The Melbourne Institute of Applied Economics and Social Research

REPORT SUBMITTED TO THE

EASTERN MELBOURNE PRIMARY HEALTH NETWORK

FOR RESEARCH INTO THE

Evaluation of Right Care Better Health

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Glossary of acronyms

Acronym	Full term	Brief description / role in this report
ABS	Australian Bureau of Statistics	National statistical agency; source of SEIFA/IRSD area-level disadvantage measures.
AQoL-8D	Assessment of Quality of Life – 8 Dimension	Generic multi-attribute utility instrument used in some comparator integrated-care trials.
ATC	Anatomical Therapeutic Chemical (classification)	Standard system for classifying medicines; used in POLAR to group prescription medicines.
BMI	Body Mass Index	Weight (kg) / height (m^2); used in RCBH eligibility criteria (e.g., ≥30 or ≤18.5).
CEA	Cost-Effectiveness Analysis	Economic evaluation comparing costs and outcomes (e.g., QALYs) of health interventions.
COPD	Chronic Obstructive Pulmonary Disease	Chronic respiratory condition; key target condition for RCBH.
CRM	Customer Relationship Management	Data system used by EMPHN to manage program-related contacts and information.
DiD	Difference-in-Differences	Quasi-experimental method comparing changes over time in treated vs comparison groups; implemented as an event-study for RCBH.
DH	Department of Health	Refers to health department / funder stakeholders (e.g., Victorian or Australian Government health departments).
EACH	Eastern Access Community Health	Community health provider contracted by EMPHN to employ NCCs and deliver the RCBH program in participating practices.
ED	Emergency Department	Hospital emergency care; reductions in ED presentations are a key RCBH objective.
EMPHN	Eastern Melbourne Primary Health Network	One of 31 PHNs nationally; commissions RCBH and provides data (including POLAR and provider datasets) for evaluation.
EQ-5D-5L / EQ5D5L	EuroQol 5-Dimension 5-Level	Standardised health-related quality-of-life instrument; used to derive utility values and QALYs for RCBH cost-effectiveness.
FIM	Functional Independence Measure	Scale of functional status used in some comparator integrated-care trials.
FROP-COM	Falls Risk for Older People in the Community	Falls risk screening tool; used in RCBH frailty eligibility criteria.
GP	General Practitioner	Primary care physician; central to identification, referral, and collaboration with NCCs in RCBH.
HARP	Hospital Admission Risk Program	Tool/score indicating risk of hospitalisation; incompletely measured for RCBH patients in POLAR.

Acronym	Full term	Brief description / role in this report
HAT	Hospital Avoidance Tool	Tool used to assess hospital-avoidance risk; only sporadically collected in provider data.
HREC	Human Research Ethics Committee	University of Melbourne ethics committee that approved the RCBH evaluation.
HTA	Health Technology Assessment	Process for evaluating clinical and cost-effectiveness of health interventions; QALYs are central to HTA in Australia.
ICER	Incremental Cost-Effectiveness Ratio	Difference in costs divided by difference in QALYs between intervention and comparator; conceptually underpinning discussion, though analysis here is "pseudo" without a control QALY series.
IRSD	Index of Relative Socio-economic Disadvantage	SEIFA index summarising area-level disadvantage; linked to patient postcodes.
LGA	Local Government Area	Small-area geographic unit; used for counts of eligible patients per LGA/suburb/practice.
LHN	Local Health Network	Hospital/network-level entity; considered in Program Logic for changes in ED/hospital admissions.
MBS	Medicare Benefits Schedule	Schedule of subsidised medical services; MBS item use is a key utilisation outcome in POLAR.
MDG	Multidisciplinary Group	Team-based care meetings evaluated in UK integrated-care research cited in the literature review.
MI	Melbourne Institute of Applied Economic & Social Research	Research institute commissioned by EMPHN to develop the evaluation strategy and conduct the RCBH evaluation.
MSAC	Medical Services Advisory Committee	Australian HTA body advising on public funding of medical services and procedures, using QALY-based CEAs.
NCC	Nurse Care Coordinator	Community-health-employed nurse embedded in general practices to deliver RCBH care coordination.
PBAC	Pharmaceutical Benefits Advisory Committee	Australian HTA body advising on public funding of medicines and vaccines, using QALY-based CEAs.
PIH	Partners in Health	12-item chronic condition self-management scale (max 108); collected for Silverchain RCBH patients.
POLAR	Population Level Analysis and Reporting	Linked electronic medical record data asset used by EMPHN; backbone dataset for primary-care utilisation analyses.
PREM	Patient Reported Experience Measure	7-item plus 2 single-item patient experience survey used to assess RCBH patient experience and satisfaction.

Acronym	Full term	Brief description / role in this report
QALY / QALYs	Quality-Adjusted Life Year(s)	Summary measure of health benefit combining length and quality of life; outcome metric in pseudo cost-effectiveness analysis.
RCBH	Right Care Better Health	Nurse-led care coordination program for older adults with chronic and complex conditions in EMPHN's catchment.
RE-AIM	Reach, Effectiveness, Adoption, Implementation, Maintenance	Framework used to guide evaluation scope and interpretation of RCBH program impact and sustainability.
SEIFA	Socio-Economic Indexes for Areas	ABS-created indices of area-level socio-economic conditions; IRSD is one SEIFA index used here.
WTP	Willingness-To-Pay (threshold)	Monetary value per QALY (e.g., ~$50,000 in Australia) used to judge whether a program is "cost-effective."
WSICP	Western Sydney Integrated Care Program	Australian integrated-care program used as a qualitative and contextual comparator to RCBH.

Executive Summary

The Right Care Better Health (RCBH) program is a nurse-led care coordination initiative designed to support people with complex and chronic health needs across eastern and northern Melbourne. Under this model, community health-employed nurse care coordinators (NCCs) are embedded within general practices to identify unmet needs, support navigation across health and aged care systems, and enhance patient self-management. The program targets people with cardiovascular disease, respiratory disease and/or frailty, with the broader objective of improving quality of life and reducing preventable hospitalisations.

EMPHN commissioned the Melbourne Institute to conduct a formal evaluation of the Reach and Effectiveness of RCBH, consistent with the "Reach, Effectiveness, Adoption, Implementation, Maintenance" (RE-AIM) framework and elements of the RCBH Program Logic. This evaluation combined three main components: (1) detailed descriptive analyses of monthly provider datasets and patient forms from EACH and Silverchain; (2) a pseudo cost-effectiveness analysis using quality of life (EQ5D5L) measures and development of an automated EQ5D5L Australian value set tool to derive quality-adjusted life years (QALYs); and (3) a quasi-experimental event-study difference-in-difference analysis using linked POLAR data covering January 2022 to August 2025.

First, we find that the RCBH program is reaching its intended target population, enrolling older patients with high chronic disease burden—particularly those with cardiovascular disease and frailty. RCBH patients also reported positive care experiences and high levels of satisfaction with the program. Early signs of effectiveness in patient reported health outcomes are modest, however improvements in quality of life were generally more pronounced for Silverchain relative to EACH patients. However, these differences were not statistically significant and the costs per QALY gained indicate that the program is unlikely to be cost-effective under standard Australian willingness-to-pay thresholds.

POLAR analysis showed that RCBH enrolment led to a substantial, albeit short-run activation of care: GP visits increase by around 42%, multidisciplinary care plans by 78%, prescriptions by 15%, and referrals by 69% in the quarter of enrolment. Most of this uplift tapers back toward baseline within 1-2 quarters, although referrals remain moderately elevated for up to four post-enrolment quarters. These effects are more pronounced for Silverchain patients and patients living in more disadvantaged regions; the latter suggesting that the model of care is particularly effective for patients who may have greater levels of unmet need.

Altogether, the results suggest that RCBH is successfully activating multidisciplinary and preventive care among targeted patients, particularly those living in areas with higher socioeconomic disadvantage. Whether this short-run activation translates into sustained improvements in patient outcomes, preventative healthcare utilisation, or reductions in acute care will depend on longer follow-up and improved data infrastructure.

1. Project context

1.1 Background

Eastern Melbourne Primary Health Network (EMPHN) is one of 31 Primary Health Networks in Australia. Its mission is to facilitate health system improvement for people in eastern and north-eastern Melbourne (EMPHN, 2024). EMPHN achieves this by improving access to existing services, commissioning new services for better health outcomes, and supporting innovation among general practitioners (GPs) and other healthcare professionals.

EMPHN's work focuses on several key areas, including chronic disease, aged care, mental health, alcohol and other drug issues, digital health, Aboriginal and Torres Strait Islander health, immunisation, and general practice support. The organisation emphasises values such as integrity, collaboration, and courage, and is committed to equity and inclusion in its operations and services.

In 20202, EMPHN launched the Right Care Better Health (RCBH) program to support patients with complex, chronic needs through coordinated, patient-centred care. Participating general practices receive a nurse care coordinator (NCC) who is integrated into the practice and on-site at least one day per week. Working with GPs, nurses, and administrative staff, NCCs identify patients who would benefit from care coordination and, once referred and enrolled, provide end-to-end support. Their responsibilities include personalised health coaching and self-management support; triaging and expediting referrals; convening case conferences with the patient's GP and other providers; developing and maintaining chronic-condition care plans; helping patients interpret test results, procedures, and medicines; conducting in-home health assessments; and arranging practical navigation such as appointment bookings and transport to practices or other healthcare providers.

The RCBH program specifically targets patients with complex and chronic conditions who might not be utilising the full spectrum of clinical and support services available, focusing on patients with cardiovascular disease, chronic respiratory disease, and/or frailty (or at risk of falls). The key theory underpinning the program is that clinical and support services are crucial for improving RCBH patient well-being and reducing

unnecessary hospital admissions. In addition, the RCBH program aims to facilitate shared learning and enable a practice-led transformation in managing complex and chronic conditions in primary care settings.

The patient eligibility criteria for the RCBH program is provided in Box 1 below.

Box 1 - Patient eligibility criteria as based on the Version 7 Design Statement

People with cardiovascular disease: Cardiovascular disease (e.g. heart failure, hypertension, atrial fibrillation) and 18 years and above

People with respiratory conditions: Respiratory disease (e.g. chronic obstructive pulmonary disease [COPD], asthma) and 18 years and above

People considered frail or at high risk of falls:

At least two of the following criteria must apply:

- Aged over 65 years, or 50 years and over for Aboriginal and/or Torres Strait Islander peoples
- Taking more than five medicines
- Prescribed medicines that increase susceptibility to falls, including but not limited to Anticholinergic medicines; Medicines with a sedative effect; Medicines used to treat hypertension

Additional criteria may include:

- Body Mass Index (BMI) ≥ 30 or ≤ 18.5
- Previous fall and/or functional decline, or mobility issues *(as determined through clinical assessment)*
- Score of 4–6 on the Clinical Frailty Scale as determined by a clinician
- Score of 4–6 on the FROP-COM (Falls Risk for Older People in the Community) falls screening tool

Key objectives of the RCBH program[1] include:

- Reduce unplanned hospitalisations and avoidable emergency presentations among participating patients
- Improve patients' quality of life
- Improve patients' ability, understanding, and involvement in managing their condition
- Promote a positive experience of care for patients and clinicians
- Embed team-based, nurse-supported care coordination as an integrated and sustainable feature of general practice

1.2 Previous Evaluation Strategy

In 2024, EMPHN engaged the Melbourne Institute of Applied Economics & Social Research (MI) to develop a comprehensive evaluation strategy for the latest iteration of the RCBH program. In response to this request, the MI team proposed several feasible, data-driven evaluation designs that can be used to evaluate RCBH, including cost-effectiveness analysis, within-practice/individual difference-in-differences (DiD), dose-response, and case-control crossover analyses. Each option was benchmarked against similar evaluations of integrated care programs completed in Australia and overseas by conducting a comprehensive literature review. The proposed evaluation approaches were then presented to EMPHN staff through meetings, workshops, and detailed briefings in order to build a shared understanding of the scope, methods, and practical implications of each option. In the report, we documented the strengths and limitations of each proposed evaluation method, together with the key data requirements and dependencies for each method that would need to be in place for the analysis to be able to be conducted.

The final strategy recommended a mixed evaluation approach that maximises the use of data already collected by practices, EMPHN, and external sources, noting also the dynamic nature of data collection and uncertainty on the data quality. We emphasised

[1] As sourced from "Design Statement V7 Aug 2025".

that there would need to be targeted improvements to data-collection processes to support a robust evaluation of RCBH. In particular, we emphasised the importance of consistent information capture over time across the different service providers (EACH and Silverchain) and across RCBH-participating practices, so that the outcomes and demographic information can be streamlined, comparisons of program effectiveness across different settings can be conducted reliably, and statistical estimation remains as sound as possible. Drawing on comparator programs, we specified outcome measures that could be suitable for DiD designs that EMPHN could potentially capture, including clinical scales to measure health outcomes for cardiovascular disease, chronic respiratory disease, and frailty. We also identified sociodemographic information that would be useful to include as control variables in any future statistical models that are estimated, which could also be used to stratify the models to conduct heterogeneity analysis (i.e. to see which type of patients the program effects the most). The sociodemographic information we suggested included standard and non-standard measures such as age, sex, income, medication used, ethnicity, and health conditions.

A review of EMPHN's data landscape at the time identified the Population Level Analysis and Reporting (POLAR) platform as the primary data backbone that could be used for this work, with scope to augment POLAR using other registry data, provider datasets from EACH and Silverchain, and other data assets as provided. The POLAR dataset seemed particularly attractive due to its excellent coverage of health and sociodemographic information in near real-time. Using POLAR would allow the evaluation to rely on detailed, routinely collected information, while reserving the option to supplement gaps. when necessary, through other data sources.

The evaluation strategy also flagged known risks at the time that were discussed with the EMPHN team, in particular pertaining to data quality. As the evaluation strategy noted, "being able to identify the practices in each catchment that have patients which participate in the RCBH program and obtaining the data on these patients is a crucial component for evaluating RCBH, regardless of the ultimate evaluation strategy or metrics that will be employed." In line with this, our Next Steps section in the evaluation strategy highlighted a strong opportunity to leverage more robust data-collection processes (particularly in the North as the program was about to be rolled out there from

September 2024). This would support cleaner outcome generation, clearer comparisons across practices and providers, and a smoother path to implementing a mixed evaluation approach using the evaluation alternatives that were proposed.

2. Project Scope

Building on the 2024 MI Evaluation Strategy, EMPHN engaged MI in early 2025 to request the formal evaluation of the RCBH program. In addition to the initial strategies that were proposed in the 2024 MI Evaluation Strategy, EMPHN was seeking to understand how to meet the Program Objectives outlined in the RCBH Program Logic through the framework of the program's Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM). The RE-AIM Framework was adopted by EMPHN as a method of understanding the key dimensions of program impact and sustainability.

Specifically, EMPHN wished to understand the following:

- Whether the RCBH program is cost-effective and appropriately targets patients who need it most;
- The elements that support the sustainable implementation of the program into the future;
- The program's sustainability, scalability, and overall performance in consideration of the RE-AIM framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance); and
- Effectiveness of the program, with explicit consideration of the Program Objectives in the RCBH Program Logic.

In the project proposal that MI provided to EMPHN, it was highlighted that the expertise of the MI team sits within the Reach and Effectiveness components of RE-AIM. EMPHN defined ***reach*** as the extent to which the RCBH program engages the target population and ensures equitable access; and ***effectiveness*** as the impact of the program on health outcomes, healthcare use, patient experience, self-management, quality of life, and the associated cost-effectiveness.

Consequently, the MI team proposed to focus on evaluating RCBH through the reach and effectiveness components of RE-AIM. Specifically, that the evaluation would explicitly consider the following:

- The cost effectiveness of RCBH (relative to measurable outcomes and Program Objectives within the RCBH Program Logic); and
- RCBH's performance within the Reach and Effectiveness components of the RE-AIM framework; and Effectiveness in meeting its Program Objectives.

The scope of the Program Logic which could be considered within the evaluation is shown in Table 2.1 below. While the outputs provided in the Program Logic are quite broad, where possible, we have streamlined by classifying healthcare use outcomes into relevant subgroups (e.g. primary and multidisciplinary care). Furthermore, while we focus on the reach and effectiveness components within RE-AIM, we also conduct a form of adoption analysis by providing details on RCBH eligibility and uptake per postcode and practice. The full Program Logic is provided in Appendix A.

Table 2.1 – Aspects of Program Logic considered in scope for evaluation

Stakeholders	**Outputs**	**Assessable?**
Patient (18+) • People with cardiovascular disease • People with respiratory conditions • People who are considered frail and/or at a high risk of falls	PROMs / PREMs scores	
	Patient education/resources Chronic disease management plan*	
	Referrals to *appropriate* services	
	Healthcare use (e.g. MBS items, ATC codes)	
EMPHN / DH / Funders	Healthcare use (e.g. MBS items, ATC codes)	
	# eligible patients per LGA/suburb/practice	
	Avoidable hospitalisations / ED presentations.	
LHN Local Health Network	Changes in ED / hospital admissions	

Notes: Green means assessable within Project whereas orange represents unlikely to be assessable. In this instance, partially assessable was attributed to 'appropriate services' as whether a referral is deemed appropriate is ultimately a judgement call to be made by EMPHN. * While chronic disease management plan was not originally listed in the program logic, this is now considered a key output within patient education/resources.

3. Our Approach

To evaluate the reach and effectiveness of RCBH, we conducted a phased and multifaceted evaluation approach. This approach was approved and informed through continuous discussions with EMPHN team members and existing, and realised, data constraints.

3.1 Data sources

The two main data sources used for the evaluation were provided by EMPHN: the (1) monthly provider data and (2) POLAR data.

The monthly provider data comprise the monthly reporting datasets from EACH and Silverchain. They capture program-level information such as (1) program enrolments, graduations, and withdrawals; (2) patient demographics such as age, gender, and post code; (3) chronic condition diagnoses; and (4) referrals to specialist care and other health care services such as residential aged care. Both EACH and Silverchain also provided PREM for a subset of RCBH patients. Additionally, Silverchain provided Partners in Health (PIH) data for a subset of RCBH patients, which assesses chronic condition self-management at baseline and follow-up. However, only a very small subset of patients had follow-up PIH data at the time this evaluation was conducted.

The POLAR data is provided to EMPHN from Outcome Health and is a big dataset that links a patient across all practices in the EMPHN catchment. It does this by routinely extracting electronic health records from practice clinical systems in near real-time. It contains comprehensive primary care information such as consultations, prescriptions, care plans, and referrals. For example, it contains both Medical Benefits Schedule (MBS) service items and Anatomical prescription codes.

The provider datasets were both linked to the POLAR data to enable a richer analysis of RCBH participants' service use, outcomes, and comparators within the broader EMPHN population. More details on the provider and POLAR data are available in Sections 6 and 7, respectively.

