

Cardiac Rehabilitation Services in Ontario: Components, Models, and Under-Served
Groups

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Introduction

Cardiac rehabilitation (CR) is a multifaceted and multidisciplinary secondary prevention program demonstrated to improve patient outcomes¹. The most recent standards from the Canadian Association for Cardiac Rehabilitation (CACR)² and the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR)³ recommend that CR programs offer the core components of baseline patient assessment, nutritional counseling, risk factor management, psychosocial interventions, physical activity counseling and exercise training, to achieve these benefits. Surveys of CR programs across regions and more broadly in entire countries, have been undertaken to ascertain whether they meet these guidelines⁴. For instance there have been reports regarding the human resource mix in programs⁵, the frequency and duration of program session offerings, their assessment of specific risk factors including dyslipidemia, hypertension and depression⁶, and more recently their adherence to performance measures⁴.

In addition to this guideline-recommended, patient-tailored programming, many sites have recognized that barriers to participation in CR exist, and have developed innovative approaches to address these inequities. For example, it is recognized that women have lower participation in CR than men. In order to overcome this barrier, gender-specific CR programs are becoming more frequently available⁷. Service accessibility barriers, such as drive time to CR⁸, have also been identified. As a result, some CR programs offer services tailored to these patients by providing home-based program models that may also incorporate electronic media for guidance.

Moreover, it has been established that the characteristics of patients entering CR has changed over time⁹. Patients are often older and suffer multiple comorbidities. In

addition, there has been greater focus on the continuum of care and ensuring patients have supportive environments and self-management skills when they “graduate” from CR. Thus, the level of integration that a CR program has within the community may affect post-CR transitions and long-term chronic disease management by graduates. The objectives of this study are therefore to survey CR sites to understand their practice towards these under-studied and emerging areas, namely risk factor screening and control, approach to other chronic diseases, whether they have implemented strategies to address barriers for under-served groups, and post-program continuity provisions for patients.

Methods

Design & Procedure

Presented herein are secondary data analyses from a cross-sectional study examining CR access and wait times¹⁰, which was approved by the York University Research Ethics Board. CR programs were identified and contact information secured in collaboration with the Cardiac Rehabilitation Network of Ontario. A survey was mailed to all 45 Ontario CR programs in early 2010. Each package included a personalized cover letter, questionnaire, and a stamped return envelope. The instructions specified that the survey was to be completed by the most senior clinical staff member. A repeat mailing was sent to optimize response rate.

CR services are covered through provincial healthcare in Ontario. In 2000, the provincial Ministry of Health funded CR programs throughout the province to increase their capacity and undertake an evaluation of a comprehensive, standardized 6-month model of care in the Ontario Cardiac Rehabilitation Pilot Project.¹⁴ This was delivered at

24 Ontario sites from 2001-03 and consisted of the following core components: standardized data collection; comprehensive intake assessment of risk factors and cardiovascular status, including exercise stress testing and psychological measures; 2 on-site exercise sessions per week; dietary counselling; psychological or psychosocial services as needed where these were available or feasible; followed by comprehensive exit assessment. Since this time unfortunately, CR programs have not had dedicated funding or agreements with the Ministry, but instead from their local setting.

Measures

The investigator-generated questionnaire items were developed based on a previous survey administered to Ontario CR programs and augmented with consideration of available literature¹¹ (unpublished data, D. Alter). Input from physicians and other health care professionals with expertise in CR was incorporated during survey development and pilot testing. The survey included items related to core program components, duration of program, indications for service, medication and depression management, alternative program models, approaches to under-served populations, and post-graduate offerings (see Appendix). These were assessed primarily through forced-choice response options, and respondents were asked to check all applicable response options for several items. All data analyses were performed using SPSS version 19. A descriptive examination was performed.

Results

Program Characteristics

Responses were received from 38 of 45 programs (84.4% response rate). CR program characteristics and core components offered are summarized in Table 1.

Integrated Chronic Disease Services

Twenty-three (62.2%) programs provided rehabilitation services to patients without a primary cardiac indication, but who had other chronic diseases. Other primary indications reported are displayed in Table 2.

Medication Changes

As shown in Table 1, 92.1% of programs assessed risk factors in patients. When asked to indicate the program process for participant medication changes, 15 (39.5%) reported they make medication changes within their program, 15 (39.5%) reported they send a note to an external physician with medication change recommendations or options, and 14 (36.8%) reported 'other' approaches. Of those, 8 (57.1%) notified the family physician if the patient's condition worsened, 2 (14.3%) consulted the program medical director for recommendations, 1 (7.1%) reported it varies by program model, 2 (14.3%) change medications at intake only, and 1 (7.1%) did not make medication changes.

