospital

Ms Annabel Hickey
- Statewide Heart Failure Services Coordinator, The Prince Charles Hospital

Dr George Javorsky
- Clinical Director, Advanced Heart Failure and Cardiac Transplant Unit, The Prince Charles Hospital

Dr Dariusz Korczyk
- Cardiologist, Princess Alexandra Hospital

Dr Louise McCormack
- Cardiologist, Royal Brisbane & Women's Hospital

Ms Emma McGlynn
- Clinical Nurse Consultant, Princess Alexandra Hospital

Ms Kellie Mikkelsen
- A/Clinical Nurse Consultant, Heart Failure Service, The Prince Charles Hospital

Ms Tracey Nunan (Co-chair)
- Nurse Practitioner (Cardiology), Sunshine Coast University Hospital

Ms Robyn Peters
- Nurse Practitioner (Cardiology), Princess Alexandra Hospital

Ms Serena Rofail
- Pharmacist, Royal Brisbane and Women's Hospital

Ms Menaka Sabaratnam
- Physiotherapist, Gold Coast University Hospital

Ms Angie Sutcliffe
- Nurse Practitioner (Heart failure), Cairns Hospital

Dr Steve Sutcliffe
- Cardiologist, Cairns Hospital

Ms Karen Uhlmann
- Acute Sector Manager, Heart Foundation Representative

Dr Yee Weng Wong
- Cardiologist, The Prince Charles Hospital

6 Future plans

The QCOR report has expanded this year to include two new modules for statewide cardiac rehabilitation and electrophysiology and pacing services. The continued growth and success of the registry can be largely credited to the commitment of participating cardiac clinical staff across the state. This work has presented new opportunities for more sophisticated reporting and analyses.

Over the next year, the focus will remain on delivering enhanced and innovative information solutions to support Queensland clinicians in delivering world-class patient care.

- Through increasing insight into the care provided to Queensland cardiac patients across participating domains, more complete analyses regarding outcomes for patients attending across multiple cardiac services are now feasible. In reports to come, allowing more complete results to provide more complete insights into the quality of care provided to our cardiac patients as they journey between various clinical specialty groups. Areas which have been highlighted as a focus for future reports include outcomes for patients that have undergone percutaneous coronary intervention and then subsequent cardiac surgery and the inter-relationship between interventional and outpatient services.

- A new QCOR Structural Heart Disease module is currently being developed with deployment expected in early 2019. This QCOR module has been developed to provide superior procedure reporting capabilities for structural heart disease interventions, device closure, and percutaneous valve replacement and repair procedures, and will enable future statewide participation in national quality and safety activities for transcatheter aortic valve replacement.

- The Annual Cardiac Surgery Audit continues to identify future enhancement opportunities. This is highlighted by this year's supplementary report on infective endocarditis surgical interventions, which recommends adding detail about the microbiology and aetiology of endocarditis infection to the registry. Given the tremendous impact and associated healthcare costs for patients undergoing repeat valve surgery due to prosthetic valve endocarditis, these additions are clearly warranted. These improvements as well as data fields allowing EuroSCORE II Risk Adjustment will be delivered in late 2018.

- In 2017/18 the QCOR provided data and reporting for the of the State Government funded Quality Incentive Payment for performance in cardiac rehabilitation. The registry will continue to build upon the excellent levels of clinician engagement to deliver a contemporary and evidence-based clinical indicator program to support quality improvement activities in this field. New system capabilities will be deployed over the next few months to allow more comprehensive assessment of patient activity and exercise levels and assist clinicians to perform everyday tasks and patient care.

- Electrophysiology and pacing services across Queensland have participated in their first QCOR review. This follows the delivery of a bespoke reporting application by the Statewide Cardiac Clinical Network's Cardiac Information Solutions Program. The project has seen a staggered uptake of the new application throughout 2017 with the final site beginning direct entry in early 2018. This has resulted in an unprecedented availability of data across services where reporting had been predominately paper-based. The report has identified several areas for improved data quality, while another focus will be to collaborate with electrophysiology and pacing clinicians to deliver a future clinical indicator program.

- Heart failure support services across Queensland have now been contributing to the QCOR quality registry since 2014. Over time, the growth of the registry has allowed more sophisticated analyses to be undertaken. This is highlighted by this year's reporting of statewide heart failure patient outcomes, which identified several priority areas for further development of the registry. Additional data points relating to mineralocorticoid receptor antagonists will be added to the data collection in late 2018, while an early investigation and scoping of a potentially new and expanded QCOR heart failure application is also underway.

- Contributions from the Queensland Ambulance Service (QAS) have been integral to the composition of this report. Collaboration between Queensland Health and QAS has been bolstered with continued investment by both organisations into cardiac outcomes. The future of this partnership is promising with a shared goal of improving patient outcomes and pre-hospital processes for Queenslanders suffering cardiovascular disease.

Cardiac Rehabilitation Audit

38 Message from the QCOR Cardiac Rehabilitation Committee Chair

A lot of activity has occurred within the realm of cardiac rehabilitation (CR) over the last few years, and we are excited to publish the first annual report of clinical indicators and service throughput for the latter part of 2017. Evidence suggests that a secondary prevention program such as CR reduces hospital readmission and death within the first year after a coronary event by as much as 56% and 30% respectively, and reduces the risk of repeat myocardial infarction.[22] Furthermore, some UK analyses have found that more than half (57%) of all potentially eligible patients leave hospital without a referral to an outpatient CR program. Despite this, 71% of patients state they would go to CR if a health professional discussed it with them before leaving hospital.[23]

The introduction of a CR Quality Incentive Payment (QIP) in December 2016 directed clinical focus toward ensuring that timely Queensland Health referrals were made to CR and that those patients were assessed within 28 days of being discharged from hospital.

Concurrently, the incoming Queensland Government provided three-year project funding to improve referral to, uptake of, and quality of outpatient CR services. With this financial support, QCOR was able to concentrate on and generate a CR-specific web-based module that supported clinical practice. A new registry tool was built to not only capture clinical indicators and key data points for reporting purposes, but also supported the practice of CR service delivery at the point of care. The QCOR CR module enables the generation of electronic referrals as well as pre- and post CR intervention assessments.

In July 2017, the QCOR CR module was released for use among all Queensland public outpatient CR programs and was mandated as the tool to capture CR QIP activity. The initial utilisation of QCOR data has been focused on generating reports that support the CR QIP initiative. For this process, 53 outpatient CR sites were identified and included (some programs deliver from multiple sites) with the vast majority of these programs using the application as part of routine practice by 31 December 2017.

As a frontline CR clinician who has utilised this module since its inception, I can attest to its wide-reaching benefit to our field. The current usability and multifaceted features (data collection, pre/post outcome comparison and report generation), as well as its future capabilities, positions the QCOR CR module as an industry leader.

This first annual report focuses on the front end of the outpatient CR patient journey. There is sufficient data available to comment on the referral to, and uptake of outpatient CR, as well as identified clinical indicators extracted from the pre- assessment phase. Future reports will incorporate post assessment data and allow analysis of changes and improvements in clinical status made by the CR model of care employed.

Stephen Woodruffe
Chair
QCOR Cardiac Rehabilitation Committee

Samara Phillips
Project Manager
Statewide Cardiac Rehabilitation Project

Cardiac Rehabilitation

39 Key findings

This first Cardiac Rehabilitation (CR) report includes the first 6 months of data collected through the statewide CR database (QCOR Cardiac Rehabilitation module) implemented on 1 July 2017.

Findings of the report include:

- 6,368 referrals were made to participating CR programs in the July–December 2017 period.

- Overall there were 44 public outpatient CR programs that participated in CR data reporting.

- Male patients aged between 65 years and 69 years comprised the largest cohort based on age category and gender.

- Of all referrals, 68% patients were male.

- The proportion of Aboriginal and Torres Strait Islander patients was 6.6%, with wide variation across the state. This population group was more vastly represented in north Queensland.

- Over three-quarters of patients (81%) were overweight, obese or morbidly obese.

- Only 34% of patients meet the physical activity guidelines for their age and are sufficiently active.

- The majority of patients presented with ischaemic heart disease (65%) with the remainder having either valvular disease (7%) or other diagnoses (28%).

- 59% of all referrals received an outpatient CR assessment within any timeframe.

- Patients electing to decline (35%), clinically inappropriate referrals (14%) and referred outside Queensland Health (10%) are the main reasons that patients don't attend an outpatient CR assessment.

- A timely referral (within three days of patient discharge) occurred in 94% of cases.

- Of the timely referrals, a timely assessment (within 28 days of discharge) occurred in 85% of cases.