3.2 Overview of approach

The actions undertaken to evaluate the RCBH program included the following:

- A comprehensive review of the Australian and international literature on evaluations of integrated care programs, specifically focusing on the evaluation methods that are employed;
- A pseudo cost-effectiveness analysis using within-individual quality-adjusted life years (QALYs) gained as the outcome measure, calculated from the quality of life measures (EQ5D5L scale) for both service providers;
- A comprehensive analysis of the monthly provider datasets from EACH and Silverchain, requested specifically by EMPHN, including but not limited to (1) analysis of patient sociodemographic data, (2) the breakdown of patient chronic conditions, (3) the calculation of average care episodes based on enrolment and graduation dates, (4) average number of NCC contacts per patient per episode of care and average NCC contacts stratified by the type of chronic condition, provider (EACH vs Silverchain), and type of NCC contact; (5) EQ5D5L score changes, specifically QALY changes and individual changes in each of the five dimensions from the EQ5D5L; (6) PREMs; (7) PIH chronic condition self-management measures; and (8) referrals to external health providers; and
- A comprehensive, scientific evaluation of the RCBH program using an event-study DiD empirical methodology that exploits the dynamic variation in the time in which individuals enrolled into the program, conducted by linking the RCBH monthly provider datasets to POLAR.

To achieve these results, the following actions were taken by the MI team:

- Systematic data cleaning in the statistical software package Stata, of the POLAR dataset, the Microsoft Excel monthly provider datasets from EACH and Silverchain (and all spreadsheets therein), the Customer Relationship Management (CRM) dataset; and other linked-in datasets such as the Socio-Economic Indexes for Areas (SEIFA) from the Australian Bureau of Statistics (ABS);

- Development of a comprehensive, event-study DiD empirical methodology, incorporating EMPHN data constraints, and continuous adjustments to the empirical methodology as new information came in;
- Conducting and completing a long-term ethics approval process with the University of Melbourne Human Research Ethics Committee (HREC);
- Coding, in Stata, of the raw five-dimensions of the EQ5D5L from the monthly provider datasets and linking raw scores to the Australian EQ5D5L value set (Norman et al., 2023) in order to generate QALYs for the pseudo cost-effectiveness analysis; and
- Comprehensive, weekly discussions with EMPHN RCBH project members Crystal McPhee and Hannah Lack, in order to receive subject matter expertise on the RCBH program, data updates, and coordinate long-term project tasks such as ethics applications, data retrievals, and analysis to be conducted.

In addition to these actions, the following complementary digital outputs were provided to EMPHN for future internal use:

- The complete code needed, in both Stata and R, to clean the POLAR data and make it ready for statistical analysis; and
- A Microsoft Excel EQ5D5L raw score to QALY converter calculator using a complex series of formulas to align the raw EQ5D5L scores to the Australian EQ5D5L Value set (Norman et al., 2023), so that EMPHN can replicate the QALY generation process without needing to code it in a statistical software package
- A Microsoft Excel pseudo cost effectiveness calculator which can be updated as and when new patient outcome measures are collected
- A Microsoft Excel spreadsheet with details on RCBH uptake at the postcode and provider level

Lastly, the formal scientific evaluation of the RCBH program, using the event-study DiD, has also been written up into a full academic paper and is planned to be submitted in conjunction with EMPHN project members Crystal McPhee and Hannah Lack to an academic journal in economics in November 2025.

4. Literature Review

This section presents a comprehensive review of the recent Australian and international (largely academic) literature on evaluation methodologies used to evaluate integrated care programs such as RCBH. This includes a review of the Australian qualitative and quantitative literature, international quantitative literature, and two key recent papers that helped motivate our empirical event-study DiD design that is described in Section 7.

4.1 Australian Qualitative Literature

In Australia, integrated-care programs are most often evaluated with descriptive and formative methods centred on implementation and stakeholder experience, rather than on causal or quasi-experimental designs (Trankle et al., 2019, Dalton et al., 2019, Tennant et al., 2020). A recent comparator program to RCBH is the Western Sydney Integrated Care Program (WSICP), which implemented shared-care arrangements, care facilitators, and rapid-access clinics for patients with diabetes, chronic obstructive pulmonary disease (COPD), and heart failure. A qualitative evaluation of the Integrated Care Program, comprising interviews with 12 patients, 11 carers and 50 healthcare providers (e.g., GPs, care facilitators, hospital specialists, and allied-health practitioners), reported improved service linkage and overall patient experience, alongside information-sharing barriers due to no access to shared patient records across healthcare providers (Trankle et al., 2019). Another evaluation of a similar, albeit 'virtual' integrated care program in Western Sydney found that providers reported improved coordination of services and reduced ED utilisation in the 12 months after enrolment compared with the 12 months prior (McNab and Gillespie, 2015). Most clinicians also agreed that the virtual NCCs enhanced communication and information sharing between patients and providers (McNab and Gillespie, 2015).

4.2 Australian Quantitative Literature

Quantitative Australian evidence exists but remains limited and mixed. First, the OPEN ARCH trial in Far North Queensland (a stepped-wedge cluster randomized trial comprising 14 GP clusters and 80 older adults with complex health needs) found no statistically significant change in emergency department (ED) presentations or hospital

admissions (Mann et al., 2021). It did find that acute healthcare utilisation displayed a downward trend over time, noting that limited power due to a small sample size made it difficult to detect statistically significant treatment effects. Second, the Gold Coast Integrated Care program, likewise targeting patients with complex and chronic conditions, was evaluated using a mixed cost-consequences and DiD framework with a non-randomised design and a matched control group (Ward et al., 2021). It found higher hospital service use and higher total costs for the treatment group (N = 1549) relative to the control group (N = 3042); approximately $6400 AUD higher hospital costs and $8700 AUD program costs per person per year, with no statistically significant quality-of-life gains over the study period. An earlier Victorian study of integrated-care facilitation for older patients reported post-enrolment reductions of 20.8% in ED presentations, 27.9% in hospital admissions, and 19.2% in bed-days in the treatment group (N = 231) and compared these changes to a control group of patients who were eligible but declined participation (N = 85) (Bird et al., 2007). However, as no confidence intervals were provided in these analyses, it is unclear whether these differences were statistically significant.

4.3 International Quantitative Literature

Internationally, evaluations of integrated care program have also displayed mixed results, although empirical evaluation methodologies tend to be advanced relative to Australia. A comprehensive systematic review conducted by Baxter et al. (2018) reviewed 167 documents across 153 unique studies on integrated care programs published between 2006 and March 2017, including 54 evaluations from the United Kingdom (UK), 43 systematic reviews, 49 international (non-UK) evaluations deemed high quality due to possessing comparator-group designs, and 21 international low-quality studies without comparator group designs. Of the 49 international comparator studies, 19 used random treatment assignment (only nine concealed assignment) and the remaining 30 were non-randomised, quasi-experimental designs. Of the 54 UK studies, 16 reported comparator designs and only two possessed random treatment assignment. Limitations across both UK and international studies included inability to blind participants to treatment assignment and small sample sizes limiting statistical

power. A third of the international studies also presented poor (potentially selective) reporting. Overall, none of the UK or international studies met the systematic reviews' criteria for reduction of potential bias. Evidence for changes to acute healthcare utilisation and cost reduction was likewise inconsistent. The stronger and more consistent signals were higher patient satisfaction, better perceived quality of care, and improved access to services.

4.4 Recent Quantitative Literature

A recent study not covered by the systematic review in Section 4.3 (Ress and Wild, 2024), evaluated an integrated-care initiative in a socioeconomically disadvantaged urban district in Germany. Using propensity-score matching and an event-study DiD design, they found increases in emergency and inpatient admissions, non-hospital outpatient visits, and total costs, with no reduction in ambulatory-care-sensitive admissions. Some outcomes showed pre-trend sensitivity; the authors interpret higher utilisation as improved access or previously unmet need. Another recent study, (Goldzahl et al., 2022) examined multidisciplinary group (MDG) meetings for high-risk older adults (65 years old and over) in socioeconomically disadvantaged UK areas using propensity-score matching and triple-difference estimates with GP Patient Survey and Hospital Episode Statistics data. MDGs reduced the probability of a primary-care nurse visit by about three percentage points and shortened length of stay after emergency admission by one day. Planned care use increased however, leaving overall costs unchanged and health status unaffected.

4.5 Conclusion from the literature review

Altogether, there is mixed evidence on the effects of care coordination on healthcare utilisation and the relative effects on acute vs primary healthcare utilisation vary significantly across program types, population groups studied, and by context.

5. Data Constraints

This section summarises the data constraints of the evaluation which limited MIs ability to deliver some of the evaluation insights sought by EMPHN, particularly against the program objectives outlined in Section 1.1 and the project scope in Section 2. Before presenting the analyses conducted with the monthly provider and POLAR datasets in Sections 6 and 7, we first outline these data constraints in this section.

5.1. Absence of a suitable control group for cost-effectiveness analysis

A full cost-effectiveness evaluation requires data for both program participants and a comparable control group who did not receive RCBH but for whom health outcomes (e.g., EQ-5D-5L or similar measures) are available over the same period. EQ-5D-5L data were collected only for RCBH participants, which necessitated a within-individual ("pre–post") analysis of quality-of-life changes relative to program costs. This approach provides indicative rather than comparative evidence on cost-effectiveness.

5.2. Limited availability of EQ-5D-5L data

Collection of EQ-5D-5L data commenced late in the program (4th of April 2025 for EACH), and many participants had only a single observation or none at all. Consequently, only a small subset of patients could be included in the cost-effectiveness analysis (approximately 11% of EACH participants and 48% of Silverchain participants), reducing the representativeness and precision of those estimates.

5.3. Lack of reliable acute care outcome measures

Key program objectives involved reducing avoidable ED presentations and hospital admissions. However, ED and hospital admission items in the monthly provider datasets were not suitable for analysis, and Hospital Admission Risk Program (HARP) and Hospital Avoidance Tool (HAT) scores were available only at a single time point (and not for all patients), precluding longitudinal assessment.

Upon inspecting the clinical dataset in POLAR (where the HARP score is located) we found 65.82% of RCBH patients had no or only one instance of the HARP score measured, making it impossible to conduct pre/post analysis on them. Additionally,

there is no date provided for when this score is measured. Thus, even for the 34% of the patients that have multiple measurements, it is impossible to use this score for any type of pre/post analysis because we do not know when it is measured for these patients.

As a result, the analyses presented herein relies on primary-care outcomes available in POLAR (with treated and control groups) and, where possible, case-control analyses within the provider data.

5.4. Data quality and harmonisation challenges

Data inconsistencies were identified across data sources, including mismatched practice identifiers, practices that merged or closed during enrolment periods, and variations in data formatting. The patient identifier ("Patient Site Key") used in the provider datasets used a separate version to the one in POLAR. Thus, in order to link the provider data to POLAR, we needed to conduct a statistical matching process based on demographic characteristics (month-year of birth, postcode, gender, and practice). Not all patients in the provider data were able to be linked to POLAR (approximately 10% of the sample –100 RCBH patients– were not linkable and had to be dropped from the POLAR analysis).

5.5. Data management and transparency issues

Some datasets had undergone manual cleaning in spreadsheet software prior to transfer, which limited reproducibility and traceability of data-handling steps. Best practice in managing clinical and administrative data recommends retaining raw data and undertaking all cleaning and transformation using statistical software (e.g., R, Stata, SPSS) with a documented syntax history.

5.6. POLAR limitations

The POLAR data asset had several limitations, such as incorrect reporting of RCBH participation, as general practices did not conduct the POLAR enrolment flagging correctly (ultimately requiring us to link enrolment dates from the provider data and dropping 100 un-linkable RCBH patients; see Section 5.4 above). Other limitations included inadequate capture on information pertaining to hospitalisations (see Section

5.3 above), whether prescription medications were actually filled, and whether referrals were actually realised. Additionally, not all referral categories get recorded in POLAR; the POLAR data focuses on referrals to specialists that are lodged formally in the practice's clinical management system but misses other referrals such as aged care, which is highly common amongst our RCBH sample in the provider data. Additionally, approximately 35% of referrals in POLAR for our treatment and control group were categorised as "unmapped", so we did not know what they were for.

5.7. Implications for the Evaluation

These data limitations had several implications for the evaluation:

- The primary analyses relied on POLAR data, focusing on primary-care utilisation and referrals rather than acute-care outcomes.
- A proportion of RCBH participants could not be included in analyses due to incomplete or unlinked data.
- Direct comparison between EACH and Silverchain was more limited.
- The PREM and PIH data became more important in assessing patient-reported experience and self-management.
- PREM information is only collected once at follow-up; there is no pre-post information available.
- The cost-effectiveness results should be interpreted as indicative estimates rather than definitive measures of program efficiency.

6. Analysis of Provider Datasets

6.1 Overview

This section analyses the RCBH patient datasets provided by EMPHN from the two service providers, EACH and Silverchain. These include the quantitative datasets that both providers submit to EMPHN as part of their monthly reporting requirements, as well as the additional PIH (Silverchain only) and PREM datasets. All datasets analysed here are the latest versions available at the time of writing and go up to September 30, 2025.

The EACH and Silverchain monthly datasets both contained the following information:

- Patient characteristics, including age bands, sex, and patient postcode;
- The dates of RCBH enrolment, graduation, and withdrawal;
- Health information such as diagnoses, referrals, and NCC contacts; and
- EQ5D5L information, including separate variables for each of the 5 unique dimensions (mobility, personal care, anxiety & depression, usual activities, and pain & discomfort), as well as the dates that this information was recorded. However, the EQ5D5L for EACH patients was only available from April 4th 2025 .

PIH data: The Silverchain PIH data was also in their monthly dataset and included individual responses to a chronic condition self-management scale. The scale is a general, self-rated questionnaire that measures how well people with chronic conditions manage their own health. It comprises of 12 items; each rated on a 9-point Likert scale for a maximum total score of 108.

PREM data: The PREM data for EACH and Silverchain was included in separate datasets. The PREM data captured patient experience in RCBH via a 7-item feedback scale, plus two single-item follow-up questions on patient perceptions on the quality of RCBH care and the likelihood of them recommending RCBH to a friend or colleague.

In order to indicate whether patients lived in areas of relatively low or high socioeconomic disadvantage, we also linked in the Australian Bureau of Statistics (ABS) SEIFA Index of Relative Socio-economic Disadvantage (IRSD)[2] to each patient's postcode.

[2] A lower IRSD score reflects a community with higher levels of socioeconomic disadvantage. This is typically seen in places where a larger share of residents have low incomes or are working in lower-skilled jobs, and where there are comparatively fewer high-income households or people employed in skilled occupations. Conversely, a higher score reflects an area with fewer markers of disadvantage and overall greater socioeconomic advantage. These areas tend to have more high-income households and residents in skilled or professional roles, and far fewer people in low-income or low-skilled employment. More details on the construction of this measure are available here: https://www.abs.gov.au/statistics/people/people-and-communities/socio-economic-indexes-areas-seifa-australia/latest-release

6.2 Methodology for provider datasets

We align the analyses of these provider datasets to the **reach** objective of the RCBH evaluation through conducting a high-level descriptive analysis of the available patient-level information on RCBH patients. This allows us to see who the program is reaching. We also provide a comparison of the descriptive statistics relative to our RCBH eligible patients in Section 7 (i.e. relative to our control group for the POLAR analysis).

Then, we conduct a pseudo, within-individual, cost-effectiveness analysis in order to evaluate the **effectiveness** of the RCBH program (albeit imperfectly due to data constraints, as outlined in Section 5), using the EQ5D5L from both providers and the available information on program costs. The effectiveness of the RCBH program is also evaluated against primary healthcare utilisation using the POLAR data in Section 7.

The methodology for the descriptive statistics and pseudo cost-effectiveness analyses are outlined below in Sections 6.2.1 and 6.2.2, respectively. The results for both analyses are presented in Section 6.3.

6.2.1 Descriptive Analysis

We first compiled comprehensive descriptive statistics on RCBH patients to provide a high-level view of program reach. These descriptives cover the following information:

- Age;
- Sex;
- IRSD for the patient's postcode (linked in from SEIFA data from the ABS);
- Distribution of chronic conditions across the three main clinical groups targeted in this evaluation (cardiovascular disease, chronic respiratory disease, frailty / at risk of falls);
- Average program duration among patients who have graduated from RCBH;
- Average number of NCC contacts, with heterogeneity by (a) the three main health conditions and (b) contact type (face-to-face, telehealth, email/fax);
- EQ5D5L descriptives for patients with a baseline and ≥1 follow-up, including average QALYs gained over the observed measurement period and mean change

in each EQ5D5L dimension (mobility; personal care; usual activities; pain & discomfort; anxiety & depression);

- PIH/PREM summaries; and
- Referrals

Beyond the tabulated statistics, we plot distributions of the key measures of interest to EMPHN to support a more granular assessment of program reach among participants.

Separately for EACH and Silverchain, we plot the distribution of average program duration in months (defined as graduation date minus enrolment date in months) for all patients that have graduated. We also plot the distribution of average QALYs gained for all patients with a baseline and at least one follow-up EQ5D5L measure. For patients not yet graduated, we use the latest available follow-up EQ5D5L to compute interim QALYs.

For Silverchain, we additionally plot the distribution of the total PIH score. The total PIH score is calculated by summing the 12 items of the chronic condition self-management scale, with each item rated on a 1-9 Likert Scale, for a maximum score of 108 (12 x 9).

The following 12 items are included in the PIH chronic condition self-management scale:

1. Knowledge of one's health condition
2. Knowledge of treatment including medications
3. Adherence to medications/treatments
4. Shared decision-making with clinicians
5. Obtaining needed services
6. Attending appointments
7. Tracking symptoms and early warning signs
8. Acting when early warning signs/symptoms worsen
9. Managing effects on physical activity
10. Managing effects on feelings
11. Managing effects on social life
12. Overall ability to live a healthy life.

For both EACH and Silverchain, we plot PREM distributions for three measures. First, responses to "Overall, the quality of care I received was…", rated 1 (extremely bad) to 4 (extremely good). Second, responses to "How likely are you to recommend our RCBH

program to a friend or colleague?", rated 1 (least likely) to 10 (most likely). Third, the total PREM score, which included seven experiential questions rated 1 (never) to 5 (always) for a total maximum score of 35, where higher values indicated a more positive experience in RCBH

The seven questions included in the PREM scale were as follows:

1. My views and concerns were listened to;
2. My individual needs were met
3. I was involved as much as I wanted in decisions about my care
4. I was in regular contact with my care team and involved in reviewing/updating my goals and support plans
5. I felt supported to achieve my goals
6. I was treated with dignity and respect
7. Staff involved in my care communicated with each other about my care.

6.2.2 Pseudo cost effectiveness analysis

Background on cost effectiveness analysis

Cost Effectiveness Analysis (CEA) evaluates the financial cost of achieving a unit benefit in a non-monetised outcome measure, such as QALY or cases of disease prevented (Riegg Cellini and Edwin Kee, 2015). QALYs are the standard measure used to estimate health benefits and are calculated by looking at health state utility values (which are measured between a scale of 0 meaning worst health, or death, and 1 being best health) and then multiplying these health states by the duration spent in that health state. QALYs bridge clinical outcomes and economic evaluation, helping to assess whether an intervention provides good value for money. They allow comparisons across diseases, treatments, and populations—enabling transparent, evidence-based prioritisation when healthcare resources are limited.