Meeting the Needs of Underserved Groups

Participants were asked whether their program offered services tailored to a list of under-served patient groups. The results are displayed in Table 3. Most frequently, programs responded that they offered services tailored to rural patients (n=10; 27.0%). Next, 6 (16.2%) sites reported that they offered services tailored to older patients. With regard to programs or services that tailor to patients of low socio-economic status, 5 (13.2%) program indicated that they did.

Finally, 3 (8.1%) CR programs reported tailoring services to non-English speaking patients (i.e., information package in different languages), 3 (8.1%) reported programs or services tailored to women (i.e., women-only program), and 4 (11.1%)

reported offering programs or services tailored to other groups. The latter included weight management classes, and classes tailored to specific cardiac or other health conditions (i.e., heart failure, transplant, musculoskeletal comorbidities).

Programs were also asked to report in open-ended fashion their approach where a patient referred to their program has longer than a 30-minute travel time to participate, or where patients report travel time as a barrier to participating. Fourteen (37.8%) programs reported offering a home-based program, 7 (18.9%) reported assisting the patient in finding a closer site, 6 (16.2%) reported offering a 'hybrid model', 4 (10.8%) reported offering multiple options, including carpooling, 2 (5.4%) reported offering fewer sessions, 1 (2.7%) reported providing program material for the patient to take home, and 3 (8.1%) reported 'nothing'.

Depression Screening and Management

Most CR programs reported that they systematically screened patients for depressive symptoms. Screening tools, an estimation of the percent of patients that screen positive for depressive disorders, and approaches to positive screens are shown in Table 4.

Post-CR Transitions

When asked about after-care support and services patients are offered, 27 (71.1%) programs reported that they did offer such services. Twenty-one (55.3%) programs reported linkages with community programs or centers that offer services, 12 (31.6%) offered a maintenance program, 3 (7.9%) referred patients to community programs, and 2 (5.3%) programs made follow-up phone calls to graduates in addition to linkages to community programs.

Discussion

The results of this study provide an update on the status of CR in Ontario. While a survey of provincial programs was undertaken in 2002¹² and 2007¹³, this survey served to update those findings, and to explore program adaptation to demographic shifts, policy changes and emerging evidence. Overall, programs offered an average of two sessions of exercise per week over 5 months. This frequency is consistent with the model implemented a decade earlier¹², but is one month shorter.

Despite wide variation in structure being reported in these earlier surveys¹², almost all CR programs have an interprofessional team and offer the core recommended components of exercise, exercise testing, education, and risk factor identification. Less than half of CR sites reported making medication changes within their program, which may be reflective of the somewhat lower rates of medical assessment, and correspondingly a physician, within programs. This is consistent with the findings from a survey of Ohio CR programs¹⁴, where 72% of programs sent a report to the patient's physician where lipids were abnormal, and 84% sent a report where hypertension was identified. Future research should be undertaken to determine whether medication change and titration within CR versus externally has an effect on patient outcomes, as this would inform discussion regarding physician staffing within programs. Overall however, results suggest that the earlier provincial pilot project and perhaps the focus on quality improvement in the current era, may be having a positive impact in terms of cross-program standardization.

Approximately three-quarters of CR programs were located within a hospital setting. This would facilitate access to interprofessional personnel including physicians,

and flow of inpatients to CR services. However, given the high burden of nosocomial infections¹⁵, the cost of hospital space, and the safety profile of CR, whether this is the best setting for the majority of patients warrants concerted consideration. The efficacy and effectiveness of home-based CR is well-established¹⁶. Moreover, most CR sites reported linkages with safe exercise environments in the community. More research is needed on the effects of community-based program as well¹⁷. However, fund administration and staffing in the community setting however may be challenging.

When queried about approaches to target services to under-served groups, programs most frequently reported tailoring services to geographically-distant patients. Indeed, a third of sites reported an approach to address these disparities. Many offered alternative approaches when patient travel time was long, and over 2/3rds of the programs offered home-based models. Unfortunately however, there were not often initiatives to reach low socioeconomic status or non-English patients, among other under-represented groups. This could be a reflection of lean program funding and the lack of evidence that specific strategies can overcome participation disparities in these populations.