40 Participating sites
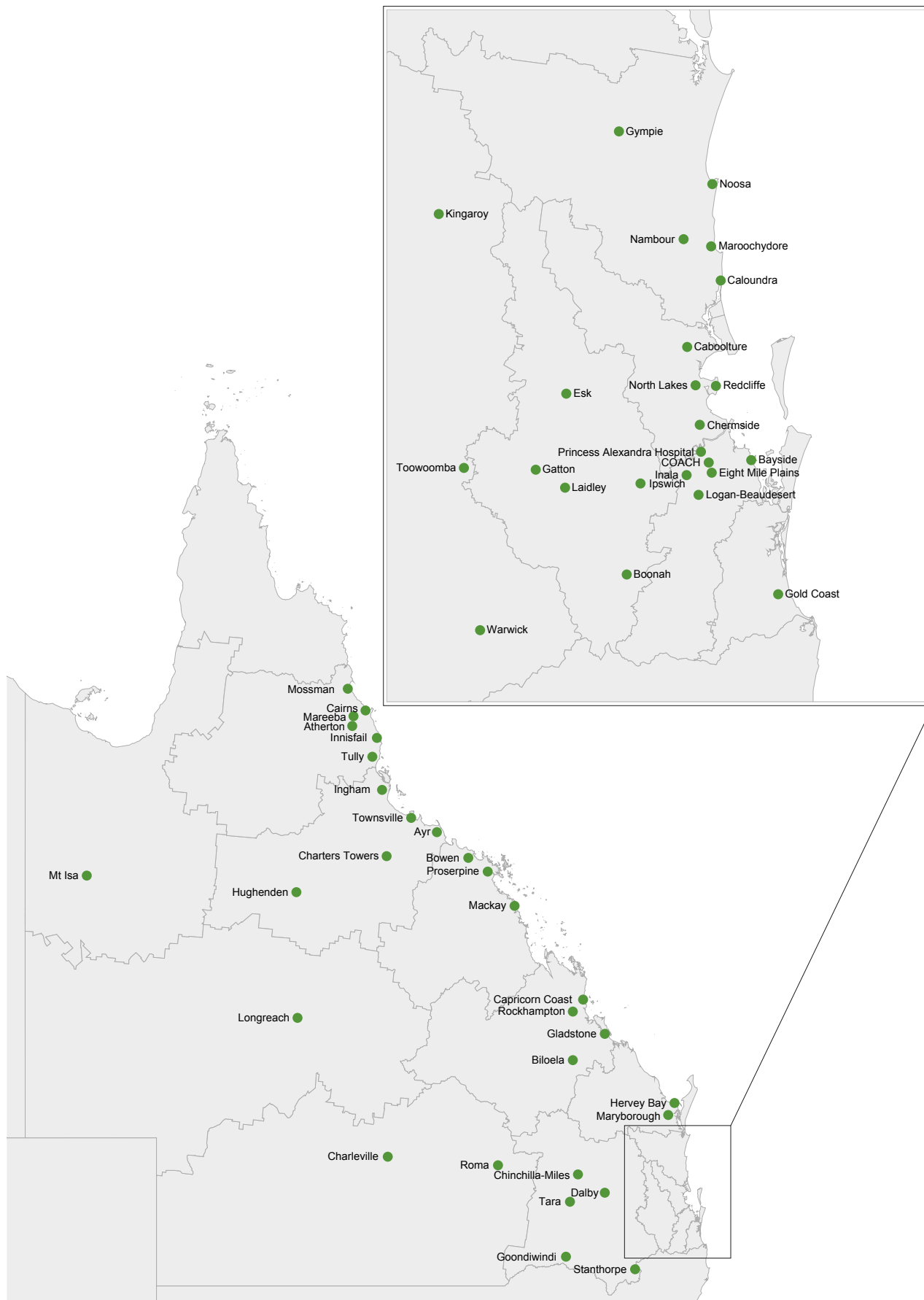
Figure 1:   Queensland public CR sites

Table 1: Participating CR sites by Hospital and Health Service

HHS	Cardiac rehabilitation program	Participating
Cairns and Hinterland	Atherton	Y
	Cairns	Y
	Innisfail	Y
	Mareeba	Y
	Mossman	Y
	Tully	Y
Central Queensland	Biloela	Y
	Capricorn Coast	Y
	Gladstone	Y
	Rockhampton	Y
Central West	Longreach	Y
Darling Downs	Chinchilla-Miles	Y
	Dalby	Y
	Goondiwindi	Y
	Kingaroy	Y
	Stanthorpe	–
	Tara	Y
	Toowoomba	Y
	Warwick	Y
Gold Coast	Gold Coast University Hospital	Y
Health Contact Centre	COACH	Y
Mackay	Bowen	–
	Mackay	Y
	Proserpine	Y
Metro North	Caboolture	Y
	Chermside	Y
	North Lakes	Y
	Redcliffe	Y
Metro South	Bayside	Y
	Eight Mile Plains	Y
	Inala	Y
	Logan-Beaudesert	Y
	Princess Alexandra Hospital	Y
North West	Mt Isa	Y
South West	Charleville	Y
	Roma	Y
Sunshine Coast	Caloundra	Y
	Gympie	Y
	Maroochydore	Y
	Nambour	Y
	Noosa	Y
Townsville	Ayr	–
	Charters Towers	–
	Hughenden	–
	Ingham	Y
	Townsville	Y
West Moreton	Boonah	Y*
	Esk	Y*
	Gatton	Y*
	Ipswich	Y
	Laidley	Y*
Wide Bay	Hervey Bay	Y
	Maryborough	Y

*   Totals for Boonah, Esk, Gatton and Laidley are reported under Ipswich

41 Total referrals

44 CR programs (undertaken at 48 sites) participated in data collection for the latter half of 2017. The programs received a total of 6,368 referrals, the majority of which (78%) originated from the inpatient setting.

It is important to note that the total referral count may be understated as not all CR programs had been entering referrals from private practice, general practitioners, and self-referrals due to the initial focus on capturing inpatient referrals from public hospitals.

Table 2: Referral sources by CR outpatient program HHS

HHS	Inpatient n (%)	Outpatient n (%)	External n (%)
Cairns and Hinterland	289 (81.9)	21 (5.9)	43 (12.2)
Central Queensland	521 (62.8)	150 (18.1)	159 (19.2)
Central West	12 (75.0)	3 (18.8)	1 (6.3)
Darling Downs	190 (76.3)	20 (8.0)	39 (15.7)
Gold Coast	639 (80.0)	80 (10.0)	80 (10.0)
Health Contact Centre	916 (90.9)	86 (8.5)	6 (0.6)
Mackay	101 (80.8)	18 (14.4)	6 (4.8)
Metro North	451 (67.6)	51 (7.6)	165 (24.7)
Metro South	757 (83.2)	27 (3.0)	126 (13.8)
North West	34 (68.0)	11 (22.0)	5 (10.0)
South West	19 (95.0)	1 (5.0)	-
Sunshine Coast	496 (90.8)	28 (5.1)	22 (4.0)
Townsville	225 (89.3)	24 (9.5)	3 (1.2)
West Moreton	195 (48.6)	69 (17.2)	137 (34.2)
Wide Bay	119 (83.8)	22 (15.5)	1 (0.7)
STATEWIDE	**4,964 (78.0)**	**611 (9.6)**	**793 (12.5)**

For referrals originating from an inpatient setting, the largest referrer was Metro North Hospital and Health Service (HHS) which accounted for over a quarter (28%) of referrals. The largest CR program was the COACH Program (Health Contact Centre) which received 19% of all inpatient referrals.

Table 3: CR inpatient referrals by source and destination HHS

HHS	Outgoing inpatient referrals n (%)	Incoming inpatient referrals n (%)
Cairns and Hinterland	250 (5.0)	289 (5.8)
Central Queensland	393 (7.9)	521 (10.5)
Central West	-	12 (0.2)
Darling Downs	92 (1.9)	190 (3.8)
Gold Coast	640 (12.9)	639 (12.9)
Health Contact Centre	-	916 (18.5)
Mackay	108 (2.2)	101 (2.0)
Mater Health Services	51 (1.0)	-
Metro North	1,363 (27.5)	451 (9.1)
Metro South	1,002 (20.2)	757 (15.2)
North West	5 (0.1)	34 (0.7)
South West	-	19 (0.4)
Sunshine Coast	467 (9.4)	496 (10.0)
Townsville	431 (8.7)	225 (4.5)
West Moreton	83 (1.7)	195 (3.9)
Wide Bay	79 (1.6)	119 (2.4)
STATEWIDE	**4,964 (100.0)**	**4,964 (100.0)**