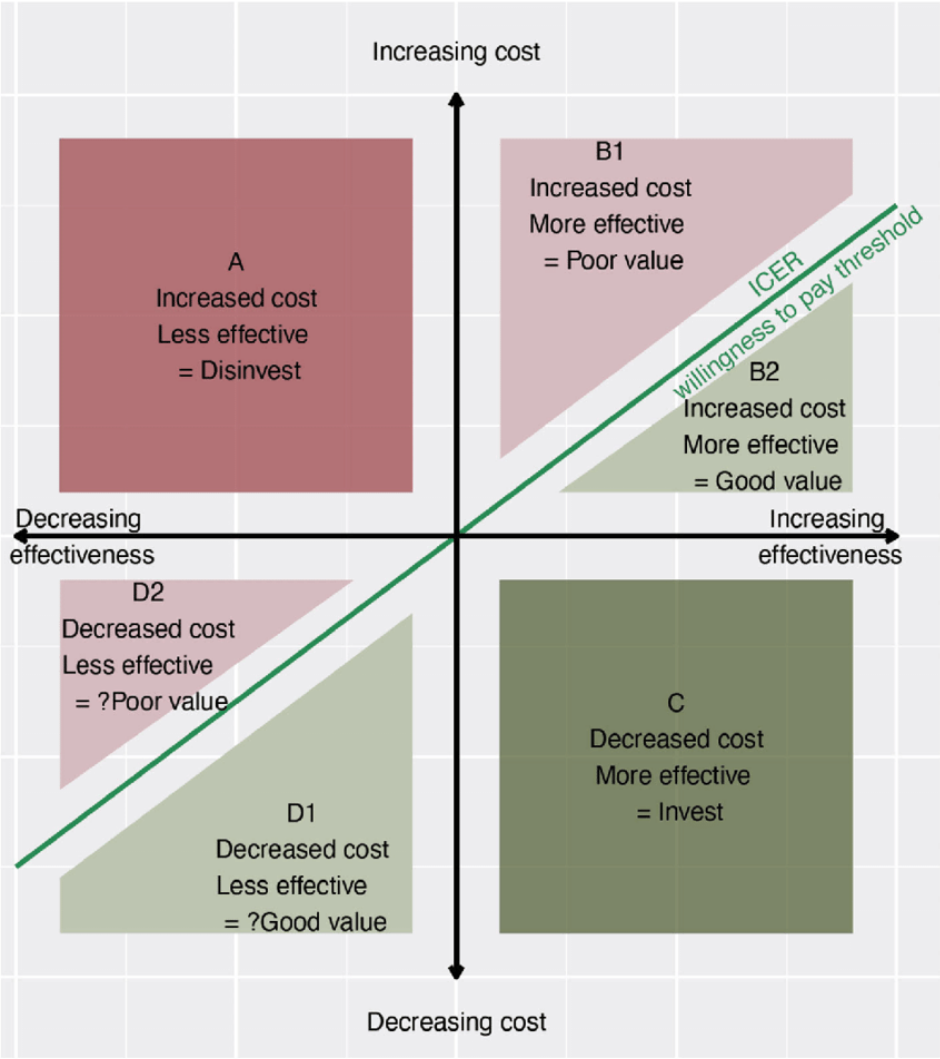
In Australia, QALYs are central to the health technology assessment (HTA) process used by the Pharmaceutical Benefits Advisory Committee (PBAC) and the Medical Services Advisory Committee (MSAC) – the two key bodies that inform government decisions about public funding of medicines, vaccines, and medical services.

In Australia, the government's general standard for a cost-effective health intervention is considered $50,000 per QALY (George et al., 2001).

Programs are evaluated using CEA by comparing the incremental costs taken to achieve a unit benefit in the outcome measure. For example, if Program A and Program B cost $30,000 and $40,000 respectively to achieve one additional QALY, then Program A would be preferred over Program B.

Figure 6.1 6.1 illustrates the cost-effectiveness plane. A program is most cost-effective when it falls under Scenario C, where the program costs less and is more effective in terms of a health-utility measure (e.g., QALY) compared to a comparator (e.g., control or reference program). In Scenario B2, the program is more effective than the other program but also costs more, so the decision hinges on whether the additional cost is acceptable. If the cost is less than the willingness to pay (WTP) threshold ($50,000), it generally represents good value. Otherwise, as in Scenario B1, it is poor value. Scenario A is the least optimal, as the program is both less effective and more costly than the other program. In Scenario D1, the program might still be considered good value despite decreased effectiveness because the cost is also reduced. If the reduced cost is less than the WTP, it is considered good value. If not, as in Scenario D2, it is deemed poor value.

Figure 6.1 – Cost effectiveness plane (Graziadio et al., 2020)



Pseudo cost effectiveness analysis for RCBH

The cost effectiveness analysis was conducted separately for each provider, EACH and Silverchain, by using the person-level QALY gained measure and average program cost. The reason these analyses are classed as "pseudo" is that there is no suitable control group with a measure of their own QALY gained over the same time period. Thus, we are restricted to conducting this analysis "within" patient and using the trapezoid formula for QALY gained. As we only had EQ5D5L data for a subset of both EACH and Silverchain patients, we likewise struggle for the suitable sample size that is necessary to derive meaningful insights with respect to statistical power. More detail on this limitation was provided in Section 5.

Our approach involved estimating an average cost effectiveness ratio with the following formula:

$$ACER = \frac{\text{Average cost per patient}}{\text{Average } \Delta QALY}. \quad (1)$$

The average $\Delta QALY$ is obtained individually for each patient (i.e. "within-patient") by applying the following formula:

$$\Delta QALY_i = \left(\frac{\mathrm{u}_{i1} - u_{i0}}{2}\right) \times \Delta t_i, \quad (2)$$

where u_{i0} is the baseline EQ5D5L utility at program entry, u_{i1} is the most recent utility observed within the study period, and Δt is time in years between the baseline and most recent utility observed. We divide by 2 based on the "trapezoidal (linear-change) assumption" – this area is a triangle between points u_{i1} and u_{i0}.

We use formula (2) in order to assume utility moves gradually from u_{i0} to u_{i1} rather than jumping immediately at the start of the program. For example, as the EQ5D5L is not recorded continuously overtime, we don't know whether the follow-up EQ5D5L value we have is based on the patients reported health state during the day it was reported, or days/weeks/months before it was reported, after the program began. The patient may have, for example, been sitting on that health state for a long-period of time, if the health gains from the program were felt immediately after the program began, or shortly afterwards. The trapezoidal change formula accounts for this measurement factor by assuming a gradual, rather than instantaneous shift.

To obtain the utility health states for each of the five health dimensions from the EQ5D5L that is required to calculate QALYs, we aligned the raw scores to the Australian Value Set (Norman et al. 2023). This is the conventional approach for deriving health state utility values for cost-effectiveness analyses in Australia. Specifically, we convert each patient's 5-digit health profile at the baseline and follow-up periods to a utility score by using this value set. Utilities are anchored at 1 (full health) and 0 (dead) and may be <0 for health states considered worse than dead.

For each person at baseline and follow-up, the health state utility is calculated as follows:

$$\text{Utility} = 1 - (\text{sum of deductions across 5 dimensions}) - (\text{extra penalty terms}) \quad (3)$$

For example, each person starts at 1 (full health). If the person has a mobility raw score of 5 (worst score), the Australian EQ5D5L value set states that this is equal to a subtraction of 0.242 from 1. If the person has a mobility score of 1 (best score), there is a subtraction of 0 (no subtraction). This is repeated for every one of the five dimensions. At the end, you also subtract an additional penalty term if any dimension scores 5 (the worst possible score; as this is seen as a compounding effect), and that is the final EQ5D5L health-state utility[3].

6.3 Results

This section presents the results from the descriptive and cost-effectiveness analysis outlined in Sections 6.1-6.2. Section 6.3.1 presents the complete descriptive results, including the descriptive statistics for RCBH patients across all information from the monthly provider datasets outlined in Section 6.2.1. Section 6.3.2 goes into a more granular distributional analysis of the health-state information outlined in the descriptives in Section 6.3.1 (i.e. PIH/PREM scores, QALYS gained, and program duration). Section 6.3.3 then presents the results from the cost-effectiveness analysis that was conducted – including the predicted ICER for both EACH and Silverchain separately, on the specific values used to calculate these ratios, and the main insight gained, considering data constraints.

[3] Key insight on converting EQ5D5L utility scores to QALY's: A utility score at a point in time converts to QALYs by multiplying by time in years and summing over the follow-up (i.e., the duration of time an individual spends in a health state multiplied by the utility value of that health state). If utility is constant for a full year, QALYs equal the utility. If utility changes between measurements of the EQ5D5L, then you have to adjust the QALY based on how long the person is in each health state. A discrete approximation is: $QALYs \approx \sum_k \frac{u_{k-1}+u_k}{2} \times (t_k - t_{k-1})$

6.3.1 Descriptive Analysis

Table 6.1 summarises patient and program characteristics from the monthly provider datasets for EACH (N = 705) and Silverchain (N = 448) RCBH patients. On average the patients enrolled into RCBH through Silverchain were slightly older than EACH patients (81 vs 78 years) and there were slightly more males (0.42 vs 0.40). The average area-level disadvantage was similar for both Silverchain and EACH patients (1008 and 1051 respectively). Clinical profiles differed slightly across providers: compared to EACH patients, cardiovascular disease was more prevalent in Silverchain (0.84 vs 0.67), while respiratory disease (0.18 vs 0.08) and frailty/musculoskeletal problems (0.38 vs 0.19) were less common.

Program duration was similar for EACH relative to Silverchain (118 vs 115 days; ~3.8-3.9 months), but engagement intensity was higher for EACH, with more NCC contacts per episode (15.8 vs 8.3). This pattern held across condition groups—cardiovascular disease (15.7 vs 8.2), respiratory (16.7 vs 8.4), and frailty (16.4 vs 8.6).

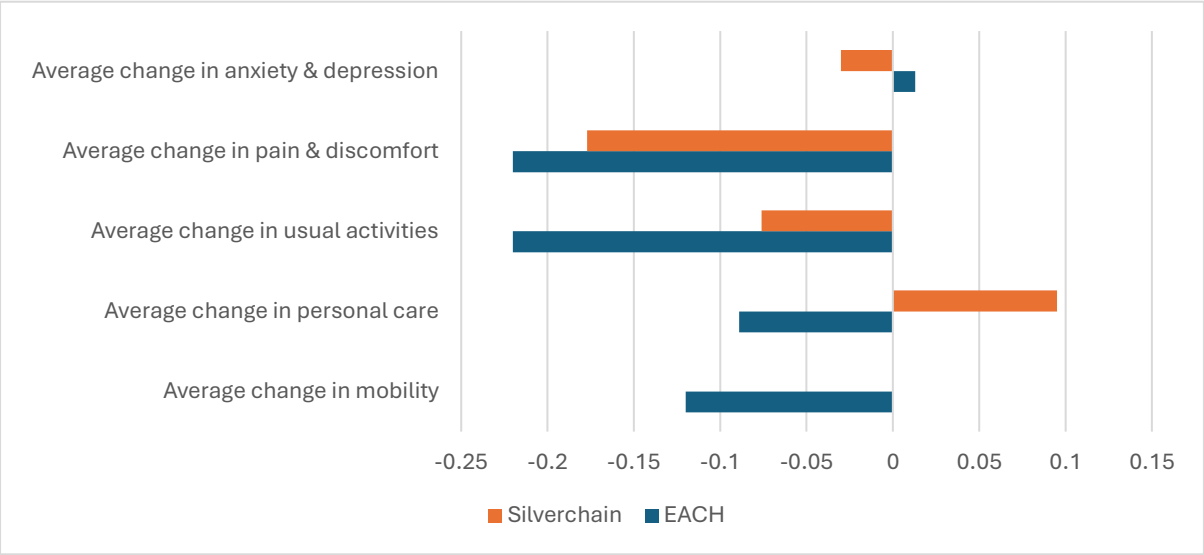
The breakdown of contacts suggests that telehealth was most common for both EACH and Silverchain (7.5 vs 7.4 per patient respectively), but face-to-face contacts were much higher in EACH (3.1 vs 1.0 per patient respectively).

Furthermore, EQ5D5L scores for EACH patients were slightly higher relative to Silverchain patients at baseline (0.75 vs 0.74) and were similar at follow-up (0.77 vs 0.77), indicating a slight improvement in utility for both groups. This translated into small average QALY gains in both EACH and Silverchain patients 0.003 and 0.004, respectively). The corresponding dimension changes are presented in Figure 6.2. For both EACH and Silverchain, the largest improvements were seen for pain and discomfort. Thereafter, improvements across domains differed. For EACH patients, the largest improvements were then for changes in usual activities, mobility, and personal care. Whereas for Silverchain patients, the next biggest improvement was for usual activities and then anxiety & depression. Personal care for Silverchain patients appeared to get worse. Overall, Silverchain appeared to have a larger impact relative to EACH.

Table 6.1 – Descriptive statistics from monthly provider datasets

	EACH (n=705) Mean/Prop.	**Silverchain (n=448)** Mean/Prop.
Age (years)	80.9	77.8
Age band (selected)		
70-74	0.09	0.15
75-79	0.21	0.29
80-84	0.26	0.20
85-99	0.36	0.20
Male	0.40	0.42
IRSD score (low = more disadvantage)	1051	1008
Health conditions		
Cardiovascular disease	0.67	0.84
Respiratory disease	0.18	0.08
Frailty (Musculoskeletal Problems)	0.38	0.19
Average program duration (days)	118.3	115.5
Average program duration (months)	3.9	3.8
Average NCC contacts per episode	15.81	8.34
NCC contacts by main health conditions		
Average NCC contacts per episode (Cardiovascular)	15.71	8.23
Average NCC contacts per episode (respiratory)	16.72	8.45
Average NCC contacts per episode (frailty)	16.37	8.62
NCC contacts by main types of contact		
Average F2F NCC contacts per episode	3.09	1.00
Average Telehealth NCC contacts per episode	7.53	7.35
EQ5D5L		
Baseline utility value	0.751	0.741
Follow-up utility value	0.770	0.771
Average QALY gained	0.003	0.004
Average change in mobility	-0.120	0.000
Average change in personal care	-0.089	0.095
Average change in usual activities	-0.220	-0.076
Average change in pain & discomfort	-0.220	-0.177
Average change in anxiety & depression	0.013	-0.030
PREM		
Total PREM score (N = 248 EACH, N= 40 SC)	33.50	34.00
Quality of care score (N = 248 EACH, N= 40 SC)	3.83	3.95
Recommend RCBH to others (N= 243 EACH, N= 40 SC)	9.66	9.4
PIH		
Total score at baseline for all patients (N = 171)	-	89.68
Total score at baseline for patients with follow-up (N=17)	-	87.70
Total score at follow-up (N=17)	-	91.00

Figure 6. 2 – Change in EQ5D5L domains



Notes: For each domain, 5 represents the worst score and 1 represents the best score.

The PREM data indicate very positive care experiences for both EACH and Silverchain patients. The average total PREM score was 33.50 out of 35 for EACH patients and 34 out of 35 for Silverchain patients, suggesting respondents almost universally felt listened to, respected, well-supported, and actively involved in their care planning. Perceived quality of care is also high (3.83 out of 4 for EACH and 3.95 out of 4 for Silverchain), indicating that most participants rated the service as "very good" or "extremely good." Willingness to recommend the program is similarly strong, with an average score of 9.66 out of 10 for EACH and 9.4 out of 10 for Silverchain, reflecting a high level of trust and satisfaction with the service. Together, these results suggest that clients viewed the RCBH model as highly person-centred, supportive, and responsive to their needs.

For Silverchain, the average total PIH score was 89.68 out of 108 at baseline for the entire sample, indicating a moderate to high level of patient activation, confidence, and self-management capability. For the 17 patients that had follow-up PIH information, there was an improvement in the average PIH total score from 87.70 to 91.00. While this difference wasn't proved to be statistically significant (t = -0.8), the low sample size makes detecting statistically significant effects difficult. Overall, we may expect a statistically significant difference between baseline and follow-up PIH scores once more patients have a follow-up measure.

A breakdown of the referral types for EACH and Silverchain is presented in Figure 6.3 and Figure 6.4, respectively. Referrals were strongly concentrated in Aged Care for both EACH and Silverchain, with 56% and 51% of referrals, respectively, coming solely from Aged Care. EMPHN team members noted this pattern was expected. For EACH, the next most common referral categories were Allied Health (18%) and Community Support (10%), which were also expected. Silverchain patients had fewer referrals overall.

Figure 6. 3 – Breakdown of referral types for EACH

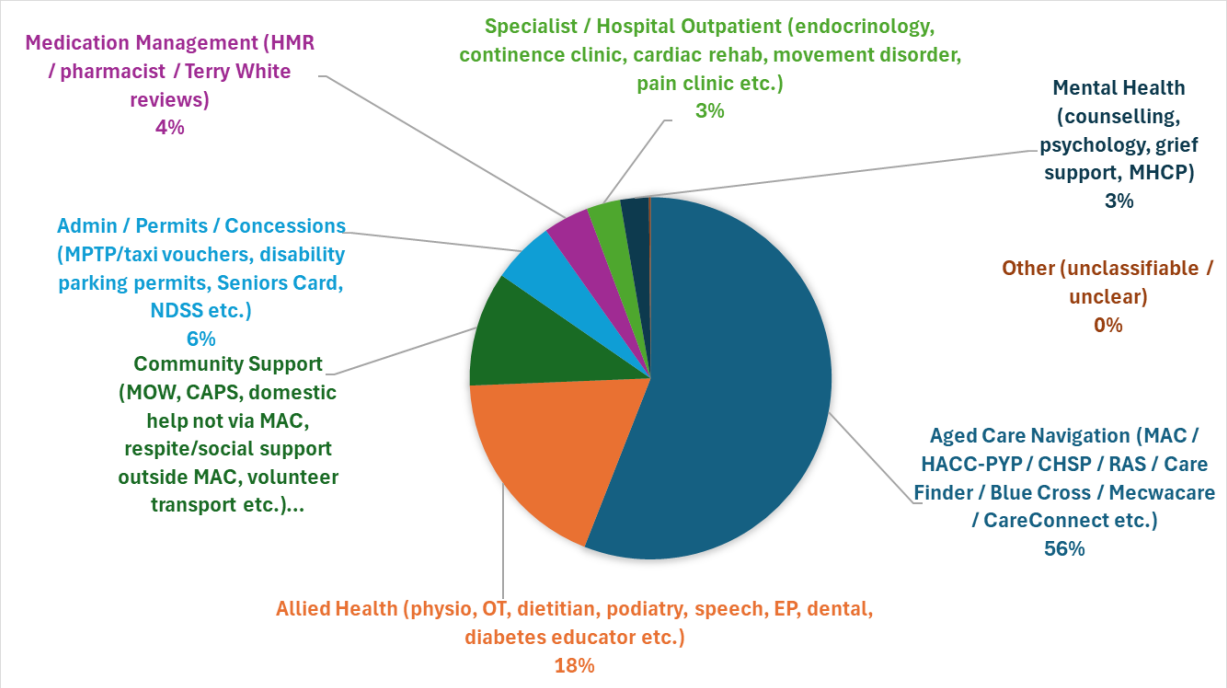
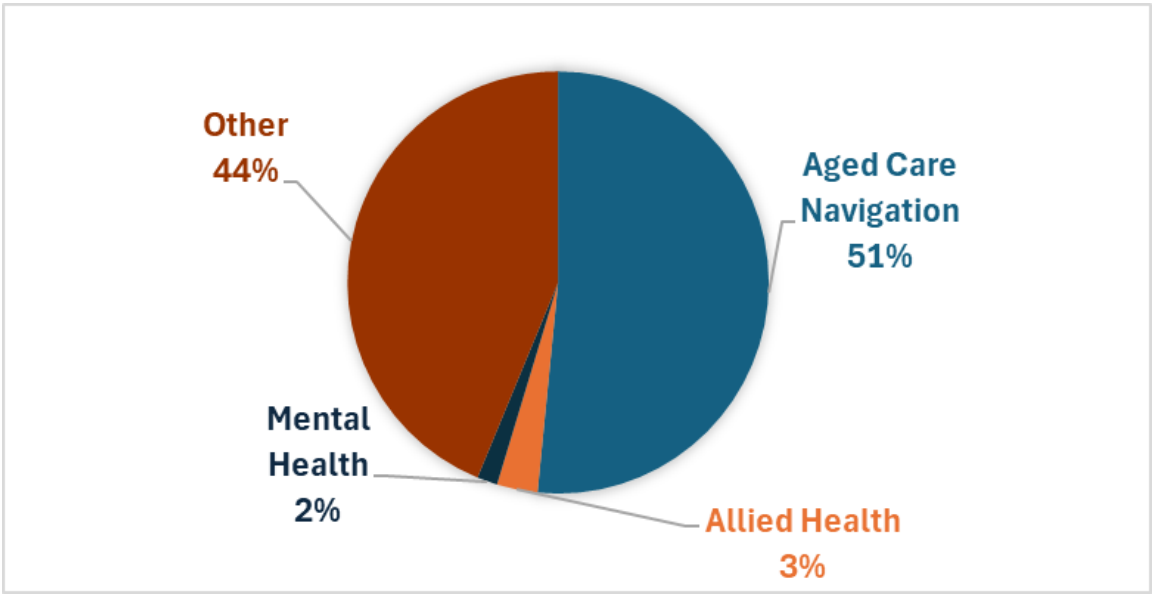


Figure 6. 4 – Breakdown of referral types for Silverchain



6.3.2 Distributional analysis

In addition to the descriptive means and proportions outlined in the descriptives analyses in section 6.3.1, we investigated the distributions across the key outcomes of interest in this section.