Of interest was the finding that approximately 2/3rds of programs offered services to patients with a non-cardiac primary indication. Indeed, health policy makers in the province have been interested in integrated models of care, and while we have no historical comparison data to demonstrate if this represents an increase from previous levels, this is likely reflective of funding opportunities in the area of diabetes and stroke management in particular. For instance, other research in the province has shown how patients fare in a CR-type program following stroke and transient ischemic attack^{18,19}.

Indeed, there is increasing recognition of the common risk factors underlying not only vascular disease, but most chronic non-communicable diseases, and of the increasing comorbidity of these chronic conditions. However, given the lack of funding and capacity to treat cardiac patients, and the lack of long-term evidence regarding efficacy of CR-type models for patients with these non-cardiac indications, caution is warranted.

Finally, the preponderance of programs screened patients for depressive symptoms. This is encouraging, given the high burden of depression in cardiac patients, and its negative impact on prognosis. In a recent survey of CR programs in Ohio, it was reported that only 36% of programs screened for depression¹⁴. In an earlier study undertaken in the UK, only 12% of programs screened for any psychosocial distress⁶. They similarly most-frequently administered the Hospital Anxiety and Depression scale²⁰, and their most frequent response to psychological distress was offering pharmacotherapy or psychotherapy. The higher rate of depression screening in the current study may be a reflection of the Ontario pilot project model recommendations, or adherence to guideline recommendations for cardiac patients²¹ and for CR participants in particular^{2,22}. Overall however, more evidence is needed on the benefits of screening²³, given that many programs do not have mental health professionals on staff.

Limitations

Caution is warranted when interpreting these results. First, respondents were from Ontario CR sites, so it cannot be determined whether the results herein are representative of CR sites in other provinces or countries. Second, the cross-sectional design precludes causal conclusions. Finally, self-report may introduce over or under-reporting biases. In

particular, caution is warranted in interpreting program estimations of the proportion of their patients with depression.

CR programs in Ontario continue to offer the recommended comprehensive components of CR. Simultaneously, there is preliminary evidence that programs are adapting to demographic and health system changes by implementing innovative strategies for patient-centered care. Given the known financial constraints in CR, it is remarkable that programs offer the standard therapies to cardiac patients, while simultaneously adapting to the needs of special, and other, populations. Future research is needed to understand the relationship between these program offerings and risk reduction, patient health behaviour, quality of life, morbidity and mortality.

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Table 1 Characteristics of CR Programs (N = 38)

Characteristic	N (%) / mean±SD
Patient capacity (per year)*	478.4±502.4
Program Duration (weeks)†	21.9±15.1
Session Frequency (days/week)	
2	24 (63.2)
1	4 (10.5)
>2	2 (5.3)
Changes over time	2 (5.3)
Other‡	6 (15.8)
Delivery model	
Facility	38 (100)
Home	26 (68.4)
Internet	4 (10.5)
Other§	5 (13.2)
Academic affiliation	
Non-AHSC	24 (63.2)
AHSC	14 (36.8)
Location	
In-hospital	27 (71.1)
Off site	11 (28.9)
Services Offered	
Education	37 (97.4)
Exercise	37 (97.4)
Exercise testing	37 (97.4)
Interprofessional team	35 (92.1)
Risk factor identification	35 (92.1)
Medical assessment	30 (78.9)
Depression screening	26 (68.4)

*Patient capacity median = 300 patients/year.

†Program duration median = 20 weeks.

‡Of the sites that offered other frequencies, 2 (5.3%) sites offered patients the choice of 1-3 sessions per week, and 2 (5.3%) reported that although usually 2 sessions per week are offered, the frequency may be altered to meet individual patient needs. Two (5.3%) sites did not specify frequency.

§Of these other models, 1 (2.6%) was delivered through community partners, 1 (2.6%) was through email, 1 (2.6%) delivered via telehealth, and 1 (2.6%) did not specify.

AHSC, academic health sciences centre; SD, standard deviation.

Table 2
Non-cardiac Primary Indications Treated within CR Programs (N = 37)*

Primary Indication	N (%)
Diabetes	18 (48.7)
Stroke/TIA	17 (46.0)
Peripheral vascular disease	15 (40.5)
Pulmonary	10 (27.0)
Renal	5 (13.5)
Joint repair/replacement	4 (10.8)
Cancer	4 (10.8)
Arthritis	3 (8.1)
Other	8 (21.6)
CVD risk factors only	5 (13.5)
Neurological	1 (2.7)

*One CR site did not respond to this question.