Cardiac Rehabilitation

The flow of inpatient referrals from the originating HHS (acute site) to the CR outpatient program HHS is illustrated in the diagram below. The majority of inpatient referrals remained within the originating HHS, though this varied between sites.
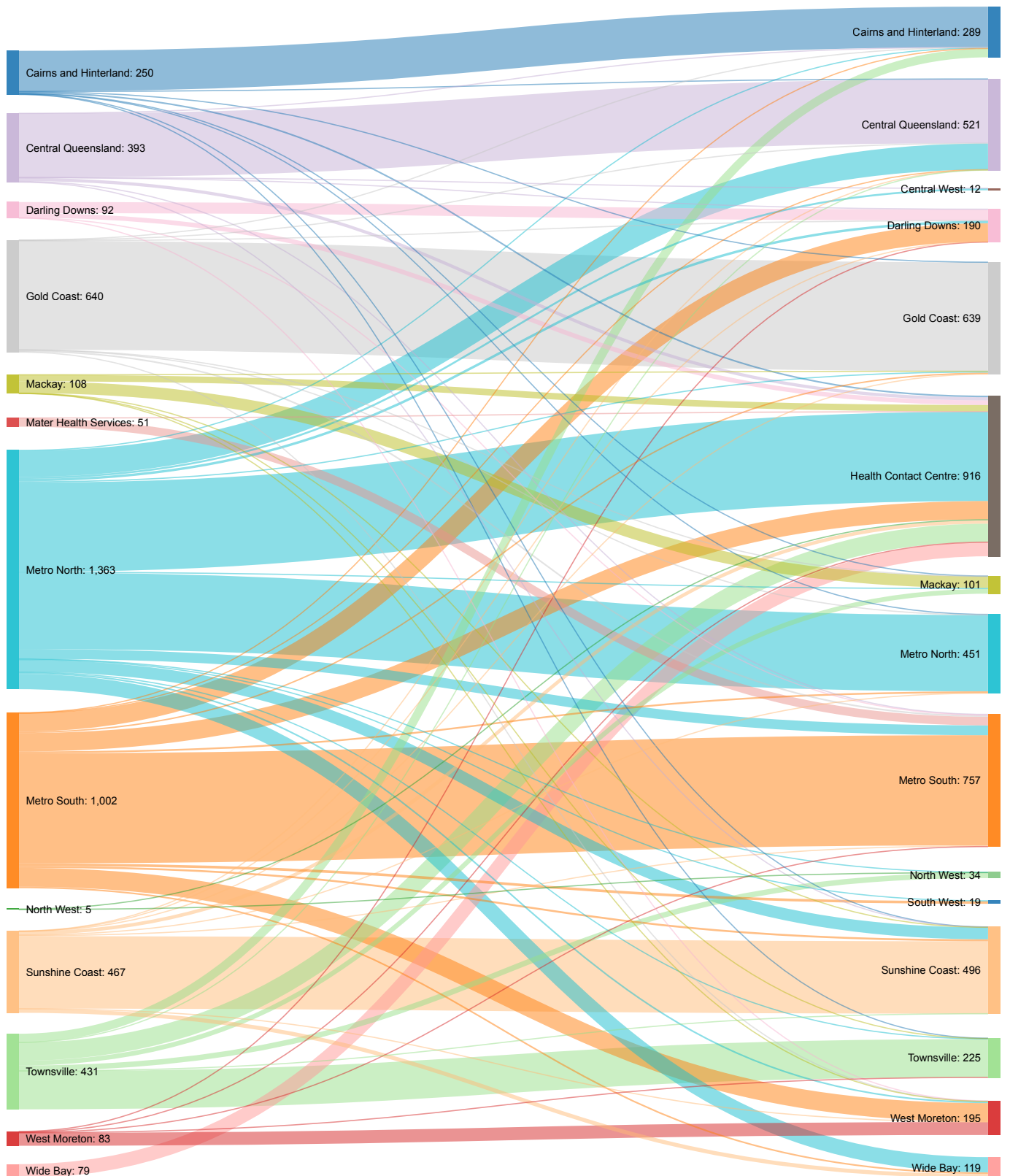
Figure 2:   CR inpatient referrals by source and destination HHS

42 Patient characteristics

42.1 Age and gender

The age distribution of referrals differed for gender. The highest proportion of referrals for both males and females was in the 65 year to 69 year age group, which included 16% of all referrals.

Overall, 68% of patients were male and 32% female.
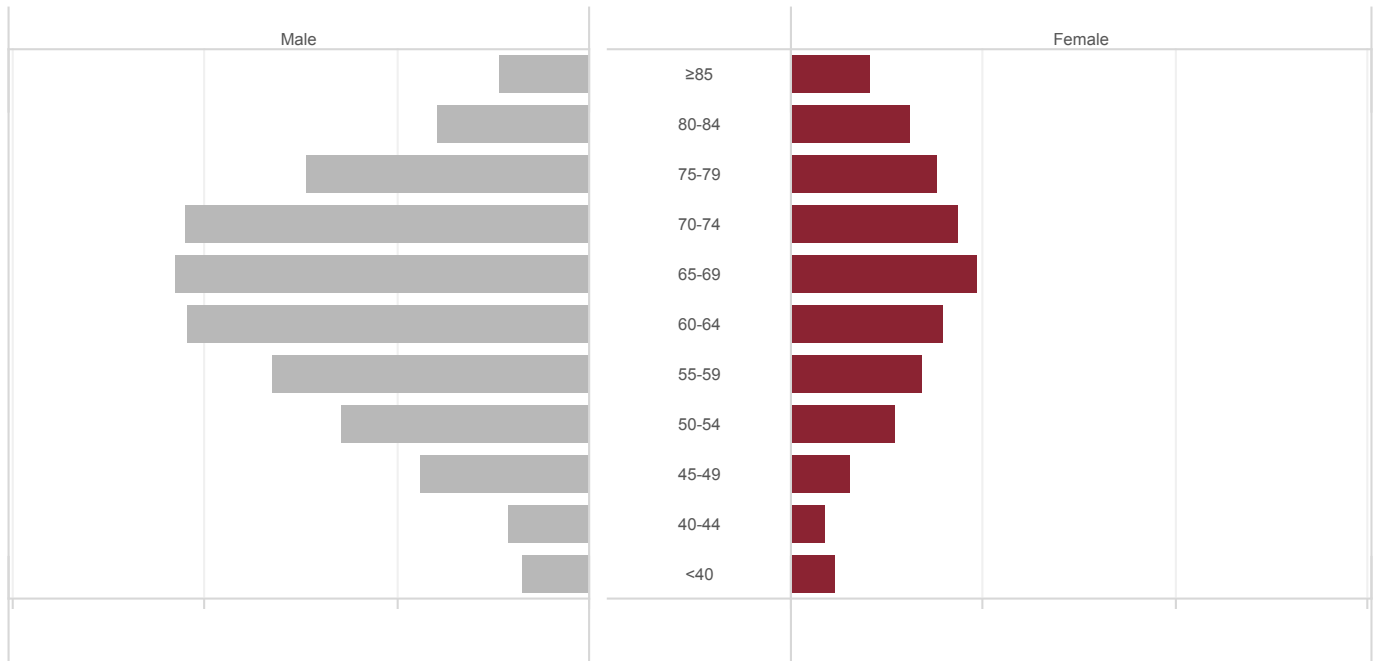
% of total referrals (n=6,368)

Figure 3:   Referrals by patient gender and age group

Table 4:   Median patient age by gender and HHS

HHS	Male (years)	Female (years)	ALL (years)
Cairns and Hinterland	61.3	60.2	61.2
Central Queensland	65.5	67.5	66.3
Central West	65.2	66.2	65.2
Darling Downs	65.7	66.4	65.8
Gold Coast	65.8	69.2	67.2
Health Contact Centre	65.3	69.8	66.8
Mackay	63.2	66.9	63.4
Metro North	66.3	68.8	67.1
Metro South	64.1	65.9	64.4
North West	56.2	60.6	59.1
South West	65.5	62.6	64.2
Sunshine Coast	68.9	67.5	68.6
Townsville	63.7	62.5	62.9
West Moreton	64.7	65.7	65.0
Wide Bay	69.3	65.1	69.1
STATEWIDE	**65.3**	**67.3**	**65.9**

42.2 Aboriginal and Torres Strait Islander status

Aboriginal and Torres Strait Islander patients represented 6.6% of all statewide referrals with considerable variation observed across HHSs.

Cairns, North West, South West and Townsville HHSs all reported greater than 15% of case load identifying as Aboriginal and Torres Strait Islander.

Table 5:   Aboriginal and Torres Strait Islander status by HHS

HHS	Indigenous n (%)	Non-Indigenous n (%)	Not stated/unknown n (%)
Cairns and Hinterland	101 (28.6)	240 (68.0)	12 (3.4)
Central Queensland	60 (7.2)	705 (84.9)	65 (7.8)
Central West	2 (12.5)	14 (87.5)	-
Darling Downs	17 (6.8)	229 (92.0)	3 (1.2)
Gold Coast	7 (0.9)	748 (93.6)	44 (5.5)
Health Contact Centre	87 (8.6)	916 (90.9)	5 (0.5)
Mackay	1 (0.8)	122 (97.6)	2 (1.6)
Metro North	23 (3.4)	617 (92.5)	27 (4.0)
Metro South	25 (2.7)	866 (95.2)	19 (2.1)
North West	17 (34.0)	33 (66.0)	-
South West	4 (20.0)	16 (80.0)	-
Sunshine Coast	15 (2.7)	525 (96.2)	6 (1.1)
Townsville	40 (15.9)	212 (84.1)	-
West Moreton	16 (4.0)	267 (66.6)	118 (29.4)
Wide Bay	7 (4.9)	132 (93.0)	3 (2.1)
STATEWIDE	**422 (6.6)**	**5,642 (88.6)**	**304 (4.8)**

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43 Total assessments

CR programs consist of multidisciplinary teams providing health education, physical activity, counselling, behaviour modification strategies and support for patient self-management.