Figure 6.5 plots the distributions of (i) average QALYs gained and (ii) program duration (days), separately for EACH and Silverchain. Overall, patterns are similar across providers. However, EACH shows more outliers on both measures: a couple of patients have durations of 13-15 months, whereas Silverchain's maximum is ~10 months. These long-duration outliers lift EACH's mean program duration, while Silverchain's durations are slightly more dispersed within the 6-10 months range. For QALYs, Silverchain has a single outlier around –0.175; otherwise the distributions are comparable, with Silverchain more tightly centred around zero than EACH.

The correlation between the number of NCC contacts and patient's duration on the RCBH program is provided in Figure 6.6. In general, there is a positive association with increased program duration and the number of NCC contacts. However, the positive correlation is more pronounced for Silverchain rather than EACH. This suggests that although the length of time individuals participated in the EACH program was quite consistent across patients, the number of contacts was more variable, particularly relative to Silverchain.

Figure 6. 5 – Distributions of program duration and QALYs gained

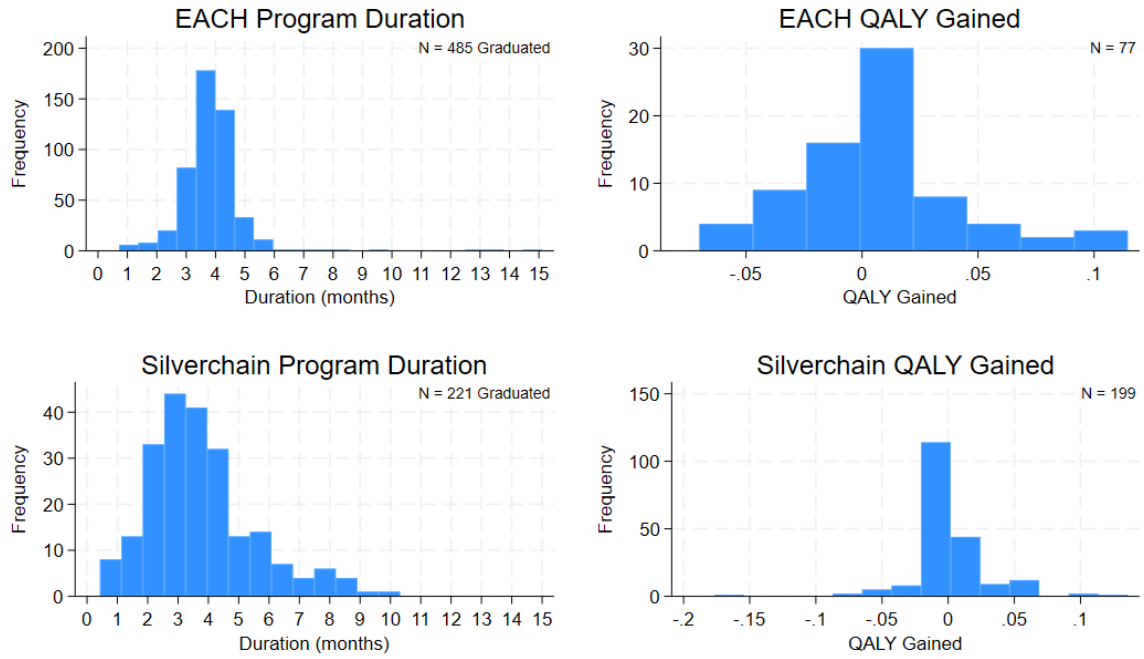
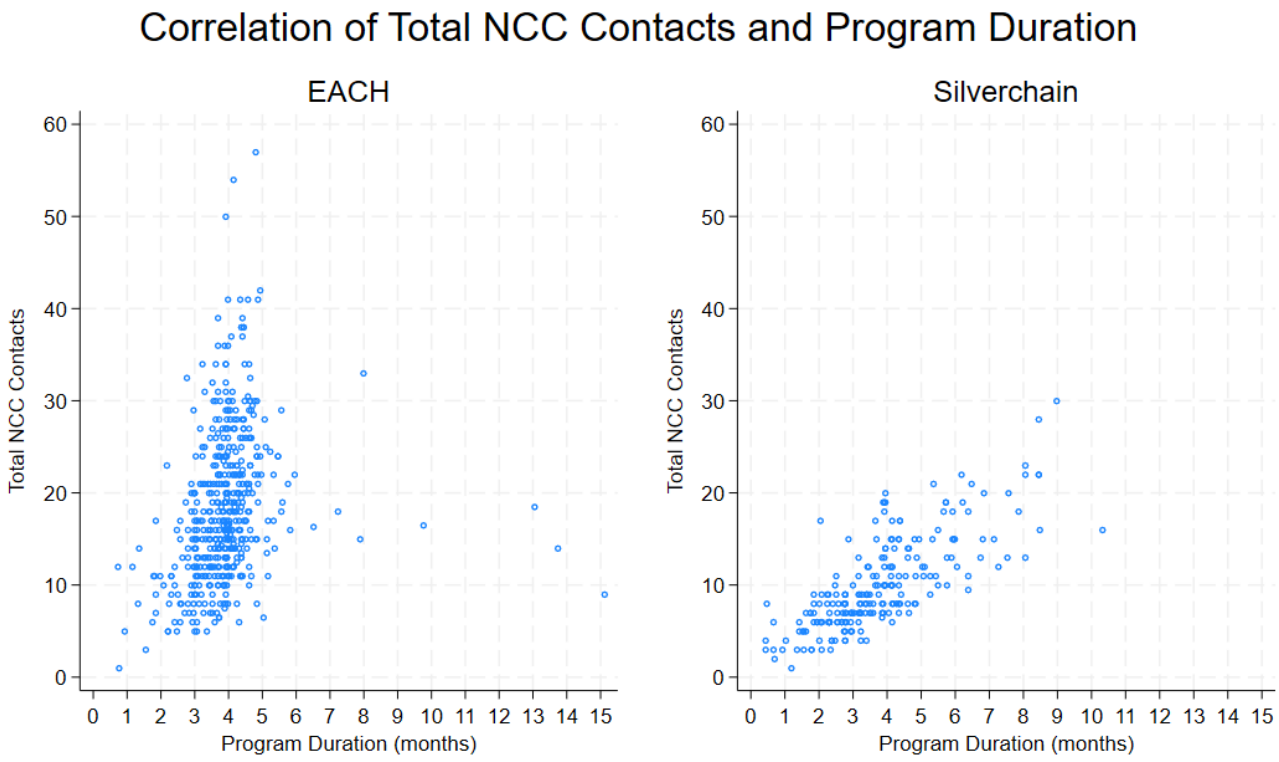


Figure 6.6 – Correlation between NCC contacts and program duration



Figures 6.7 and 6.8 present the distributions for EACH and Silverchain's PREM measures, respectively. Responses from both providers are highly favourable. Most participants selected the top categories: quality of care = 4 (extremely good), recommendation = 10 (most likely), and total PREM score of 35 (most positive). Overall, these results indicate an excellent patient experience among RCBH participants.

Figure 6.7 – Distributions of PREM information for the provider EACH

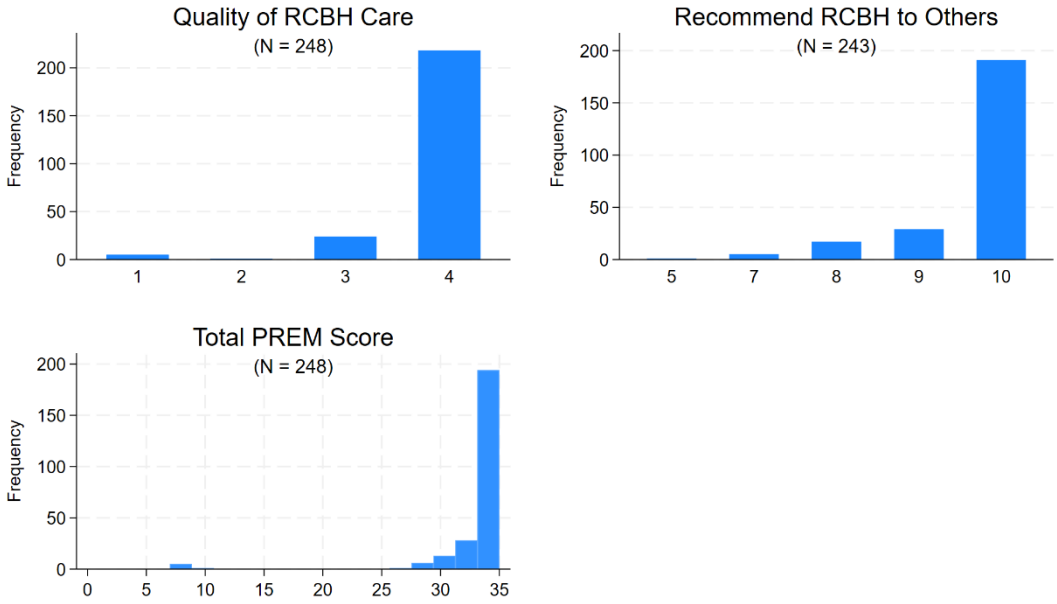
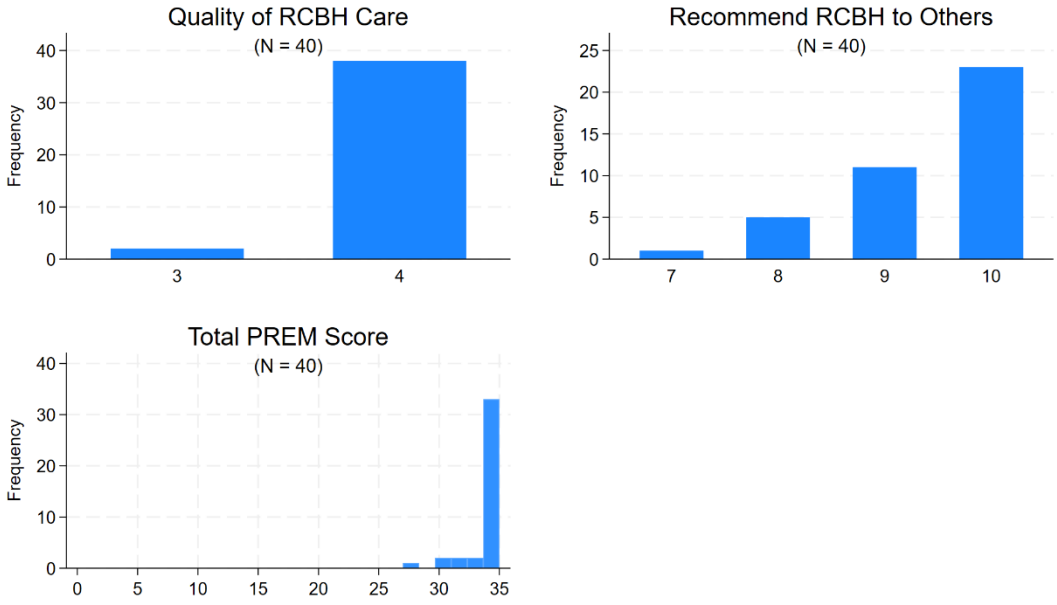
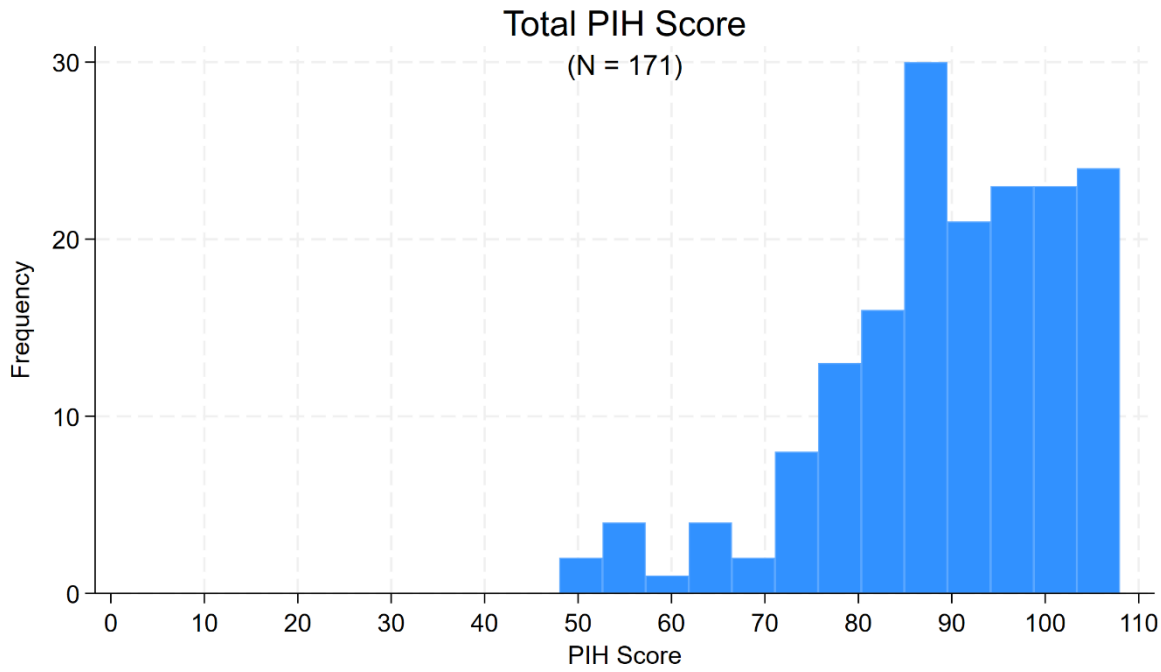


Figure 6.8 – Distributions of PREM information for the provider Silverchain



Lastly, for Silverchain, Figure 6.9 shows that their PIH scores at baseline are quite dispersed. While most patients report generally a moderate to high level of self-management of their chronic condition at baseline, the spread indicates meaningful differences across participants in their ability to manage their health. As follow-up was provided for only 17 patients we did not model this distribution; the mean follow-up scores for these patients are outlined in Table 6.1. To date, no follow-up PIH measurements are available[4]; however, we would expect scores to increase after participation in RCBH.

Figure 6. 9 – Distribution of Baseline PIH Score for Silverchain patients



6.3.3 Pseudo cost Effectiveness Analysis

The results for the pseudo cost-effectiveness analysis are presented in Table 6.2. On average, the projected cost per patient is somewhat higher for Silverchain ($3,104) relative to EACH ($2,437). As reported in the descriptive analysis above, quality of life information at baseline and follow-up was available for 77 patients in EACH and 199 patients in Silverchain. For this subset, the average QALY gain per patient was slightly

[4] I.e., relative to baseline.

higher for Silverchain patients relative to EACH patients (0.004 vs 0.003). The average cost per QALY gained was subsequently larger for EACH ($927,778) relative to Silverchain ($699,837). Under conventional willingness to pay (WTP) thresholds in Australia ($50,000 per QALY), both programs are not cost effective.

Table 6.2 – Pseudo cost-effectiveness analysis

Provider	**EACH**	**Silverchain**
Cost	$1,957,107	$1,328,655
Enrolled patients	803	428
Cost per patient	$2,437	$3,104
Baseline utility value	0.751	0.741
Follow-up utility value	0.770	0.771
Projected QALYs[A]	0.277	0.296
QALYs[B]	0.208	0.219
QALY gain	0.003	0.004
Cost per QALY gain	$927,778	$699,837
Cost per patient required to meet WTP	$131	$222
QALY gain per patient required to meet WTP	0.049	0.062
Number patients needed to meet WTP	14,900	5991

***Notes*:** A) projected QALYs is based under the assumption that the individual's utility value would not have changed throughout the follow-up window. B) Actual QALYs based on 77 patients with pre-post follow up of the EQ5D5L for EACH and 179 with pre-post follow-up EQ5D5L information for Silverchain.

This cost-effectiveness analysis should be considered within the context of several limitations. Namely, that the cost per patient provided is based off budgets for the projected number of patients that providers expected to enrol. Actual costs may reduce over time as providers enrol more patients. Further, we are presenting on the average cost per QALY gained and typically one would conduct this analyses by comparing to a control or comparator cohort who had not experienced the intervention. This analysis is therefore operating under an assumption whereby the control cohort would have experienced no change in QALYs.

The main results are as follows:

- With these projected program costs, the QALY gain would need to be approximately 15 times larger in magnitude for both EACH and Silverchain for their programs to be cost effective (i.e., cost per patient / QALY gains per patient).
- With the current QALY gains, one would need the program to be approximately $131 per patient for EACH and $222 per patient for Silverchain (i.e., $50,000 x QALY gain).
- With the current QALY gains and program costs, one would need to have 5991 patients enrolled for Silverchain and 14,900 patients enrolled for EACH.

As discussed in Section 3.2, a Microsoft Excel calculator and code file has been provided to EMPHN to replicate this analysis in the future as more patient data is collected.