The model of care each program implements is dependent upon the local resources and demands. All have a common aim to maximise the physical, psychological and social functioning of people with cardiac disease as well as introduce and encourage behaviours that are known to minimise the risk of further cardiac events and reduce avoidable hospital admissions. The team may comprise of a CR nurse, physiotherapist or exercise physiologist, and other health professionals.

CR service delivery may be individual or group-based, and may be located in the home, centre or via virtual means. Regardless of the specific model of care employed by individual CR programs, the main elements of outpatient CR are consistent and include:

1   Assessment, review and follow-up,

2   Low or moderate intensity physical activity, and

3   Education, discussion and counselling.

The pre-assessment comprises a review of the presenting, medical and social history as well as a comprehensive cardiac disease risk factor review. The pre-assessment occurs prior to the patient attending a CR program and can be undertaken over the phone or face-to-face. When the identified assessment minimum dataset has been obtained, the assessment is considered complete and for the purposes of QIP, deemed eligible.

The number of total referrals proceeded to a pre-assessment (within any timeframe) is 60%.

Table 6:   Total pre-assessments completed by HHS

HHS	Fully assessed n (%)	Not assessed n (%)	Missing data n (%)
Cairns and Hinterland	232 (65.7)	103 (29.2)	18 (5.1)
Central Queensland	409 (49.3)	407 (49.0)	14 (1.7)
Central West	13 (81.3)	3 (18.8)	-
Darling Downs	129 (51.8)	113 (45.4)	7 (2.8)
Gold Coast	391 (48.9)	408 (51.1)	-
Health Contact Centre	578 (57.3)	421 (41.8)	9 (0.9)
Mackay	81 (64.8)	44 (35.2)	-
Metro North	386 (57.9)	281 (42.1)	-
Metro South	691 (75.9)	219 (24.1)	-
North West	46 (92.0)	4 (8.0)	-
South West	14 (70.0)	3 (15.0)	3 (15.0)
Sunshine Coast	355 (65.0)	188 (34.4)	3 (0.5)
Townsville	116 (46.0)	135 (53.6)	1 (0.4)
West Moreton	255 (63.6)	134 (33.4)	12 (3.0)
Wide Bay	99 (69.7)	43 (30.3)	-
STATEWIDE	**3,795 (59.6)**	**2,506 (39.4)**	**67 (1.1)**

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There are several reasons why patients may not proceed through to a complete assessment. Patients may decline the service, be uncontactable or medically unsuitable for program completion. Interstate referrals also account for a significant proportion of patients not assessed, particularly in the Gold Coast HHS where a high number of patients referred reside in New South Wales.

Of those patients referred to CR, 39% do not complete a full assessment which highlights the difficulties encountered in providing services. Patients choosing to decline assessment and intervention represented the most common reason for not proceeding with the CR program.

This decline usually occurs when the clinician makes initial contact with the patient. In some instances, the clinician may still opportunistically provide education and advice though this is difficult to document.
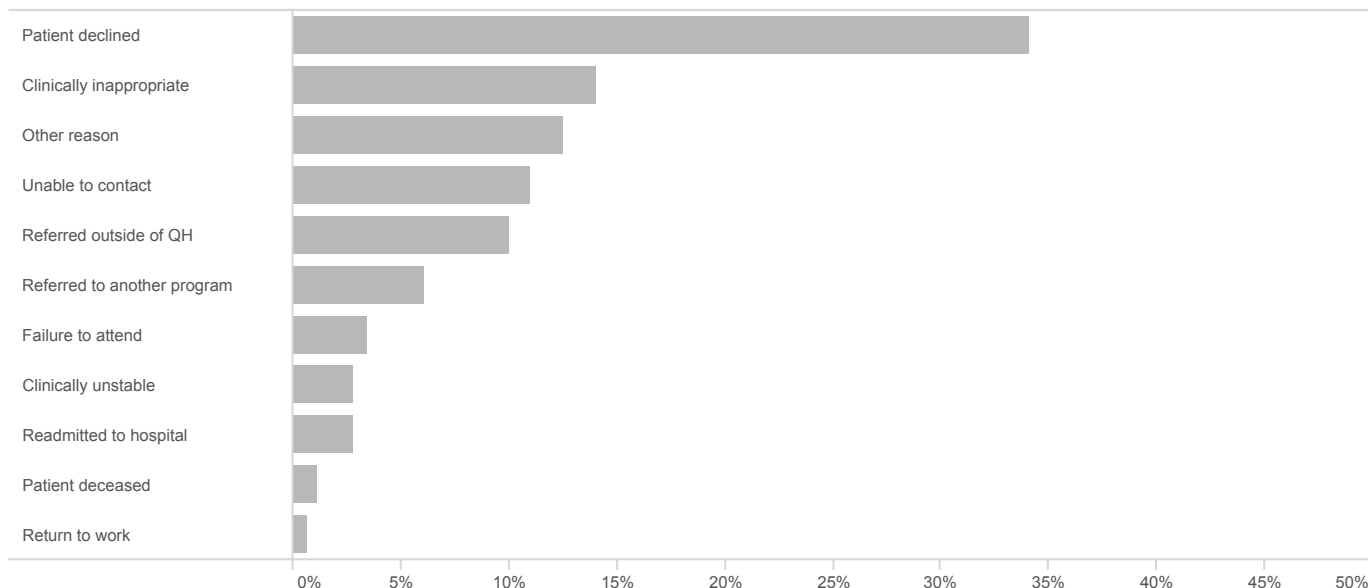

Figure 4:   Reasons pre assessment was not conducted

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44 Clinical presentation

44.1 Diagnosis

Patients have been grouped into a diagnosis category for the following analysis. The majority of assessments (65%) were related to a previous diagnosis of ischaemic heart disease (IHD).

Table 7:   Assessments by diagnosis and diagnosis category

Diagnosis	Category	Total n (%)
NSTEMI	IHD	2,455 (64.7)
NSTEMI, Arrhythmia		
NSTEMI, Arrhythmia, Other		
NSTEMI, CHF		
NSTEMI, CHF, Arrhythmia		
NSTEMI, CHF, Arrhythmia, Other		
NSTEMI, CHF, Valvular disease		
NSTEMI, Other		
NSTEMI, Stable angina		
NSTEMI, Unstable angina		
NSTEMI, Unstable angina, Valvular disease		
NSTEMI, Valvular disease		
Stable angina		
Stable angina, Arrhythmia		
Stable angina, Other		
Stable angina, Unstable angina		
Stable angina, Unstable angina, Other		
Stable angina, Valvular disease		
Stable angina, Valvular disease, Other		
STEMI		
STEMI, Arrhythmia		
STEMI, Arrhythmia, Other		
STEMI, NSTEMI		
STEMI, Other		
Unstable angina		
Unstable angina, Arrhythmia		
Unstable angina, Arrhythmia, Other		
Unstable angina, Other		
Unstable angina, Valvular disease		
Arrhythmia, Valvular disease	Valvular disease	278 (7.3)
Arrhythmia, Valvular disease, Other		
CHF, Valvular disease		
Valvular disease		
Valvular disease, Other		
Arrhythmia	Other	1,062 (28.0)
Arrhythmia, Other		
CHF		
CHF, Arrhythmia		
CHF, Other		
Other		
Total		**3,795 (100.0)**

44.2   Risk factors and comorbidities

The following risk factors and comorbidities are presented according to the diagnosis categories listed in Table 7. These areas are discussed during the assessment phase and self-reported by the patient.

It is important to note with self-reporting instances, sometimes the responses are not accurately communicated while the patient and clinician are in the establishment phase of their relationship. As a result, it is expected that some of the risk factor metrics may be understated.

There are a number of opportunities for data quality improvement with the steering committee identifying the data definitions as a focus for development. This will ensure that a consistent approach and categorisation can be applied which would allow uniform analyses and comparison between sites.

44.2.1   Smoking

At the time of the pre-assessment, 10% of patients were identified as current smokers (defined as smoking within 30 days prior to assessment).
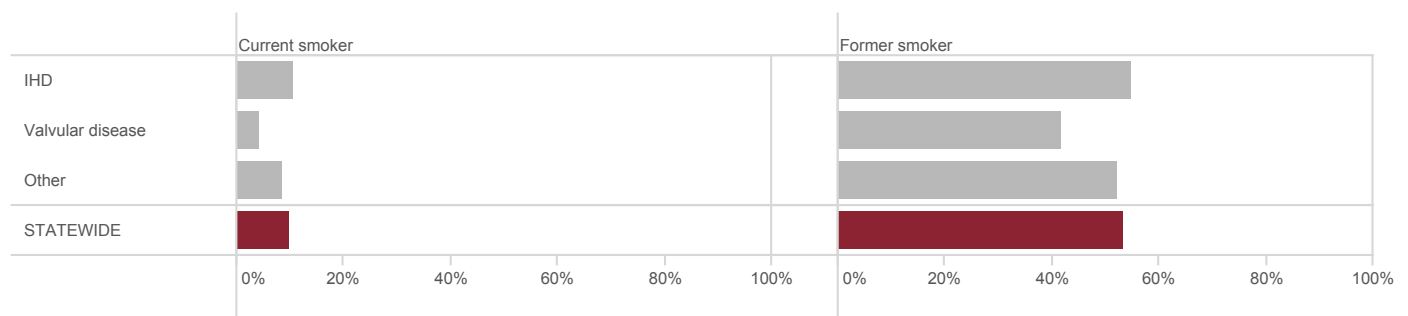
Figure 5:   Smoking status by diagnosis category

44.2.2   Body mass index

Less than one quarter (18%) of patients were identified as having a BMI within the normal range, while the majority (81%) of patients attending outpatient CR were classified as overweight, obese or morbidly obese. Less than 1% of patients were classified as underweight (BMI <18.5 kg/m^2).
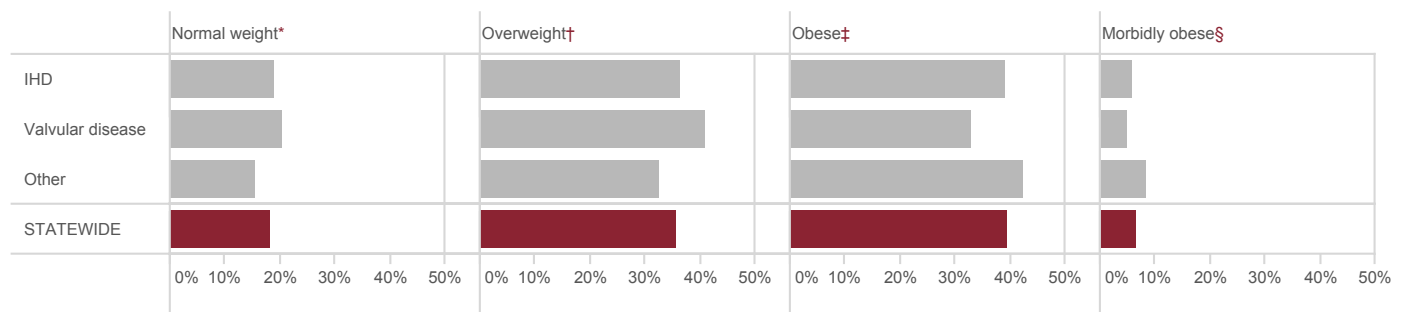
*   BMI 18.5–24.9 kg/m^2

†   BMI 25–29.9 kg/m^2

‡   BMI 30–39.9 kg/m^2

§   BMI ≥40 kg/m^2

Figure 6:   BMI category by diagnosis category

44.2.3   Diabetes

Overall, 27% of patients had diabetes as a comorbidity with considerable variation observed between diagnosis categories, ranging from 16% to 31%.
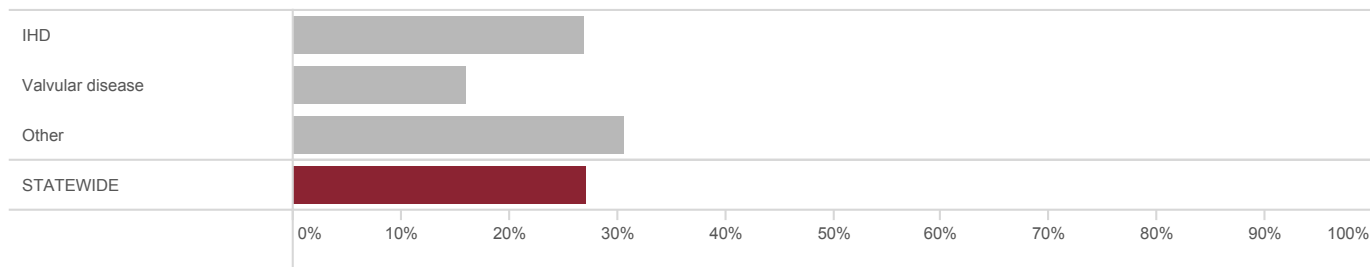
Figure 7:   Diabetes by diagnosis category

44.2.4   High blood pressure

More than half of patients (62%) were identified as having hypertension, ranging from 53% to 69% across diagnosis categories.
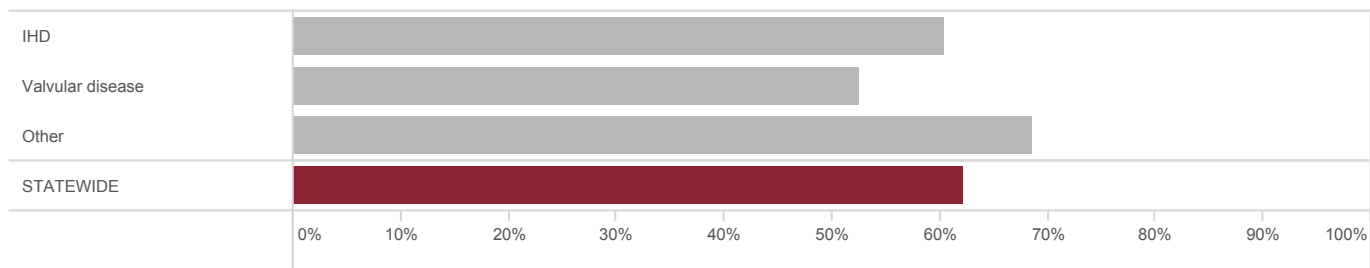
Figure 8:   High blood pressure by diagnosis category

44.2.5   Abnormal cholesterol

65% of patients had abnormal cholesterol levels. Abnormal cholesterol levels for patients with known cardiovascular disease include a measure of:

- Total cholesterol <4.0mmol/L
- HDL >1.0mmol/L
- LDL <2.0mmol/L
- Triglycerides <2.0mmol/L.[24]
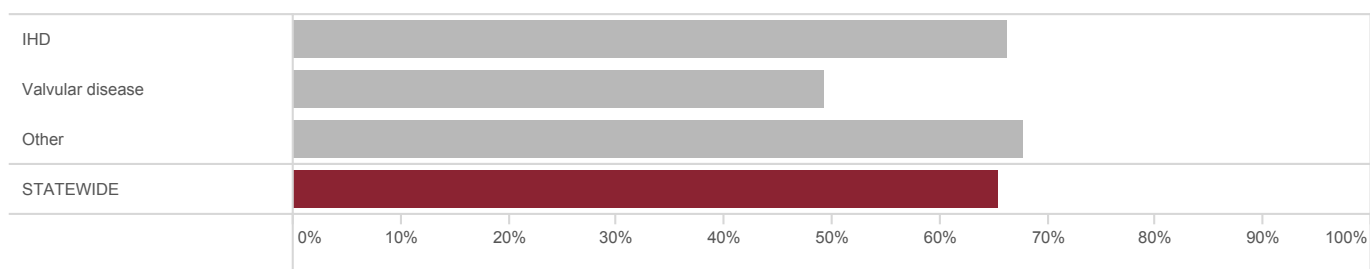
Figure 9:   Abnormal cholesterol by diagnosis category

44.2.6   Family history of cardiovascular disease

44% of patients had a family history of cardiovascular disease. This had been defined as having a first degree relative diagnosed with cardiovascular disease by the age of 60 years.
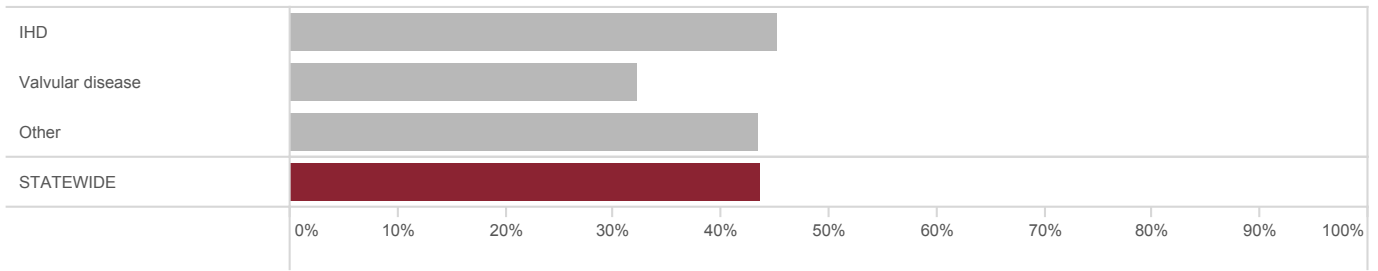
Figure 10: Family history of cardiovascular disease by diagnosis category

44.2.7   Heart failure

12% of patients assessed for outpatient CR were documented as having heart failure as a comorbidity.
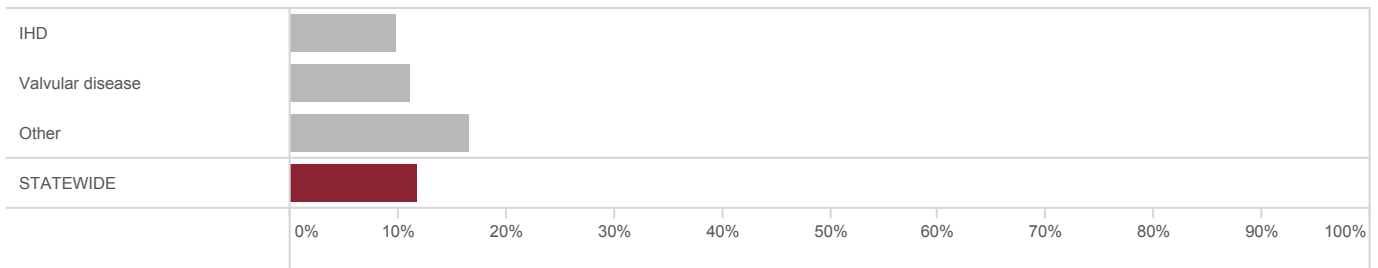
Figure 11: Heart failure by diagnosis category