Comparison to similar programs

The RCBH pseudo cost-effectiveness results are broadly consistent with the limited Australian evidence on coordinated-care and integrated-care programs, which typically show modest or statistically insignificant quality-of-life improvements and high costs relative to QALY gains. The cost per QALY for RCBH providers (ranging from approximately $699,837 for Silverchain to $927,778 for EACH) greatly exceeds conventional Australian willingness-to-pay thresholds. A broad comparison to other similar studies is presented in Table 6.3.

Similar patterns were observed in the Health Care Homes trial, which found no significant EQ-5D-5L change over 3.5 years, and in the Gold Coast Integrated Care program, which reported higher costs without measurable QALY improvement. In

contrast, small, tightly targeted trials such as OPEN ARCH and Comprehensive Geriatric Assessment have demonstrated modest utility gains and potential cost-effectiveness at <$50,000 per QALY, but only after longer follow-up and intensive clinical integration. These studies were also more robust in their data collection and empirical approaches in that they were randomised.

These findings mirror international evidence described in the Literature Review section: large systematic reviews and recent European evaluations continue to show mixed impacts of care coordination, with the most consistent benefits relating to patient satisfaction and perceived experiences of care coordination rather than measurable changes in QALYs (relative to program costs).

Table 6.3 – Other programs

Study authors	Study title	Results
Carter et al., 2022	Cost-Effectiveness of Care Coordination for Children With Chronic Noncomplex Medical Conditions: Results from a Multicentre Randomized Clinical Trial	• Randomised trial; into care coordination arm or not • Quality of life measure using paediatric-specific measure converted into QALYs • Children in the intervention arm incurred an average of $17 in additional health system costs (95% confidence interval −3861 to 1558) and gained an additional 0.031 QALYs (95% confidence interval −0.29 to 0.092) over 12 months, producing an incremental cost-effectiveness ratio of $548 (2021 AUD) per QALY
Pearse et al., 2022	Evaluation of the Health Care Homes trial	• tested a coordinated-care model for high-risk, chronically ill patients within general practice • EQ-5D-5L measured over ~3.5 years • no statistical difference in the distribution of EQ-5D-5L scores at second wave and third waves compared with the first wave
Kinchin et al., 2022	Cost-effectiveness of a community based integrated care model compared with usual care for older adults with complex needs: a	• A 9-month stepped-wedge cluster-randomised Trial • 3, 6 and 9 month measurements of change in functional status and dependency levels assessed using the

Study authors	Study title	Results
	stepped-wedge cluster-randomised trial	Functional Independence Measure (FIM) scale; EQ-5D-5L and AQoL-8D • Intervention = 0.02 higher utility score on EQ-5D-5L • phases$1,679 (in 2025 AUD) per participant • Recommended over usual care with WTP<$50,000
Nord et al., 2022	Cost-Effectiveness of Comprehensive Geriatric Assessment Adapted to Primary Care	• Randomised trial with EQ-5D-5L measured at baseline, and follow-up after 10 months and 22 months • Mean difference in QALYs was 0.05 • Intervention resulted in both lower costs and QALY gains → cost effective
	Cost-utility analysis of case management for frail older people: effects of a randomised controlled trial	• Randomised trial, nurses and physiotherapists working as case managers, who undertook home visits at least once a month • No significant differences between the intervention group and control group for total cost, EQ-5D-based QALY at 1-year follow-up

7. POLAR Analysis

The following section presents the POLAR analysis, which focuses on primary healthcare utilisation for RCBH patients and RCBH eligible patients (i.e. the control group) across practices in the EMPHN catchment.

7.1 Data

POLAR is an electronic medical record system used by general practices in the EMPHN catchment that captures the patient's complete health-record and journey from the point of general practice care, with comprehensive coverage across the EMPHN (Pearce et al., 2019b, Pearce et al., 2019a).

The extract used for this analysis spans from January 2022 to August 2025. In POLAR, patients flag patients that enroll, withdraw, and graduate from RCBH, as well as patients who are eligible but are not enrolled (i.e. the providers instruct this as part of formal, contractual reporting requirements for RCBH). Upon discussions with the EMPHN team

members, concerns were raised that the RCBH flagging information is not robust in POLAR as it's left largely up to the GPs discretion and is not well monitored. Consequently, it was suggested that we should use the information on RCBH patients that is provided in the monthly provider datasets and link them to POLAR.

As the unique patient identifier used in the monthly provider datasets was not the same as the unique patient identifier in the POLAR dataset, we had to conduct our own statistical matching process and link patients across the two datasets. Namely, in each provider dataset, we kept RCBH patients that were unique across the characteristics of month-year of birth, practice registered at RCBH with, biological gender, and post code of residence. These were the only demographic characteristics that were available across both the monthly provider datasets and POLAR. Then, in POLAR, we likewise flagged unique patients across the same characteristics that at any point were flagged to have enrolled in or graduated from RCBH. We then mapped the unique RCBH patients in the monthly patient datasets to the associated unique RCBH patients in POLAR. After mapping, we defined program duration variables and also compared the enrolment/graduation dates in the monthly provider datasets with POLAR. Upon examining this information, we believe our matching process was highly (if not completely) robust in identifying a subset of the RCBH enrolled patients in POLAR. We nevertheless used the enrolment, withdrawal, and graduation dates from the monthly provider datasets to remain robust.

For this analysis, we refined outcomes based on the objectives of the RCBH program (i.e., 'MBS items' within Program Logic). Specifically, to investigate primary and multidisciplinary care, we looked at GP visits, prescription medicines prescribed, and referrals to tertiary and secondary care. We considered multidisciplinary chronic disease services as a pooled index of GP health Management Plans, including GP chronic condition and multidisciplinary plans, multidisciplinary case conferencing arrangements, team care arrangements. The item codes are outlined in Appendix C**.** For each individual, all outcomes are aggregated at the quarterly level.

We retain all individuals that participated in RCBH and were flagged as RCBH eligible in POLAR, who ended up serving as our control group. The main sample restriction imposed is that we restrict the analysis to all people who were 53 years old at the start of the

observation window (January 2022). This is because, upon analysis of age at RCBH enrolment, there were 11 outliers (based on a three-standard deviation criterion applied to the highly skewed age distribution of RCBH enrollees). The final sample included >18,000 individuals across the EACH and Silverchain RCBH practices.

7.2 Statistical methodology

In this subsection, we provide a descriptive overview of the statistical approach used to estimate the effectiveness and reach of the RCBH program; the formal mathematical specification is provided in Appendix B. Our objective is to estimate how enrolment in RCBH changes healthcare utilisation and whether effects differ by sex, age, program duration, and area-level socioeconomic disadvantage.

We use an event-study DiD design because people did not all enrol in RCBH at the same time. When enrolment is staggered, the "treatment" and "comparison" groups change over calendar time. This design lets us make two complementary comparisons: (1) each person relative to their own pre-enrolment history (within-person change), and (2) earlier enrolees relative to otherwise similar people who have not yet enrolled in the same calendar period (the "RCBH-eligible" group flagged in POLAR who may enrol later).

To implement the within-person comparison, we include individual fixed effects. Intuitively, this is like subtracting each person's own 'baseline' effect which impacts their utilisation. Thus we focus on how their outcome moves around the time they enrol. Individual fixed effects remove all time-invariant differences across people (for example, sex, long-standing health risk, or any fixed unobserved traits). That means if someone's outcome shifts after enrolment, the change is not attributed to those fixed characteristics because they are held constant by construction. To ensure fair comparisons across calendar time, we also include time fixed effects (quarter-year indicators). These soak up system-wide influences that hit everyone in a given period—policy changes, seasonal patterns, influenza waves—so we are comparing earlier and later enrolees within the same time of reference. Put simply, we compare people to themselves over time and, at the same time, compare earlier enrolees with not-yet-enrolled peers in the same period; then we average these within-person contrasts across individuals to obtain the program's average effect.

A helpful way to see this is to think in rolling cohorts. Suppose the first RCBH enrolments occur in April 2024. In that month, everyone not yet enrolled forms the comparison group; e.g. everyone who enrols in May 2024 until the end of the observation period. In May 2024, additional patients enrol. The first post-enrolment effect for the April cohort is measured in May; the first post-enrolment effect for the May cohort is measured in June. Although these "first-period" effects happen at different calendar times, the model aligns them by event time (time since enrolment) and pools them to estimate the average first-period effect. The same pooling happens for the second period after enrolment, the third, and so on, up to the last enrolment in our data (August 2025). As cohorts roll into treatment, they are removed from the comparison group for subsequent cohorts, ensuring that comparisons are always between enrolees and genuinely not-yet-enrolled peers. Because longer-run effects (many periods after enrolment) are informed by fewer individuals with sufficiently long follow-up, their estimates are typically less precise; accordingly, standard errors widen as we move further from the enrolment point (for illustration we described months; in the actual estimation we use calendar quarters).

The key requirement for this design is the parallel-trends assumption: in the absence of RCBH, outcomes for earlier and later enrolees would have evolved similarly. We assess this by inspecting the pre-enrolment event-time coefficients; flat, near-zero estimates before enrolment support the assumption. For each person we index event time relative to five quarters before enrolment as the omitted (reference) category. This baseline is far enough from program start to avoid short-run anticipatory upticks that can occur immediately before care coordination begins. Individuals are censored at death, and standard errors are clustered at the individual level. We present event time point estimates with 95% confidence intervals.

7.3 Results

7.3.1. Descriptive statistics

The descriptive statistics of the summary sample are presented in Table 7.1. The data contains 954 patients who were enrolled into RCBH during the study period and 17,534 patients who were flagged as RCBH eligible but were not yet enrolled.

Descriptive statistics somewhat suggest that enrolled patients may have been prioritised because of need or healthcare engagement. RCBH participants were older than not yet enrolled, or 'RCBH eligible' patients (80 vs 71 years), were more likely to be female (0.58 vs 0.54), and live in areas with higher socioeconomic disadvantage (0.57 vs 0.49). Consistent with the project aims and participant eligibility criteria, cardiovascular disease, respiratory disease, and frailty were the most common health conditions reported among RCBH enrolled and flagged patients. Cardiovascular disease and frailty were more common in enrolled relative to eligible patients (0.84 vs 0.77 and 0.52 vs 0.38, respectively). Among enrolled patients, the average duration of 'treatment' was 121 days (~4 months).

These results indicate that on average patients enrolled into RCBH may have been sicker and more engaged with healthcare than eligible patients. This selection into treatment, and particularly, differences in outcome 'levels' across flagged and enrolled patients, suggests that there is a need to control for unobserved individual-level confounders and justifies our inclusion of individual fixed effects in the modelling approach.

7.3.2. Referrals

Unfortunately, a large share of referrals noted within POLAR are unmapped or not classified (38%). Referrals mapped are extremely varied; the referral types for the study period for RCBH enrolled and RCBH eligible are presented in Figure 7. 1 and Figure 7.2.

Throughout the observation period, podiatry, cardiology, physiotherapy, dermatology, ophthalmology, urology, and administration were among the top ten referral types. The main points of difference in these leading referral types across groups were that RCBH eligible had a slightly higher number of referrals pertaining to hospital/ED, gastroenterology, and psychiatry whereas RCBH enrolled patients had more neurosurgery, endocrinology, and psychology referrals.

The top ten referral categories for RCBH patients after enrolment is presented in Figure 7.3. The main differences after enrolment is that referrals to pharmacy, hospital/emergency slightly increase.

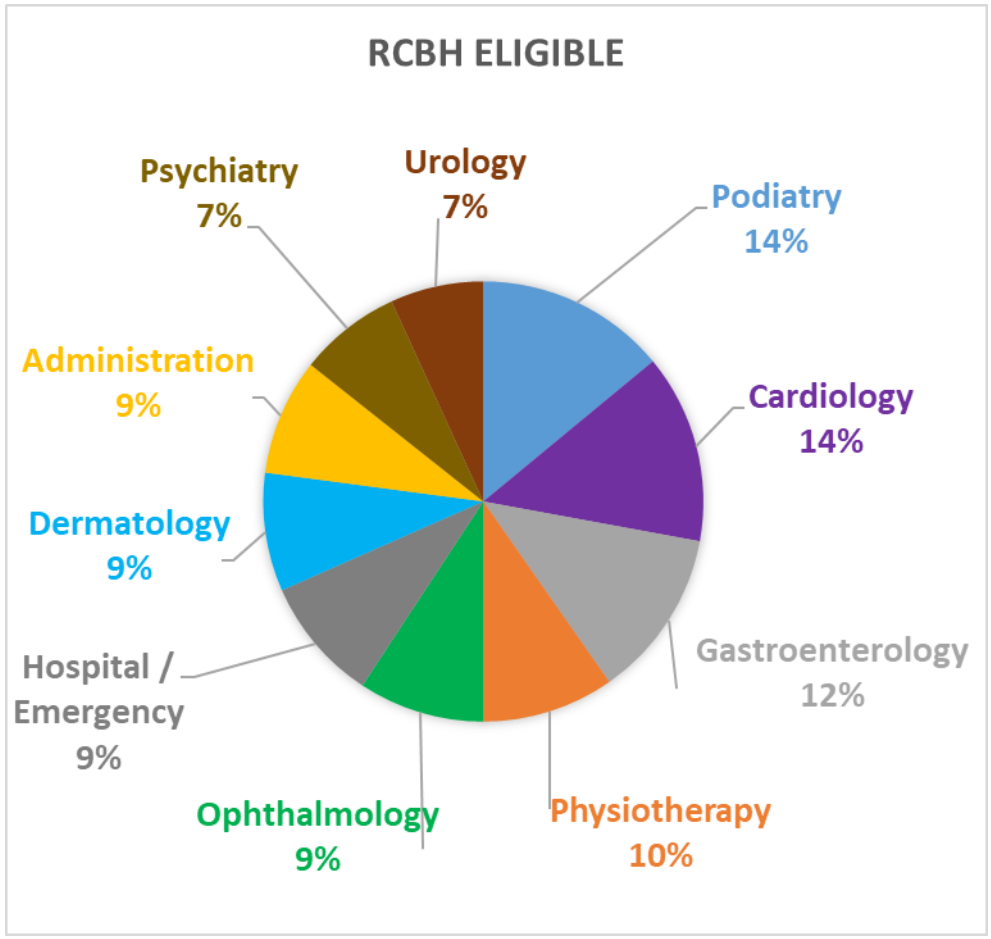
Taken together with the analysis of the referrals data provided in EACH, this suggest that the aged care referrals are not being captured within POLAR appropriately. Thus in the POLAR analyses, the referrals presented likely are an underestimate the true number of referrals.

Table 7. 1 – Descriptive statistics

	RCBH Enrolled (n = 954) Mean/Prop.	Not yet enrolled (n=17,534) Mean/Prop.
Age[A]	80.21	70.74
Age group[A]		
Greater than 81 years	0.51	0.21
Female[B]	0.58	0.54
Above median level socioeconomic disadvantage	0.57	0.49
Health conditions[C]		
Cardiovascular disease	0.84	0.77
Chronic respiratory disease	0.27	0.24
Frailty	0.52	0.38
Died during study period	0.04	0.02
Duration in RCBH program (days)[D]	119	-
Outcomes (per person-quarter before enrolment)[E]		
GP visits	3.27	2.35
Prescription medicines	4.46	2.99
Chronic disease services	0.54	0.27
Referrals	1.49	1.19

Notes: A) characteristics at latest data set extraction date (September 2025). B) Refers to sex at birth, individuals with innate variations of sex characteristics are censored due to low numbers. C) individuals may have multiple conditions. D) Duration for graduated patients only (n=612); median duration of participation was 118 days. These numbers may slightly vary relative to the provider data due to incomplete data linkage between the provider and POLAR datasets. E) Mean of outcomes for RCBH but not yet treated are from whole sample period.

Figure 7. 1 – Referrals for RCBH eligible and RBCH enrolled across study period (% of top ten referrals)