44.2.7.1 LV dysfunction

Of the patients documented to have heart failure as a comorbidity (Figure 11), 88% were classed as having impaired left ventricular ejection fraction (LVEF). This included 27% with mild LV dysfunction, 37% with moderate LV dysfunction and 23% with severe LV dysfunction. The remainder (12%) were documented as having normal LV function (LVEF ›50%).
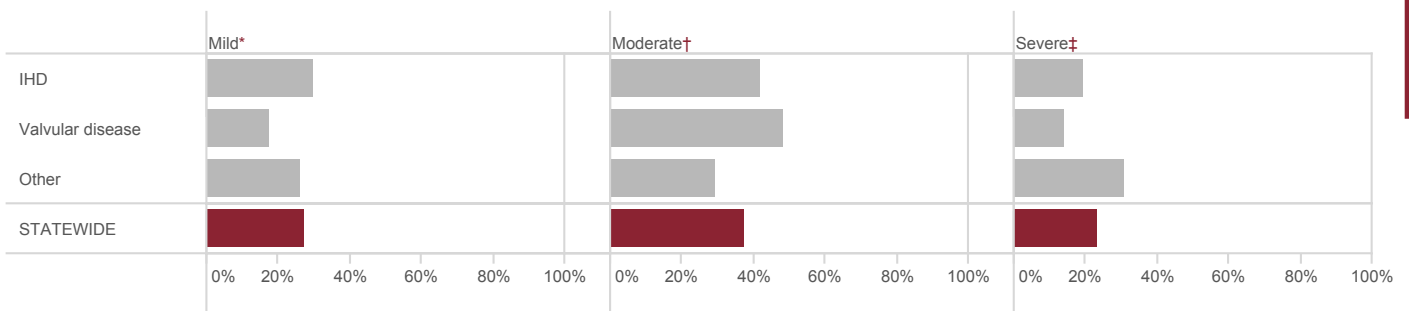
*   LVEF 40%–49%

†   LVEF 30%–39%

‡   LVEF ‹30%

Figure 12: Severity of LV dysfunction by diagnosis category

44.2.8   History of depression

Over one-quarter of patients (27%) had a history of depression prior to experiencing the most recent cardiac event.
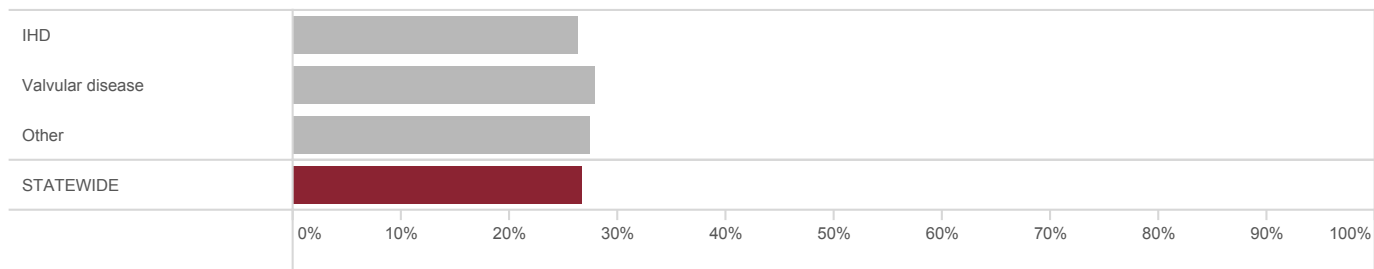
Figure 13: History of depression by diagnosis category

44.2.9   Activity level

34% of patients met the physical activity guidelines for their age and were sufficiently active. Conversely, 19% of patients were classed as inactive meaning they only undertake activities associated with daily living.
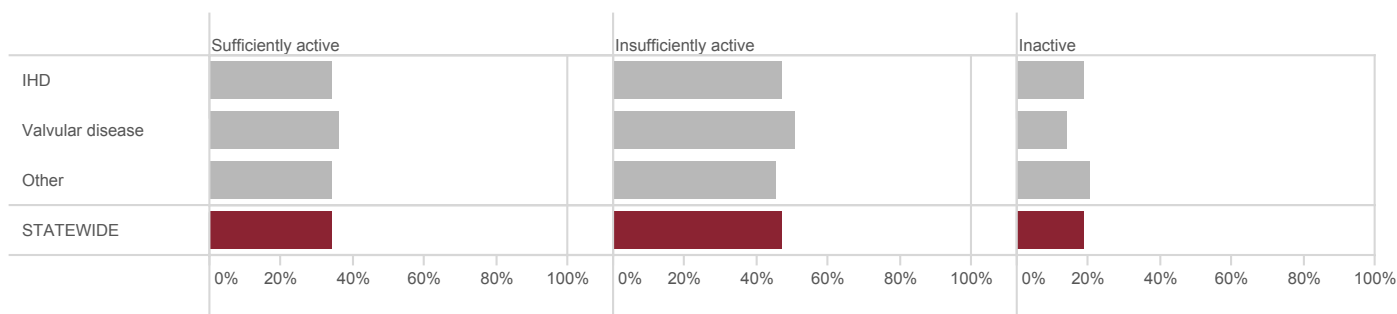
Figure 14: Activity level by diagnosis category

44.2.10   Alcohol consumption

The majority of patients indicated at the initial assessment that they did not consume any alcohol at all (60%).[25] 12% of patients exceeded the guideline of two standard drinks per day.[25]
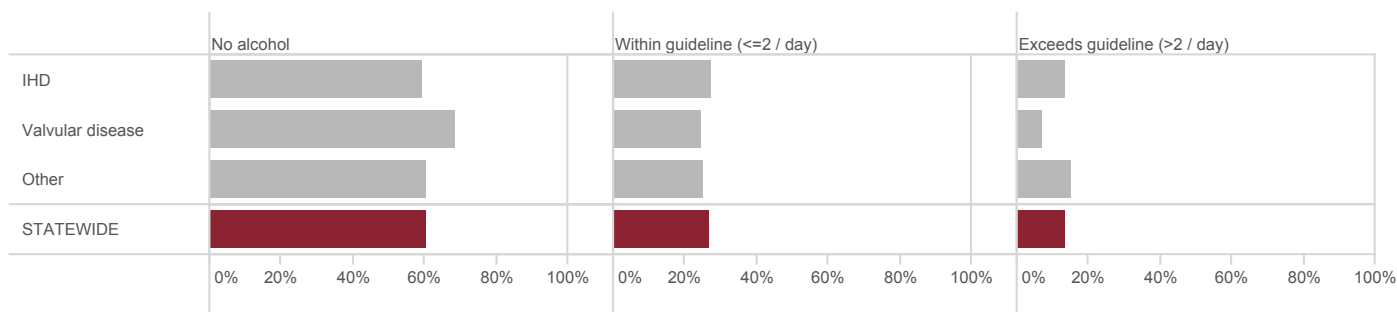
Figure 15: Alcohol consumption by diagnosis category

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44.3 Current medications

Table 8:   *Current medications by diagnosis category*

Medications	IHD (%)	Valvular disease (%)	Other (%)	ALL (%)
Aspirin	87.2	57.7	66.9	79.3
ACEI / ARB	61.2	42.3	52.9	57.5
Antiplatelet	64.3	10.0	35.3	52.2
Anticoagulant	15.2	55.9	25.3	21.0
Beta blocker	62.4	48.0	54.0	59.0
Lipid lowering	86.2	53.4	71.0	79.5
Sublingual nitrate	54.6	4.3	28.0	43.5
Diabetic medications	20.4	10.7	21.8	20.1
Diuretic	10.5	29.2	19.2	14.3
Other medications	44.3	57.3	49.6	46.8

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45 Clinical indicators

For this first annual report, the initial emphasis has been towards the introduction of the QCOR CR module to outpatient programs and the collection of data supporting the CR QIP. The two clinical indicators included are similar to those used by Queensland Health to determine eligibility for the CR QIP reward:

1. Timely referral – proportion of patients receiving a referral to CR within three calendar days of hospital discharge.
2. Timely assessment – proportion of timely referrals to CR where the patient completed an initial CR assessment within 28 days of hospital discharge.

For reporting purposes the QCOR CR committee determined that these indicators would be applied to all public inpatient referrals regardless of whether the patient had had an overnight stay (which is required for CR QIP eligibility).

Future reports will expand the clinical indicator analysis to include additional clinical performance and quality benchmarks. This will include an analysis of changes in patient risk factors between the CR pre-assessment and post assessment.

As data collection continues to evolve, opportunities to examine outcome measures such as patient rehospitalisation and mortality will be explored.

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45.1 Timely referral

The vast majority (94%) of referrals generated within a public hospital to a participating CR program were made within three days of the patient being discharged.

Performance was consistent across most sites, however, there were some challenges associated with the implementation of the new QCOR module due to logistical and technical barriers. This may explain some observed variation.

Table 9:   Inpatient referrals created within three days of discharge from a Queensland Health facility

	Referrals (n)
Eligible for analysis	4,724
Achieved target	4,440
Target not achieved	284
Ineligible for analysis	1,404
Not a Queensland Health referral	757
Not an inpatient referral	647
Incomplete data	240
Total referrals	**6,368**

Table 10:   Proportion of CR referrals completed within 3 days of hospital discharge by acute site

HHS	Acute site	Total analysed (n)	Met 3 day target (%)
Cairns and Hinterland	Cairns Hospital	238	94.5
Central Queensland	Gladstone Hospital	6	–
	Rockhampton Hospital	350	97.1
Darling Downs	Chinchilla Hospital	1	–
	Toowoomba Hospital	84	94.0
Gold Coast	Gold Coast University Hospital	610	82.8
Mackay	Mackay Base Hospital	100	99.0
	Proserpine Hospital	1	–
Mater Health Services	Mater Hospital Brisbane	30	73.3
Metro North	Caboolture Hospital	84	96.4
	Redcliffe Hospital	13	–
	Royal Brisbane & Women's Hospital	245	79.6
	The Prince Charles Hospital	969	97.5
Metro South	Logan Hospital	123	99.2
	Princess Alexandra Hospital	800	98.4
	Queen Elizabeth II Jubilee Hospital	29	96.6
	Redland Hospital	44	97.7
North West	Mount Isa Base Hospital	5	–
Sunshine Coast	Gympie Hospital	6	–
	Sunshine Coast University Hospital	457	98.5
Townsville	The Townsville Hospital	409	93.2
West Moreton	Ipswich Hospital	41	85.4
Wide Bay	Bundaberg Base Hospital	79	96.2
STATEWIDE		**4,724**	**94.0**

Sites not displayed where there are less than 20 cases available for analysis

Cardiac Rehabilitation

45.2 Timely assessment

From the sub-group of patients that receive a timely referral, the timely assessment indicator is calculated. The target is that a comprehensive patient initial assessment occurs within 28 days of the patient being discharged from hospital.

There was a total of 4,440 acute referrals which met the target for timely referral, and are thus eligible for this indicator.

Table 11:   Acute referrals assessed within 28 days of hospital discharge

	Referrals (n)
Eligible for analysis	2,624
Achieved target	2,236
Target not achieved	388
Ineligible for analysis	1,771
Patient declined	615
Other reason	375
Clinically unstable / inappropriate	292
Unable to contact	199
Referred outside of Queensland Health	162
Failure to attend	60
Readmitted to hospital	47
Patient deceased	21
Incomplete data	45
Total timely inpatient referrals	**4,440**

Table 12:   Proportion of pre assessments completed within 28 days of hospital discharge by HHS

HHS	Total analysed (n)	Met 28 day target (%)	Median days to assessment
Cairns and Hinterland	180	87.2	21
Central Queensland	189	31.2	46
Central West*	9	–	–
Darling Downs	79	83.5	18
Gold Coast	238	91.2	7
Health Contact Centre	464	85.8	14
Mackay	61	75.4	19
Metro North	254	85.4	15
Metro South	522	92.9	10
North West	29	86.2	14
South West*	13	–	–
Sunshine Coast	319	97.8	13
Townsville	90	94.4	8
West Moreton	103	91.3	13
Wide Bay	74	82.4	20
STATEWIDE	**2,624**	**85.2**	**14**

*   Not displayed due to less than 20 assessments available for analysis

Table 13: Proportion of pre assessments completed within 28 days of hospital discharge by site

HHS	CR program	Total analysed (n)	Met 28 day target (%)	Median days to assessment
Cairns and Hinterland	Atherton	4	–	–
	Cairns	146	91.8	20
	Innisfail	11	–	–
	Mareeba	5	–	–
	Mossman	9	–	–
	Tully	5	–	–
Central Queensland	Biloela	5	–	–
	Capricorn Coast	3	–	–
	Gladstone	42	50.0	28.5
	Rockhampton	139	25.9	52
Central West	Longreach	9	–	20
Darling Downs	Chinchilla-Miles	1	–	–
	Dalby	4	–	–
	Kingaroy	18	–	–
	Toowoomba	46	91.3	16
	Warwick	10	–	–
Gold Coast	Gold Coast University Hospital	238	91.2	7
Health Contact Centre	COACH	464	85.8	14
Mackay	Mackay	52	76.9	19
	Proserpine	9	–	–
Metro North	Caboolture	51	92.2	15
	Chermside	88	88.6	11
	North Lakes	86	75.6	21
	Redcliffe	29	93.1	15
Metro South	Bayside	122	91.8	11.5
	Eight Mile Plains	51	98.0	8
	Inala	43	97.7	8
	Logan-Beaudesert	213	96.7	7
	Princess Alexandra Hospital	93	80.6	21
North West	Mt Isa	29	86.2	14
South West	Charleville	5	–	–
	Roma	8	–	–
Sunshine Coast	Caloundra	82	100.0	12.5
	Gympie	56	98.2	13
	Maroochydore	42	100.0	13
	Nambour	83	95.2	14
	Noosa	56	96.4	14.5
Townsville	Ingham	7	–	–
	Townsville	83	100.0	8
West Moreton	Ipswich	103	91.3	13
Wide Bay	Hervey Bay	51	82.4	20
	Maryborough	23	82.6	20
STATEWIDE		**2,624**	**85.2**	**14**

Sites not displayed where there are less than 20 cases available for analysis

Cardiac Rehabilitation

46 Conclusions

This first QCOR report captures 6 months of activity and data relating to 6,368 referrals to 44 participating outpatient CR programs from July through December 2017. The information provides an initial snapshot of the clinical characteristics of patients referred to outpatient CR, while the initial focus has been towards the initial implementation of the CR module to capture CR QIP activity.

Going forward, it is hoped that outpatient CR programs would use the QCOR CR solution to capture all inpatient, outpatient, private, GP and self-referrals, which would allow comprehensive reporting across the breadth of outpatient CR. This will provide great opportunities for CR programs to undertake service planning and reviews using QCOR data.

The report shows that acute sites are performing well, with 94% of referrals made within three days of hospital discharge even though not all hospitals have a dedicated CR nurse seven days per week. This high level of performance indicates that this responsibility can be shared across the hospital community.

Timely assessment by the CR outpatient program (pre assessment conducted within 28 days of hospital discharge) occurred in 84% of cases. The majority of HHSs achieved this target in over 80% of cases, however there is considerable variation in target achievement across the state. This should prompt further exploration and mapping of resourcing, staffing and CR service delivery models. Furthermore, investigation of the underlying reasons for patients declining to attend outpatient CR has been identified as a priority for further expansion of the dataset.

The Queensland Health CR QIP ceased on 30 June 2018, however key indicators will continue to be monitored through QCOR. The QCOR CR module has proven to be very useful in capturing quality data to enable benchmarking and allow service improvements to be measured. The transition to the ongoing use of QCOR and implementation of an ongoing clinical indicator program in the absence of CR QIP is essential to ensure ongoing quality measurement and benchmarking of care delivery for this patient cohort.

47 Recommendations

The introduction of QCOR CR module has provided a standardised means for capturing structured CR data for the first time. This initial review generates an unprecedented snapshot of statewide CR practice that will be instrumental in development and further refining of services offered to Queenslanders. To assist and maintain success of the program, it is recommended that:

1. CR clinicians continue the support and commitment toward the QCOR initiative in order to build a more comprehensive view of a patient's journey through CR in Queensland. This would include using the CR module for all patients attending outpatient CR, such as referrals from general practitioners, private hospitals and self-referrals.

2. The registry builds upon existing collaboration with Queensland Health internal partners such as the Clinical Excellence Division and System Performance Reporting to ensure continued delivery of health service economic benefits beyond the initial period of the CR QIP.

3. The QCOR CR module is enhanced to further provide a platform that accommodates the breadth of CR services now and into the future. These enhancements may consider the increasing role of mobile devices, telephone-based programs such as COACH and local challenges of individual site resourcing and regional accessibility.

4. The potential to enhance QCOR beyond the existing dataset is explored, and developed into an extended specification that encompasses further measures in the areas of physical wellbeing and exercise. Similarly, exploration of alternative quality of life measures with the goal of being able to provide enhanced patient-centred outcome indicators.

5. The CR module builds upon existing site-based initiatives to understand patient needs outside traditional CR offerings. This would include investigation of declined and non-assessment reasons for service planning as well as developing the capabilities of QCOR to link with non-Queensland Health services such as interstate health agencies and private CR programs.

6. CR clinicians continue to work collaboratively to expand and develop a comprehensive evidence-based clinical indicator frame-work. This will enable enhanced data quality and improvement in the ability to benchmark statewide clinical practice across participating sites.