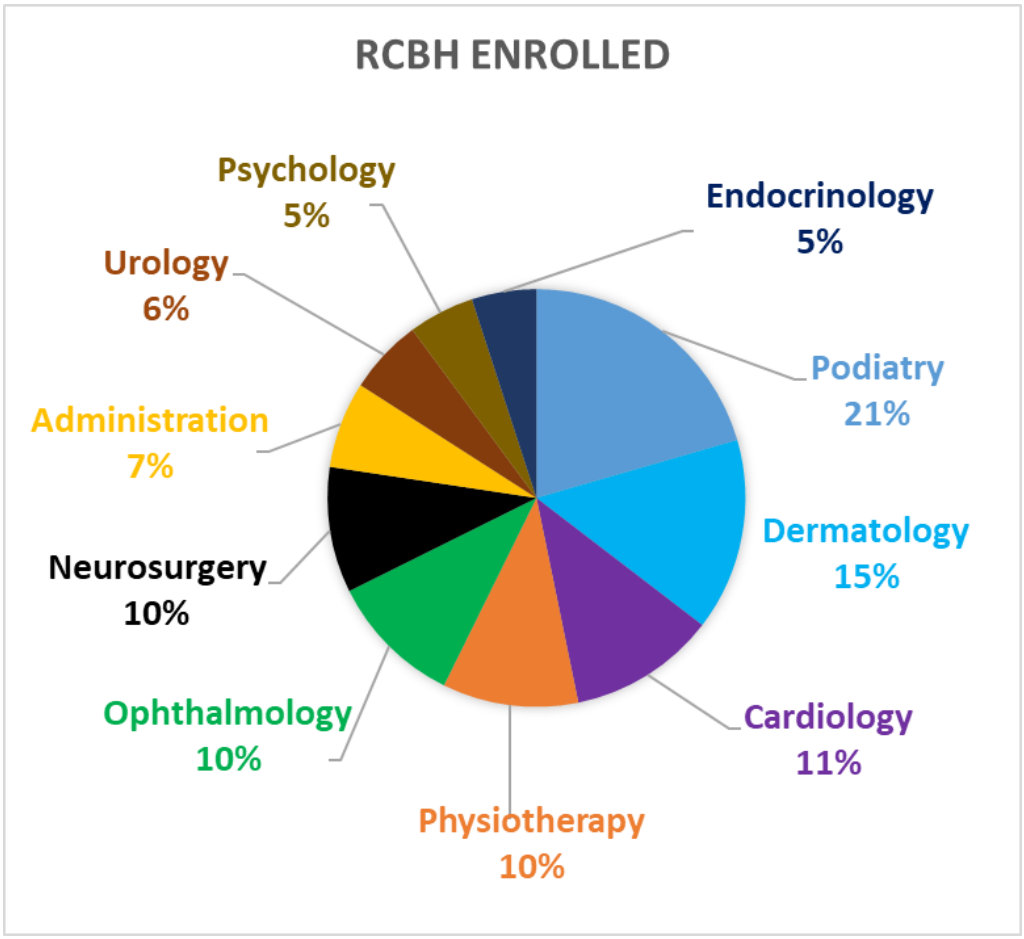
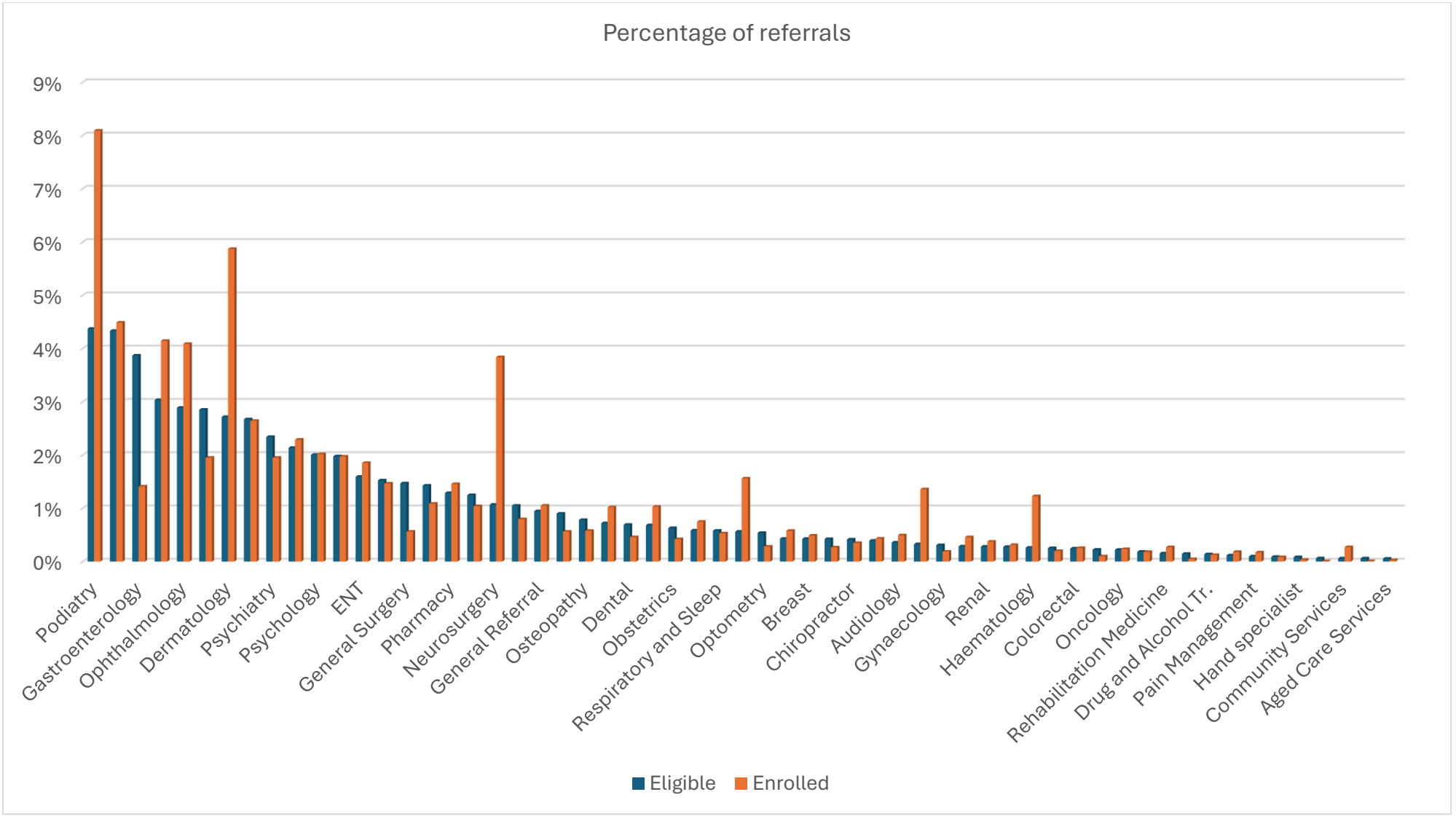
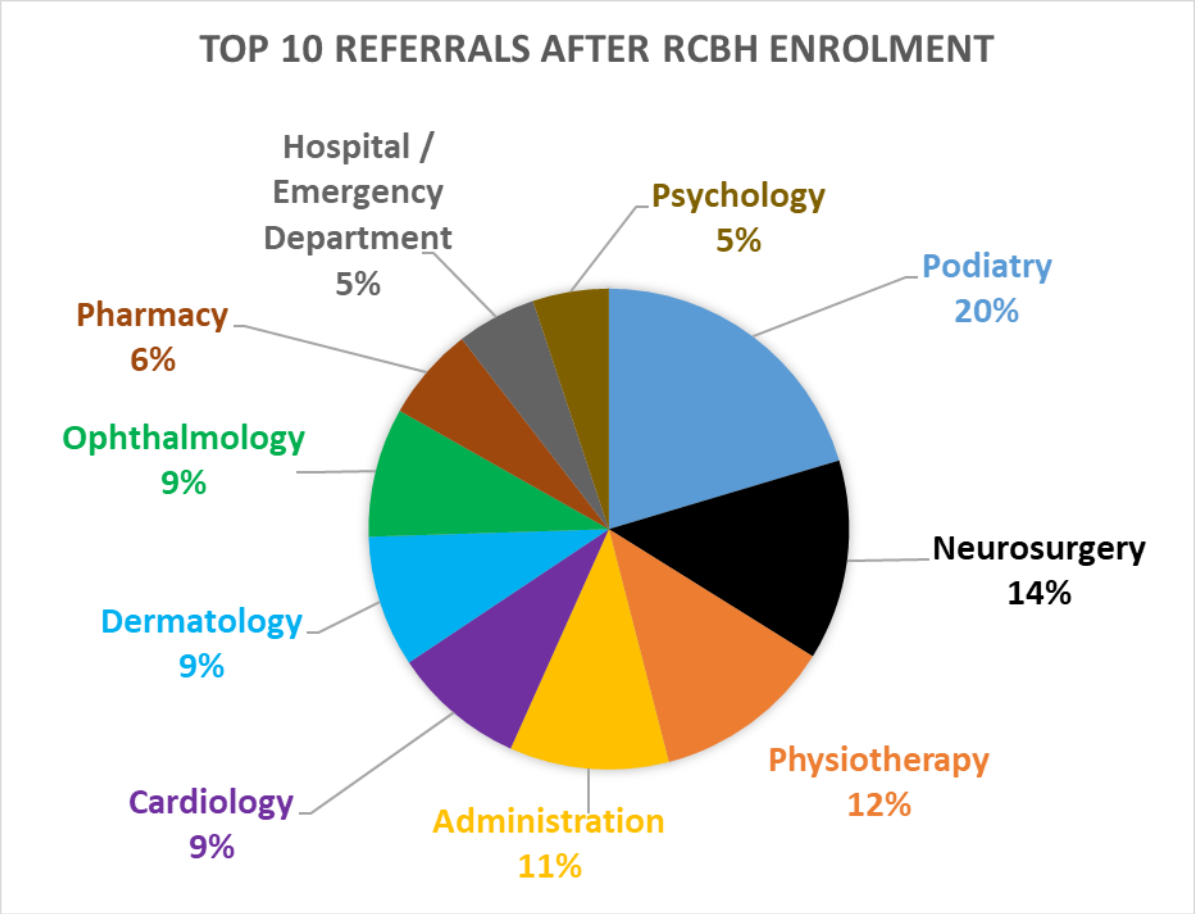


Figure 7. 2 – Referrals for RCBH eligible and RBCH enrolled across study period (all referrals)



Notes: Raw data for this graph has been provided alongside this report.

Figure 7. 3 – Referrals for RBCH enrolled following enrolment (% of top ten referrals)



7.3.3. Event study results

The main estimation results are presented in Figure 7. 4. These figures show the changes in GP visits, prescriptions prescribed, multidisciplinary chronic disease services, and referrals per person-quarter relative to five quarters before being enrolled into RCBH (i.e., the baseline / reference period).

These figures show the changes in GP visits, prescriptions prescribed, multidisciplinary chronic disease services, and referrals per person-quarter relative to five quarters before being enrolled into RCBH (i.e., the baseline / reference period).

For all outcomes, there is evidence of increasing healthcare utilisation in the year prior to RCBH enrolment, aligning with increased healthcare engagement prompting enrolment. For all outcomes, utilisation levels peak in the quarter of RCBH enrolment and reduce thereafter. In the quarter of enrolment, RCBH patients use 1.38 (95%CI 1.14;1.61) more GP services, are prescribed 0.67 (95%CI 0.36;0.99) more prescription medicines, receive 0.58 (95%CI 0.48; 0.68) more multidisciplinary chronic disease services; and are referred to 1.02 (95%CI 0.84;1.20) more services.

Utilisation of this care remains significantly higher relative to the baseline for up to two quarters for GP visits and prescribed medicines and for one additional quarter for multidisciplinary chronic disease services. In contrast, the number of referrals was elevated relative to baseline for up to four quarters after enrolment (+0.45 (95%CI 0.11;0.78) more referrals).

The results stratified by provider are presented in Figure 7.5. This shows that following enrolment, utilisation of GP services and multidisciplinary chronic disease services was more pronounced among RCBH patients who were enrolled in Silverchain relative to those who were enrolled through EACH. Referrals after enrolment were slightly more elevated among Silverchain enrolled RCBH patients relative to EACH patients in the quarter immediately following enrolment albeit these differences were not statistically significant.

To further understand what could be driving these differences, we conduct several heterogeneity analyses across patient level characteristics.

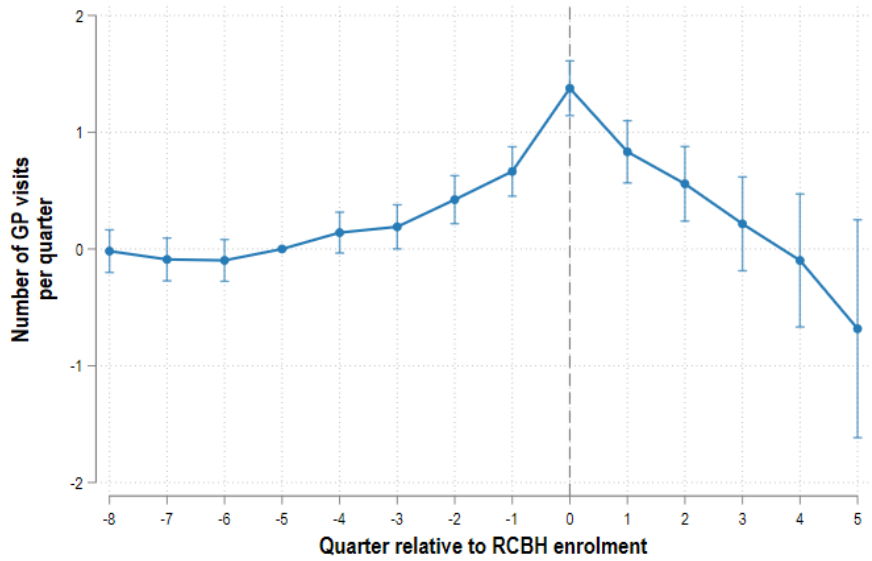
The outcomes stratified by age, sex, length of RCBH program duration, and patients' area-level socioeconomic disadvantage are presented in Figure 7.6

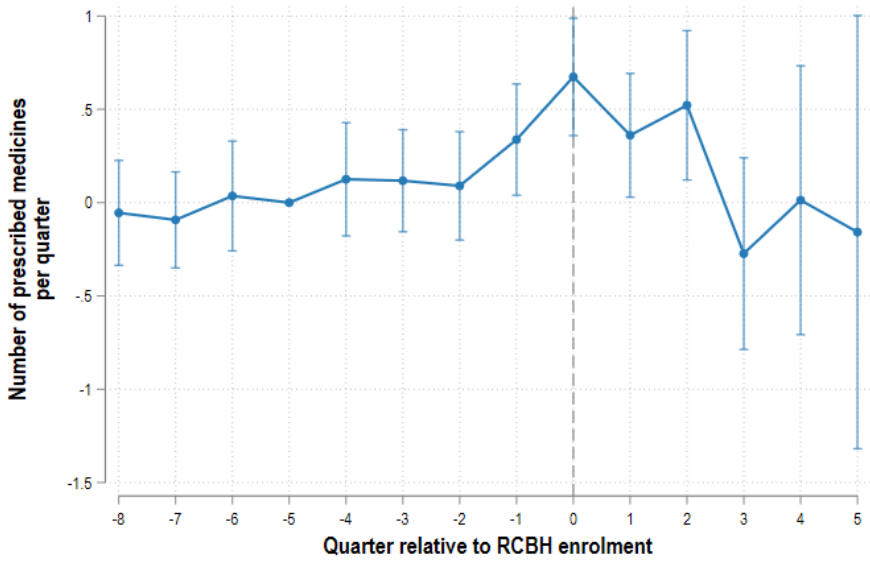
These results suggest that spikes in healthcare utilisation in the quarter of enrolment were generally more pronounced for patients living in areas with higher socioeconomic disadvantage, particularly for multidisciplinary chronic disease services and referrals. Individuals who participated in the program for longer appear to have slightly larger effects for practice services (multidisciplinary care services), whereas the opposite was true for referrals. This potentially suggests that those who participated in the program for longer were engaged in more practice-level, rather than secondary, care. However, effects are uncertain.

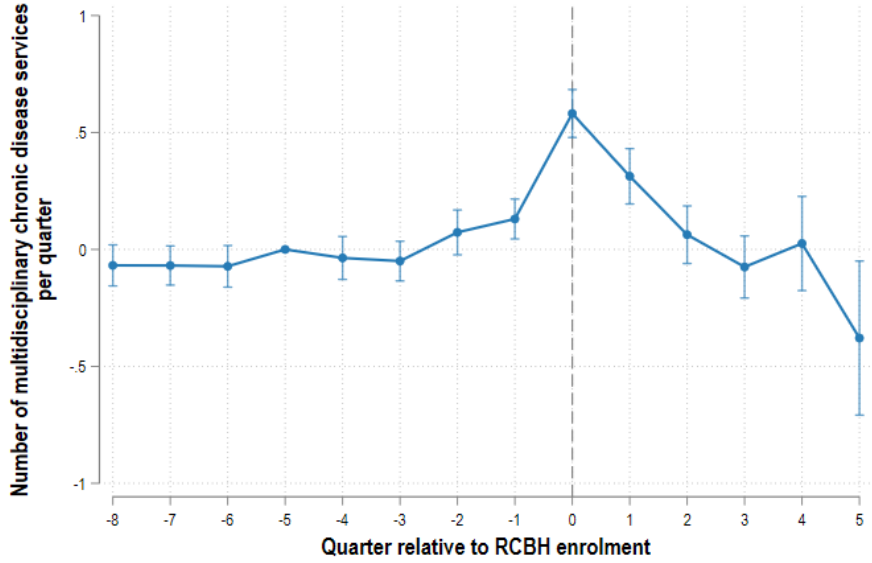
Individuals who were 81 years and above were prescribed a larger number of prescription medicines than those under 81 years and were referred to fewer services than the younger group. There was also suggestive evidence that effects on multidisciplinary services were more pronounced for females relative to males.

Our descriptive analyses on differences between EACH and Silverchain suggests that RCBH enrollees in Silverchain were more likely to live in areas with higher socioeconomic disadvantage. Given the effects on healthcare utilisation were more pronounced in this group, this may be in part explaining some of the observed differences across providers. But given the differences in referrals were not significant across EACH relative to Silverchain, but were more pronounced for patients living in more disadvantaged areas, this suggests that irrespective of provider, more disadvantaged patients may be more likely to benefit.

Figure 7. 4 – GP visits, prescription medicines, chronic disease management, and referrals relative to RCBH enrolment







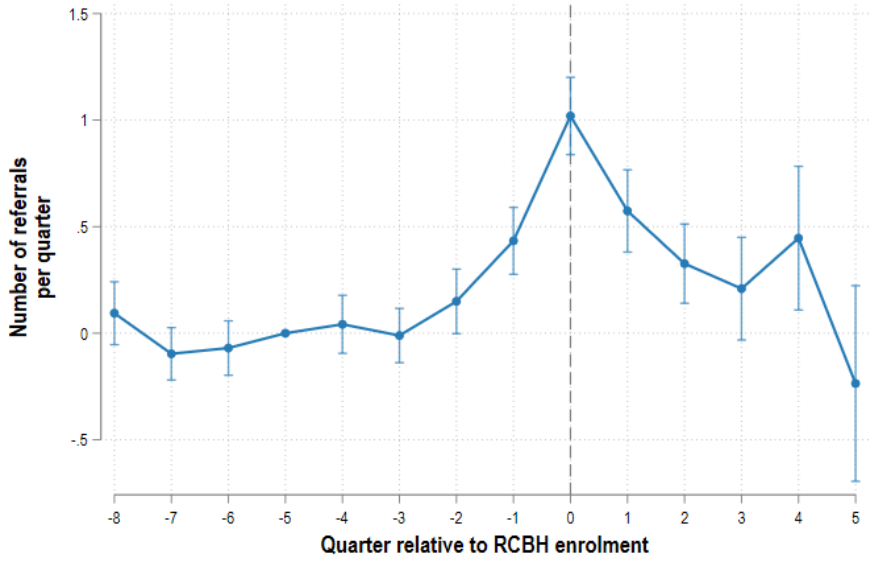


Figure 7. 5– GP visits, prescription medicines, chronic disease management, and referrals relative to RCBH enrolment stratified by provider