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59 Glossary

ACC	American College of Cardiology
ACEI	Angiotensin Converting Enzyme Inhibitor
ACS	Acute Coronary Syndromes
ANZSCTS	Australian and New Zealand Society of Cardiac and Thoracic Surgeons
ARB	Angiotensin II Receptor Blocker
ARNI	Angiotensin Receptor-Neprilysin Inhibitors
ASD	Atrial Septal Defect
BCIS	British Cardiovascular Intervention Society
BiV	Biventricular
BMI	Body Mass Index
BMS	Bare Metal Stent
BVS	Bioresorbable Vascular Scaffold
CABG	Coronary Artery Bypass Graft
CCL	Cardiac Catheter Laboratory
CH	Cairns Hospital
CHF	Congestive Heart Failure
CI	Clinical Indicator
CR	Cardiac Rehabilitation
CRT	Cardiac Resynchronisation Therapy
CS	Cardiac Surgery
CV	Cardiovascular
CVA	Cerebrovascular Accident
DAOH	Days Alive and Out of Hospital
DEM	Department of Emergency Medicine
DES	Drug Eluting Stent
DOSA	Day Of Surgery Admission
DSWI	Deep Sternal Wound Infection
ECG	12 lead Electrocardiograph
eGFR	Estimated Glomerular Filtration Rate
EP	Electrophysiology
FdECG	First Diagnostic Electrocardiograph
FTE	Full Time Equivalent
GCUH	Gold Coast University Hospital
GP	General Practitioner
HF	Heart Failure
HFpEF	Heart Failure with Preserved Ejection Fraction
HFrEF	Heart Failure with Reduced Ejection Fraction
HFS	Heart Failure Service
HFSS	Heart Failure Support Service
HHS	Hospital and Health Service
IC	Interventional Cardiology
ICD	Implantable Cardioverter Defibrillator
ICD-10	International Classification of Diseases 10th edition
IHT	Interhospital Transfer
IVDU	Intravenous Drug Use
KPI	Key Performance Indicator
LAA	Left Atrial Appendage
LAD	Left Anterior Descending Artery
LCX	Circumflex Artery
LOS	Length Of Stay
LV	Left Ventricle
LVEF	Left Ventricular Ejection Fraction
MBH	Mackay Base Hospital
MI	Myocardial Infarction

MRA	Mineralocorticoid Receptor Antagonists
MSSA	Methicillin-sensitive Staphylococcus aureus
NCDR	The National Cardiovascular Data Registry
NGH	Nambour General Hospital
NOAC	Non-Vitamin K Antagonist Oral Anticoagulants
NP	Nurse Practitioner
NRBC	Non-Red Blood Cells
NSTEMI	Non ST-Elevation Myocardial Infarction
PAH	The Princess Alexandra Hospital
PCI	Percutaneous Coronary Intervention
PDA	Patent Ductus Arteriosus
PFO	Patent Foramen Ovale
QAS	Queensland Ambulance Service
QCOR	Queensland Cardiac Outcomes Registry
QE II	Queen Elizabeth II Jubilee Hospital
QH	Queensland Health
QHAPDC	Queensland Hospital Admitted Patient Data Collection
QIP	Quality Incentive Payment
RBC	Red Blood Cells
RBWH	The Royal Women's and Brisbane Hospital
RCA	Right Coronary Artery
RHD	Rheumatic Heart Disease
SCCIU	Statewide Cardiac Clinical Informatics Unit
SCCN	Statewide Cardiac Clinical Network
SHD	Structural Heart Disease
STEMI	ST-Elevation Myocardial Infarction
STS	Society of Thoracic Surgery
TAVR	Transcatheter Aortic Valve Replacement
TMVR	Transcatheter Mitral Valve Replacement
TPCH	The Prince Charles Hospital
TPVR	Transcatheter Pulmonary Valve Replacement
TTH	The Townsville Hospital
VCOR	Victorian Cardiac Outcomes Registry
VF	Ventricular Fibrillation
VSD	Ventricular Septal Defect

60 Upcoming initiatives

- Improved collaboration with the Rheumatic Heart Disease (RHD) Register and Control Program is a key objective in the recently published RHD Action Plan. As of September 2018, rheumatic heart disease is a notifiable condition in Queensland. QCOR will work with the RHD Register to improve the quality and ease of access to related information. The QCOR currently reports to relevant National clinical registries and its currently participating in the development of the National Cardiac Registry and the National Cardiac Rehabilitation Registry.

- Cardiac outreach services are delivered to regional and remote sites across Queensland, primarily by staff from large tertiary hospitals. There is limited data about the quality and effectiveness of these services. QCOR will develop and deploy a centralised data collection and reporting module to enhance coordination of services and monitor the care provided to patients residing in rural and remote locations in Queensland. The new QCOR module is anticipated to be in place in early 2019.

- The final project for delivery from the Statewide Cardiac Clinical Network's Cardiac Information Solutions Program is currently being deployed. The ECG Flash: 24/7 Clinical Advice and ECG Interpretation Service connects clinical staff in rural and remote locations with cardiologists in metropolitan facilities. The system allows rapid inter-hospital clinical interpretation of 12-lead ECG readings and clinical advice for patients with challenging clinical presentation. To date, the system has been deployed in 5 Hospital and Health Services and will be deployed in most services by the end of 2019.

Patient presents in emergency department with chest pain.

ECG is taken and is difficult to interpret.

Remote clinicians use ECG Flash solution to request a specialist ECG interpretation.

Calls back the treating clinician with specialist advice.

Receives an email with a digital copy of the ECG and contact details.

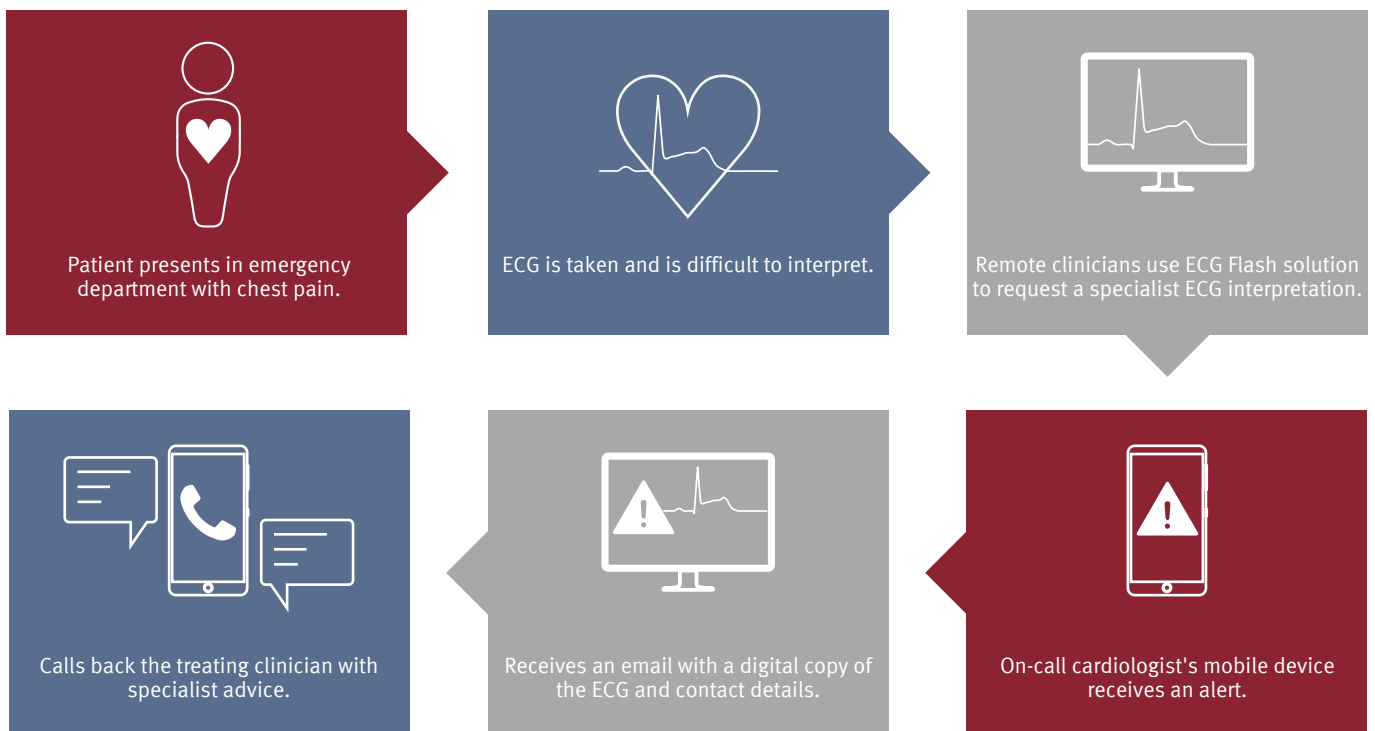On-call cardiologist's mobile device receives an alert.

Figure C: Concept model for rapid inter-hospital clinical interpretation of 12-lead ECGs (CISP ECG Flash Project)