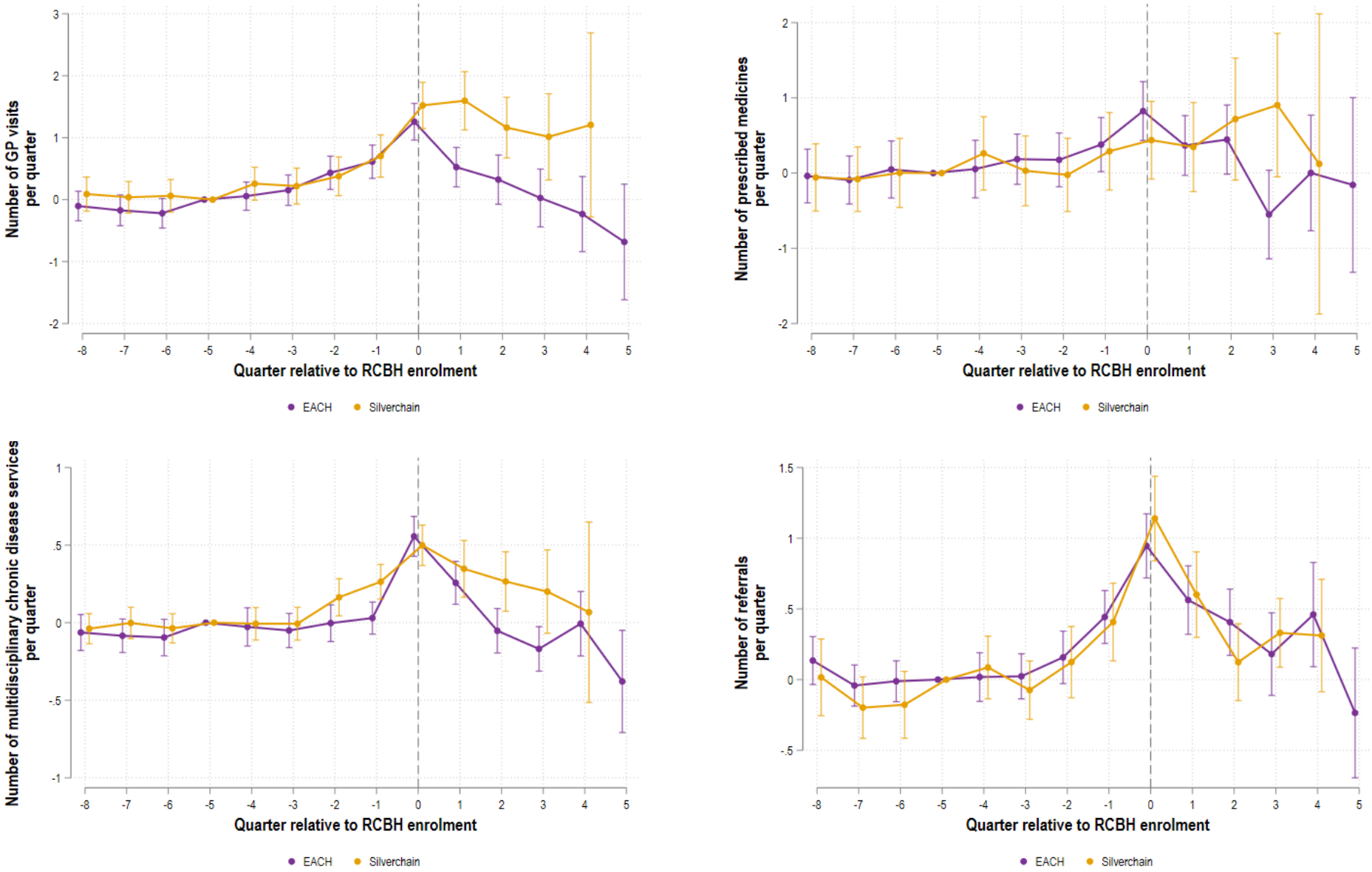
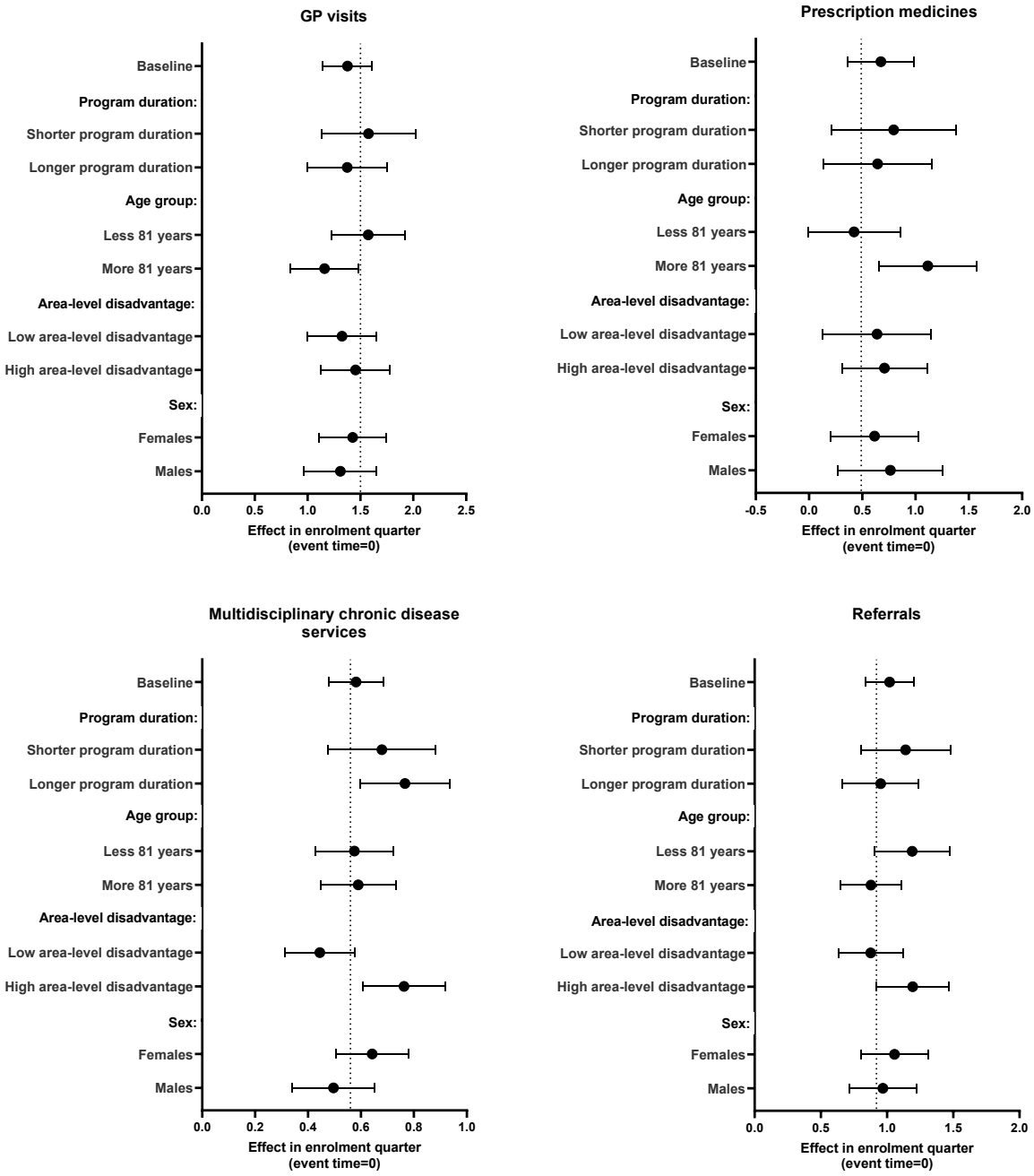


Figure 7. 6 – Heterogeneity analysis



Notes: Dashed line presents results from baseline estimation 'full' sample. Point estimate shown is quarter of enrolment (i.e., event time=0). All coefficients are estimated separately by subgroup and are referenced to the baseline (event time= -5).

7.3.4. Discussion

This analysis shows that RCBH enrolment has dynamic and heterogenous impacts on utilisation. RCBH enrolment increases healthcare utilisation, particularly in the quarter of enrolment and then reverts to baseline levels after 1-2 years. We also document substantive heterogeneous effects by patient characteristics, in particular finding that patients living in more socioeconomically disadvantaged areas receive more primary healthcare services (GP visits and multidisciplinary chronic disease services) upon enrolment.

The uptick in the use of multidisciplinary healthcare is somewhat modest compared to other financial incentive-based programs. For example, the Indigenous Practice Incentives Program (Saxby et al., 2023), which provided AUD145 payment per patient (per year)[5] that receives a chronic disease management plan, led to approximately 0.10 more chronic disease related services per quarter over a sustained period of five years (a 34% increase). This is seemingly a similar treatment effect compared to the average treatment effects estimated in this study, albeit achieved at a lower relative cost per patient.

As the RCBH program commenced in April 2024, and our data only spans until September 2025, we could only follow patients' post-enrolment for a maximum of six complete quarters. Thus, we cannot observe whether there were longer term changes in healthcare utilisation. However, with the exception of referrals, which still seemed to be somewhat elevated even after four quarters of RCBH enrolment, all outcomes were approaching baseline after approximately one year after enrolment. This indicates that sustained utilisation may be unlikely in the absence of continued nurse interactions. The less pronounced effects for patients who participated in the program for shorter periods of time supports this hypothesis (at least for multidisciplinary and practice services).

[5] On top of the traditional fee for service payment. Inflated to 2024 dollars.

8. RCBH uptake

Evidence on the number of RCBH patients enrolled per postcode for both EACH and Silverchain are mapped in Figures 8.1 and 8.2, respectively. By providing this information at this smallest geographic level, this enables EMPHN to aggregate values up to desired geographies. This data was sourced from the latest monthly provider data from both EACH and Silverchain.

There were some postcodes that had more patients than others. In particular, the following postcodes had at least 30 patients for each provider.

EACH: 3101, 3108, 3125, 3125, 3130, 3131, 3150 and 3180

Silverchain: 3076, 3083, 3752 and 3754

Figure 8.1 – Number of enrolled RCBH patients for EACH by patient postcode

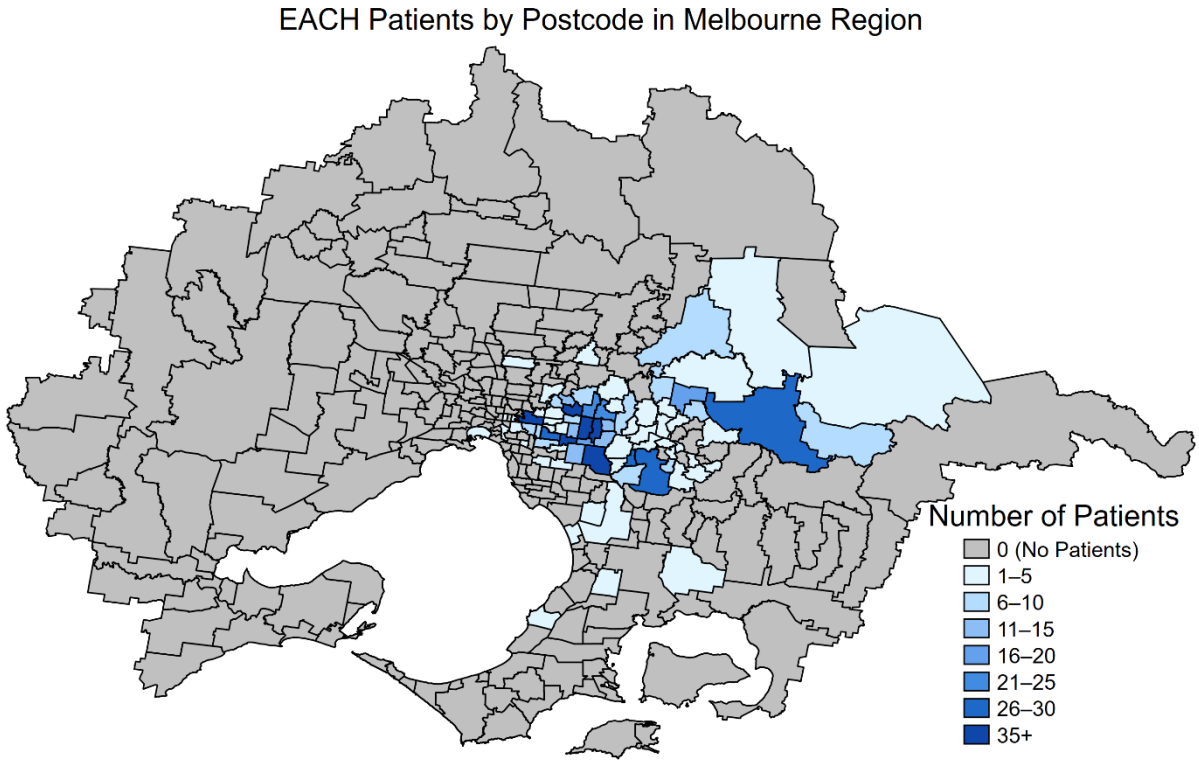
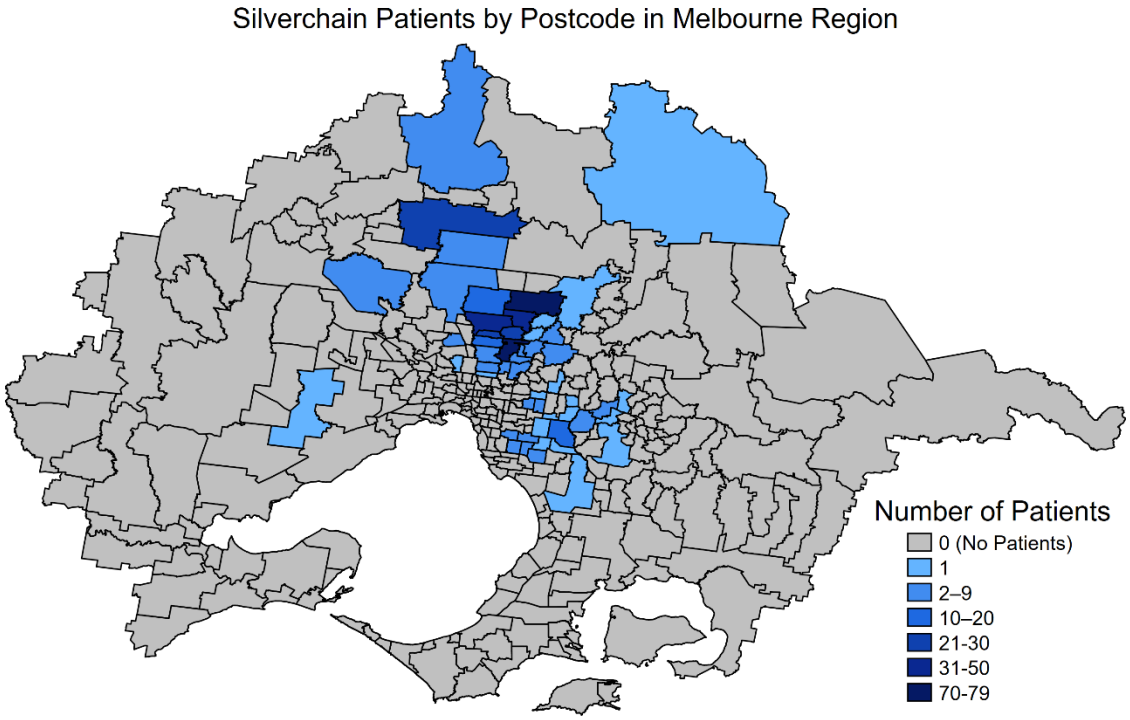


Figure 8.2 – Number of enrolled RCBH patients for Silverchain by patient postcode



The number of eligible RCBH patients per practice and adoption rates are additionally provided in Table 8.1. This analysis was done by linking the patients in the provider data to POLAR and taking the POLAR RCBH-Eligible group as a measure of total people that could be enrolled. This is not perfect as practices may flag patients according to their discretion or reporting requirements. The largest uptake was observed in Together Medical Family Practice, and the lowest uptake was observed for Mernda Junction Medical.

Table 8. 1 – RCBH eligible patients and RCBH enrolled by practice

Practice ID	Practice Name	Eligible	EACH	Silverchain	Adoption (%)
847	Canterbury Garden Medical Centre	1	-	5	500
1066	Together Medical Family Practice	214	42	-	19.63
393	Orion Medical Centre	324	47	-	14.51
103	SIA Burwood	1,183	69	-	5.83
392	392	1,657	92	-	5.55
1797	Bundoora Medical Centre	1,071	-	58	5.42
115	Forest Hill Family Clinic	1,102	52	-	4.72
125	Kaizen Clinics Seville	1,239	51	-	4.12
244	244	1,169	-	44	3.76
2154	St Peter Medical Centre	162	-	6	3.7
953	Riverstone Medical Practice	659	-	23	3.49
782	Plenty Road Health Services	1,417	-	49	3.46
2029	Lilydale Medical Centre	1,273	43	-	3.38
2030	Kew Junction Medical Clinic	1,869	59	-	3.16
59	O'Herns Road Medical Centre	670	-	21	3.13
88	Verve Family Doctors	1,965	56	-	2.85
510	Kerrie Road Family Medical Centre	1,545	40	-	2.59
247	Wallan GP SuperClinic	1,344	-	26	1.93
472	Lakes Boulevard Medical	2,674	-	51	1.91
82	Manningham General Practice	4,231	76	-	1.8
968	Heidelberg Family Medical Centre	272	-	4	1.47
141	Medisurge Surgery	503	-	7	1.39
2031	Camberwell Junction Medical Clinic	2,664	30	-	1.13
970	Alsalam Medical Centre	1,822	-	13	0.71
1001	Family Medical Practice	968	-	6	0.62
1445	NorthEnd Medical	3,220	-	20	0.62
2028	Forest Hill Chase Medical Centre	13,560	46	-	0.34
1900	Mernda Junction Medical	1,468	-	4	0.27
1083	1083	5	-	-	0

Notes: The data incorporated information on Silverchain for only 372 patients (not 448 in the latest sample) and ~750 patients in total (not 954 as in the POLAR sample); this data was provided on 5/11/2025 and was not able to be used to update this analysis in time as we focused on updating the reach and effectiveness analysis in this evaluation. Practice IDs were mapped to the CRM dataset to identify practice names. Practice 1083 did not exist in the latest CRM dataset and practices 244 and 392 mapped to multiple sub-practices (e.g., 244a, 244b, and so on), so were left in raw number format in the table. The 92 patients mapped to 392 from EACH comprise 51 from 392B and 41 from 392C. Practice id 847 was a theoretical impossibility, likely due to incorrect polar flagging.

9. Summary of main findings

As aforementioned, the key RCBH program objectives were to:

1. Reduce unplanned hospitalisations and avoidable emergency presentations among participating patients
2. Improve patients' quality of life
3. Improve patients' ability, understanding, and involvement in managing their condition
4. Promote a positive experience of care for patients and clinicians
5. Embed team-based, nurse-supported care coordination as an integrated and sustainable feature of general practice

An overview of the project's main findings mapped against the RE-AIM framework, and these program objectives, is presented in Table 9.1 below.

Additional details regarding each of the main findings from the analyses are summarised in below.

Table 9. 1– Summary of findings against the RE-AIM framework and program objectives; grey=not assessed; green=assessed.

RE-AIM component	**Main findings**	**Assessment against program objectives**				
		1 (acute care)	**2** (quality of life)	**3** (patient involvement)	**4** (positive experience)	**5** (team-based care)
Reach extent to which the program engages the target population and ensures equitable access	Patients with cardiovascular disease and frailty, older patients, and those with initially higher healthcare utilisation and higher mortality risk are more likely to be enrolled					
Effectiveness Impact of the program on health outcomes, healthcare use, patient experience, self-management, quality of life, costs, and the associated cost-effectiveness	Patient knowledge, skills and confidence to managing their health condition improves as measure by Patient Activation Measure					
	Patient quality of life improves as measured by EQ5D5L					
	Patients would recommend the program to others					
	Primary and preventative healthcare utilisation and referrals increase following RCBH enrolment. Referrals					

RE-AIM component	Main findings	Assessment against program objectives				
		1 (acute care)	**2** (quality of life)	**3** (patient involvement)	**4** (positive experience)	**5** (team-based care)
	were largely for Aged Care Navigation and Allied Health Services					
	Cost of program is relatively high compared to Australia's typical Willingness to Pay thresholds and uplift in utilisation observed in similar programs					
Adoption Uptake of the program by general practices	Number enrolled patients varies significantly across patient postcode and practices. The number of eligible and enrolled patients is provided per practice.					

***Notes*:** Program objectives: 1) Reduce unplanned hospitalisations and avoidable emergency presentations among participating patients; 2) Improve patients' quality of life; 3) Improve patients' ability, understanding, and involvement in managing their condition; 4) Promote a positive experience of care for patients and clinicians; 5) Embed team-based, nurse-supported care coordination as an integrated and sustainable feature of general practice

9.1. RCBH may be reaching the intended cohort but this is an EMPHN judgement call

This study found key differences across RCBH enrolled relative to RCBH eligible patients. Namely, compared to eligible patients, RCBH-enrolled patients were:

- Older
- More likely to be female
- Using more healthcare prior to enrolment;
- More likely to have cardiovascular disease and frailty
- More likely to have died during observation window

This suggests that enrolled patients are likely to be sicker relative to eligible patients. The question is to EMPHN is; are these the patients you want to target?

9.2. Enrolment triggers a short-run uplift in care

Across GP visits, multidisciplinary chronic-disease services and referrals, utilisation rises sharply in the enrolment quarter, then tapers toward baseline over the following 3–5 quarters. Referrals remain somewhat elevated longer than practice-based services, consistent with coordination unlocking downstream care. Patients were already interacting with healthcare services prior to enrolment which may have triggered enrolments[6] however chronic disease care and referrals remain somewhat elevated even a year after enrolment, suggesting an uplift in practice-level and secondary care.

9.3. Sustained engagement is important

Effects on healthcare utilisation are larger for patients who had longer program duration. In particular, positive program effects were more pronounced for EACH compared to Silverchain and this was likely due to increased contacts. This pattern suggests the NCC model can mobilise primary and preventive care, but benefits attenuate without continued contact.

[6] Patients may also have had their enrolment 'triggered' due to selection on their HARP/HAT score.

9.4. Early signals on effectiveness are modest and proximate

Patient-reported outcomes (EQ5D5L) indicate small within-person QALY gains over short follow-up for the subset with pre/post measures. Patient experience measures indicate that the program is positively associated with patient confidence in managing their own health conditions. However, given current costs and the limited time horizon, the pseudo cost-effectiveness suggests value for money is unlikely at present under current willingness to pay thresholds.

9.5. Data limitations constrain conclusions on cost-effectiveness and 'appropriateness' of referrals

Fragmented identifiers between provider feeds and POLAR, inconsistent variable definitions across providers, EQ5D5L capture without control groups, and unmapped referral categories somewhat constrain causal inference and robust cost-effectiveness analyses. These are solvable process issues that could be improved particularly through investment in data infrastructure and cleaning and are not intrinsically due to the limits in the model of care.

Specifically, we recommend the following data improvements:

- Collect information on quality of life measures for treated and control groups over long periods of time
- Code referrals made into POLAR categories; this ensures that referrals and onwards healthcare utilisation is not under-estimated
- Ensure all patients enrolled into EMPHN programs such as RCBH are coded as such in POLAR; this includes mapping across information on date of enrolment, program duration, etc. All program details should be coded into POLAR in the first instance.
- If EMPHN cannot achieve linkage to hospital data, try to get information on longitudinal measures of acute care utilisation (for both control and treated groups), such as the components within HARP scores
- Longitudinal information on relevant clinical outcomes for control and treatment groups

9.6. The quasi-experimental evaluation is appropriate and feasible at scale

The event-study DiD design leveraging staggered uptake and POLAR data provides a credible framework to estimate program impacts; not only for RCBH but for other EMPHN programs. The exact analyses can be readily repeated in 1-2 years' time to investigate longer term follow up and enhance statistical power for RCBH. This empirical approach can be readily adapted for other EMPHN programs (pending appropriate identification of program participants in POLAR).

For example, if you run another program investigating the impacts of another EMPHN program on healthcare use; you explicitly identify the date that these patients enrol into the program. If your sample size is large enough and say you enrol 1,000 patients into this program over 2-3 years, you can compare any longitudinally collected outcomes before and after their enrolment relative to patients who will enrol in the future. In this sense, you are merely exploiting the variation in the time in which these patients were enrolled. The alternative option would be to match this group of enrolled patients to patients who are eligible but yet to be enrolled. This is exactly the approach we have used in our evaluation and you can apply the exact same code to investigate outcomes for other EMPHN programs.

10. Recommendations

10.1. Consider the PICO framework

When it comes to rigorous decision-making around programs funded by the Pharmaceutical Benefits Advisory Committee (PBAC) and the Medical Services Advisory Committee (MSAC), the government employs the PICO framework – Population; Intervention; Comparator; and Outcomes. Thinking through a comparator or control cohort when implementing and designing interventions is crucial to enabling robust evaluation and supporting decisions. While the existing program logic identifies relevant domains of change, many of the listed 'outcomes' within these domains are broad

descriptors of activity (e.g. “MBS items” or “referrals to appropriate services”) rather than clearly defined outcomes that can be measured and attributed to the intervention.

MSAC- and PBAC-style assessments typically require outcomes to be defined using the PICO structure, including explicit specification of:

a. the measurement tool or proxy (e.g. EQ5D5L, statin initiation, chronic disease management items, polypharmacy reduction);
b. the time horizon for change (e.g. three years before and after enrolment), and;
c. the relevant comparator or counterfactual (e.g. not-yet-treated or usual-care cohorts).

Without this level of specificity, it becomes difficult to determine whether changes in outcomes are genuinely attributable to the program rather than underlying factors or secular trends. Applying PICO principles would materially improve evaluability and claims around effectiveness or value for money. We also recommend that EMPHN focuses on how this PICO framework and outcomes (measurement tool) may vary for different conditions. Reviewing public summary documents from MSAC and PBAC submissions could support this approach.

10.2. Invest in POLAR and EMPHN program linkage

EMPHN could consider incentivising practices to maintain and frequently update their measures including clinical outcomes (which should be decided for specific conditions using a PICO framework), quality of life measures, program start and stop dates. This would have benefits that expand beyond the RCBH program.

Unfortunately, a large share of referrals noted within POLAR are unmapped or not classified (38%). Referrals classified manually in the RCBH forms are very varied and difficult to categorize. For example, one line of referrals could contain multiple referrals within it and the same referral type could be listed up to 14 different ways (e.g. MAC, My Aged Care, MAC referral, referral to MAC). To this end, we suggest creating a NCC referral flag and enabling the NCCs to fill the referrals recommended directly into POLAR. This will ensure that categorisation is consistent across all patients within POLAR.

In lieu of data linkage, EMPHN can refine measures already collected within POLAR such as the HARP scores, to try and capture longitudinal measures of acute care utilisation. In particular, when HARP scores are collected, there needs to be associated time stamps. EMPHN should also request that Outcome Health provides the components that make up these scores.

Other factors such as hospital discharge summaries could be consolidated into POLAR as another way to monitor these acute care outcomes. Similarly, relevant clinical outcomes could be integrated into POLAR more frequently, such as blood pressure, BMI, blood glucose levels, or other clinical outcomes that are of interest to your study population (as defined through a PICO framework).

Data linkage between POLAR and EMPHN programs should also be considered to improve the utility of all data assets. Patient information such as RCBH enrolment and graduation date were at times inconsistently coded across POLAR vs patient intake forms. Through consultation with EMPHN, the patient intake forms were determined to be the most robust and subsequently, the MI team needed to conduct manual matching to try and link the correct RCBH patient information into POLAR.

Improving linkage between data collected in EMPHN programs to POLAR (and potentially other data assets) should consider robust collection of *POLAR ID* for patients enrolled into EMPHN programs. This information would facilitate linkage. If it is difficult to capture information on *POLAR IDs*, you could consider liaising with Outcome Health to request permission for them to release exact date of birth information. This would allow you to provide linking based on exact date of birth, sex at birth, patient postcode, and practice ID – all factors that could improve matching.

10.3. Consider downstream outcomes

Due to short-term follow-up, it is difficult to investigate the longer term outcomes associated with RCBH. Short-term changes in healthcare utilisation, if not sustained, are unlikely to lead to substantive changes in downstream outcomes such as quality of life improvements, acute care use or mortality. However, these outcomes should be revisited when the RCBH participants reach five years of follow-up. This time horizon would enable robust analyses of whether utilisation measures were sustained and

crucial analyses such as survival analyses. The rich information on date of death is a strength for this analysis that is readily achievable and should be considered to be embedded as a long-term outcome within the program logic.

Moreover, linkage to external datasets such as hospitalisations should be considered to investigate outcomes such as potentially preventable hospitalisations and ED visits. This linkage and analyses would require significant investment, including linkage and extensive data cleaning, but does pose a unique opportunity to investigate longer term outcomes.

In conducting this linkage, it is important that EMPHN liaises with relevant ethics committees to ensure that appropriate consent has been considered. In particular, for each EMPHN program in operation, one would need to provide consent forms for this linkage. We recommend that EMPHN consider this approach for a single EMPHN program in the first instance, to demonstrate feasibility, before attempting these types of analyses for all EMPHN programs.

10.4. Collect consistent patient outcome measures across providers

All patient reported outcome measures and patient reported experience measures should be collected consistently across providers. Changes to collect EQ5D5L within EACH have been a positive first step and enables for comparisons across providers relative to patients' baseline scores, however limited observations, before, during and after RCBH participation limit the measure's utility. For instance, should EMPHN wish to conduct a robust cost effectiveness analysis, one would need to have a control group. Control groups are individuals who have very similar characteristics to the treated group. The most important outcome to collect would be individuals' quality of life measures and HARP scores for both treated and control groups, noting the time points for each of these measures e.g. baseline, after 3 months, after 6 months after 12 months. This could be considered for all RCBH eligible patients.

10.5. Prioritise patients who are likely to benefit

Patients living in socioeconomically disadvantaged regions more likely to use chronic disease services and GP visits following RCBH enrolment whereas older patients are the

most likely to receive prescription medicines and referrals following enrolment. Should EMPHN seek to focus on uplifting primary and preventive healthcare among socioeconomically disadvantaged groups, these groups could be prioritised in future iterations of the program.

10.6. Conduct long term follow-up and refine comparison groups

The POLAR data cleaning and analysis processes can be easily updated to assess the long-term impacts of the RCBH program. Re-running the analysis in one to two years would provide longer follow-up and greater confidence in the estimates. Future analyses could also refine the comparison group by focusing only on patients who enrolled in RCBH, which may yield more accurate estimates of the program's true effects given the differences observed between enrolled and eligible patients.

10.7. On improving the cost effectiveness of RCBH

Our pseudo-CEA shows cost per QALY gained of approximately $700k–$930k, indicating that—at current outcome levels—QALY gains would need to be around 15 times larger, per-patient program costs would need to fall to roughly $131–$222, or total enrolments would need to increase to approximately 6,000–14,900 patients to approach a $50k/QALY willingness-to-pay threshold. In practical terms, this implies that EMPHN would need to either improve patient outcomes, reduce per-patient costs, or substantially scale enrolments (holding costs and QALY gains constant) for the program to be cost-effective under standard Australian thresholds.

While the literature, on average, shows that care coordination can achieve modest QALY gains, our POLAR analyses suggests that these gains might be larger for specific patients (such as socioeconomically disadvantaged patients who may have had unmet care needs and patients who participated in the program for longer). In particular, one option could be to standardise a higher-intensity, longer-duration care bundle (clear contact schedule, medication review/deprescribing, proactive care plans, post-discharge/referral follow-ups). We suggest this as we saw from the POLAR analysis, that the largest uptick in preventive and primary healthcare was for patients with more contacts (longer duration). Our results also suggest that you could consider targeting to

patients most likely to benefit (e.g., higher frailty/SES-disadvantaged cohorts where our effects are larger).

Naturally, the other option would be to reduce program costs. While EMPHN is more across the practical realities of such an approach, these could consider aspects such as template referrals which use POLAR categories, embedding NCC data entry in POLAR, reducing duplicative information collection,[7] and setting a defined intensity level of the program for one patient.[8]

Given the costs, a clear option is to scale up patient enrolment. Practice-level enrolment targets and data completeness could be linked to performance payments.

Finally, in line with all the recommendations above, the data and evaluation strategies need to be improved to appropriately understand the program impact (collect EQ-5D-5L at baseline/3/6/12 months, track mortality, and implement a comparator (not-yet-treated eligible cohort or stepped-wedge)). EMPHN could also consider employing activity based costing strategies to ascribe costs to practices and patients. This would involve, for example, documenting the amount of time NCCs spend with each patient/practice.

11. Conclusions

RCBH appears to effectively *activate* multidisciplinary and preventive care at the point of enrolment, especially for patients from more socioeconomically disadvantaged regions. The short-run uplift in GP visits, chronic disease management items, prescriptions, and referrals suggests that nurse-led coordination may be uncovering unmet need and enabling patients to navigate the health system more effectively.

Translating this early activation into sustained health gains and value-for-money will require strengthening the program's data foundations. EMPHN should (i) standardise

[7] See initial report on RCBH Evaluation Strategies which outlines the data collected in duplicate across RCBH and POLAR, as well as unnecessary data collected in patient forms upon registration.

[8] Example: e.g., 1 intake + 4 care-coordination calls + 1 GP case conference + 1 meds review + 1 follow-up over 3–6 months

outcome measurement across providers—including routine pre/post EQ5D5L collection in both treated and comparator groups, (ii) maintain a clearly defined comparator cohort within POLAR, (iii) harmonise patient identifiers to support reliable linkage of RCBH and POLAR data, and (iv) invest in improved referral categorisation to reduce the “unknown” referral classes that currently limit analysis. Longer-term follow-up within POLAR will be essential to determine whether short-run increases in care translate into durable improvements in patient outcomes and reduced acute care use.

Appendix A

Table A1 – Components of RCBH Program Logic that can be addressed by the MI Evaluation Strategy (submitted in project proposal). Green indicates that it can be assessed under this evaluation, while red indicates that this may not be possible.

Stakeholders	Outputs	Assessable?	Short-term outcomes (<1year)	Assessable?	Medium-term outcomes (2-5 years)	Assessable?
Patient (18+) • People with cardiovascular disease • People with respiratory conditions • People who are considered frail and/or at a high risk of falls	Care plan		Improved self management, (self advocacy, confidence, knowledge, skills)	Medication adherence may be appraised as an indication of "self-management" depending on quality of POLAR data.	Decrease in ED/hospital admissions in comparison to 12 months prior to program. *please note added long-term outcome to this column: " Less frequent hospital admissions for people who have been involved in the RCBH program"	May be possible depending on EACH linkage and quality of POLAR data (i.e., HARP, HAT scores). Not possible for Silverchain yet.
	Goals		Improved understanding of condition, treatment, and medications.	Medication adherence may be appraised as an indication of "understanding" depending on quality of POLAR data.	Reduced (HAT score)	May be possible depending on pre-post patient form collection of HAT scores. I.e., not in POLAR.
	Referrals to appropriate services	Specific outcomes may be appraised if they are collected in POLAR, such as item numbers for medication reviews.	Patients receive support for their conditions/ through appropriate services.	Specific outcomes may be appraised if they are collected in POLAR, such as item numbers for medication reviews.		
	PROMs / PREMs scores		Patients feel engaged in the program (decision making, reaching goals, and are treated with dignity and respect)			

Stakeholders	Outputs	Assessable?	Short-term outcomes (<1year)	Assessable?	Medium-term outcomes (2-5 years)	Assessable?
	Patient education/resources		Improvement in QoL as measured by EQ5D-5L, within an episode of care.		sustained QoL post the life of the program	As longer term outcome, May be possible depending on EACH linkage and quality of POLAR data (i.e., HARP, HAT scores). Not possible for Silverchain yet.
EMPHN / DH / Funders	Avoidable hospitalisations / ED presentations.	Partially possible depending on EACH linkage and quality of POLAR data (i.e., HARP score).	Commissioning value for money services that meets the needs of people with cardiovascular disease, respiratory conditions, and people who are considered frail and/or at a high risk of falls		Identification of suitable RCBH practices (location, staffing mix, patient mix)	
	MBS items		Improved relationships across providers & partners			
	Type & mix of staff to run program & associated costs					
	# eligible patients per LGA/ suburb/practice					
LHN Local Health Network	Changes in ED/hospital admissions	Specific outcomes may be appraised depending on data quality in POLAR or RCBH patient forms.	Reduced number of ED / hospitalisations for patient's while in the program	Specific outcomes may be appraised depending on data quality in POLAR or RCBH patient forms.		

Appendix B

In order to empirically estimate the effects of RCBH on healthcare utilisation outcomes, we exploit the variation in the time in which individuals first enroll into RCBH. The key identification assumption for this approach is the parallel trends assumption: that outcomes for individuals enrolling into RCBH earlier would have, in the absence of RCBH, evolved in parallel to those who enroll later. While this counterfactual cannot be directly observed after enrolment, using an event study approach, we do test whether the outcomes between these groups moved in parallel prior to enrolment.

To estimate the healthcare effects of RCBH, we conduct a dynamic different DiD event study of the following form:

$$Y_{it} = \alpha + \sum_{k=-8, k\neq -5}^{N} \beta_l D_{k,it} + \mu_i + \tau_y + X_{it} + \in_{it} \quad (1)$$

where Y denotes the outcome of interest for individual i in quarter t, D_k are event time indicators (leads and lags) for time relative to RCBH enrolment ($k = t - R_i$, where R is the RCBH enrolment period for individual i)[9], μ_i are individual fixed effects (which accounts for all observed and unobserved time-invariant confounders), τ_y are quarter-year fixed effects, α is the grand intercept, and $\in_{it}$ is the error term. All event-time coefficients (β_l) are referenced to five quarters before RCBH enrolment (i.e., event time$= -5$). This reference period was specifically chosen to avoid potential confounding with any upticks in healthcare use that may have preceded RCBH enrolment, ensuring that we do not use anyone in the immediate periods before RCBH enrolment as controls. All individuals are censored at death and standard errors are clustered at the individual level, the level at which the treatment occurs.

We report point estimates and 95% confidence intervals from these models.

All analyses were conducted in Stata version 17.

[9] People who are registered but not yet treated also serve as controls.

Appendix C

Table B.1 below presents the items from the Medicare Benefits Schedule (MBS) that were identified for each patient in POLAR and used to generate the two outcome variables of total GP visits and multidisciplinary chronic disease management. The other two outcome variables (prescriptions and referrals) were not generated with MBS items and have already been described elsewhere in text.

Table B.1. The Medicare Benefits Schedule items that were used to construct the GP visits and multidisciplinary chronic disease management plan outcome variables in the Event Study DiD design

Outcome	**Sub-category**	**Micro-category**	**Item numbers**
Total GP Visits	Face-to-face	General attendance in consulting rooms	3, 23, 36, 44, 123
		General attendance outside consulting rooms	4, 24, 37, 47, 124,
		General attendance in residential-aged care facilities	90020, 90035, 90043, 90051, 90054
		After hours	5000, 5020, 5040, 5060, 5071, 5003, 5023, 5043, 5063, 5076, 5010, 5028, 5049, 5067, 5077

Outcome	Sub-category	Micro-category	Item numbers
	Telehealth	General attendance	91790, 91800, 91801, 91802, 91920, 91890, 91891, 91900, 91910, 91920
Multidisciplinary Chronic Disease Management	Face-to-face	GP Chronic Condition Management Plans and reviews	721, 965, 732, 967
		Team Care Arrangements	723
		GP Multidisciplinary Management Plans	729, 731
		GP health assessments	701, 703, 705, 707, 715
		Medication reviews	900
		Multidisciplinary Case Conferencing	735, 739, 743, 747, 750, 758
		Practice nurse services to	10997

Outcome	Sub-category	Micro-category	Item numbers
		chronic disease patients	
		Mental health plans and reviews	2700,2701,2712,2713,2715,2717
	Telehealth	GP Chronic Condition Management Plans and reviews	92024, 92029, 92028, 92030
		Team Care Arrangements	92025
		GP Multidisciplinary Management Plans and review	92026, 92027
		Practice nurse services to chronic disease patients	93201, 93203

Notes: Items 965 and 967 only activate post 1st July 2025 and replace the previous chronic disease items. Items 91900 and 91910 are longer subsidised telehealth consultations active from October 2023 for patients who register in MyMedicare.

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