TIA, transient ischemic attack; CVD, cardiovascular disease.

Table 3
Services Tailored Specifically to Under-served Patient Groups (N=38)

Patient Group	N (%)
Rural*	
Home-based program	2 (5.4)
Find closer CR site	1 (2.7)
Hybrid model	1 (2.7)
Telemedicine	1 (2.7)
Videoconference	1 (2.7)
Not specified	4 (10.8)
Older*	
Exercise adaptation	2 (5.4)
Not specified	4 (10.8)
Low SES	
Waive program fees	3 (7.9)
Waive parking fees	1 (2.6)
Transportation aid	1 (2.6)
Non-English speaking*	
Information in different languages	2 (5.4)
Not specified	1 (2.7)
Women*	
Women's only CR	1 (2.7)
Not specified	2 (5.4)

*One CR site did not respond to this question.
SES, socioeconomic status.

Table 4
Depression Screening and Management (n=26)*

Variable	N (%) / mean±SD
Screening tool†	
HADS	15 (60.0)
BDI	3 (12.0)
STOP-D	1 (4.0)
Multiple instruments	1 (4.0)
Other instruments	4 (16.0)
Not specified	1 (4.0)
QOL survey	1 (4.0)
Percentage of patients estimated to screen positive‡	15.9±12.0
Response to Positive Screen	
Referral	
Within-program provider§	20 (80.0)
Primary care physician	15 (60.0)
External provider§	8 (32.0)
Recommendation	
Counselling	12 (48.0)
Antidepressant	3 (12.0)
Yoga	1 (4.0)
Stress management classes	1 (4.0)
Other	
Discuss with patient and rescreen later	15 (60.0)
Discuss results at CR team meeting	8 (32.0)
Educational pamphlet or website	5 (20.0)

*One CR site did not respond to this question.

†HADS, Hospital Depression and Anxiety Scale²⁰; BDI, Beck Depression Inventory²⁴; STOP-D, Screening Tool for Psychological Distress; QOL, quality of life survey, specifically the 12-Item-Short-Form Health Survey²⁵.

‡Patients estimated to screen positive median = 13.8%.

§Referral to psychologist social worker, or psychiatrist.

Appendix

Excerpt of CR Program Survey

SECTION A – PROGRAM INFORMATION

1. The Canadian Association of Cardiac Rehabilitation defines a CR program as having the following elements. Please check (✓) all of the elements that your program offers:

- Medical assessment
- An interprofessional team of health care professionals, including a physician
- A core element of exercise
- The ability to provide and/or access approved exercise testing procedures
- Client and family education
- Structured heart hazard identification and behaviour modification

2. Are your CR services located within a hospital (check ✓ one response option)?

- Yes
- No

→ If no, where?

- 2b. **If yes**, is it an Academic Health Sciences Centre (i.e., affiliated with a medical school)?

- Yes
- No

3. What is the duration of the on-site post-event CR program that you provide, from intake assessment and commencement of the exercise programming to last visit?

_____ months OR _____ weeks

4. For your on-site program, how many sessions per week of exercise and education on average are suggested for participants (check ✓ one)?

- one
- two
- more than two
- it changes over the course of the program (i.e., twice to once / wk)
- other, please specify: _____

5. Is there a cost for the patient associated with participation in your program?

- Yes
- No
- No, but there is a cost for parking – specify amount per month: \$ _____

- 5b. **If Yes**, specify what the fee is used for (check ✓ all that apply):

- Program manual, information packages: specify \$ _____ for full program
- Gym fee: specify \$ _____ for full program
- Other, please specify: _____
 - \$ _____ for full program

5c. **If Yes**, please specify the total cost, including parking, to attend your full CR program
\$ _____

6. Does your CR centre offer alternative models of program delivery than an on-site program, such as home-based CR?

- Yes
 No

6b. **If yes**, please specify:

- Home-based
 Internet / web
 Other, specify: _____

7. Do you have any programs or services tailored to the following under-served groups? Check all that apply, and specify where affirmative:

- Women: _____
 Non-English speaking patients: _____
 Low socio-economic status patients: _____
 Older patients: _____
 Rural patients: _____
 Other: _____

8. What after-care supports and services do you offer after a patient graduates from your program (check all that apply):

- We offer a maintenance program
 We have linkages with community programs / centres that offer services
 Unfortunately we do not have capacity to offer after-care
 Other: please specify: _____

9. Do you provide rehabilitation services to patients without cardiac disease, but with other chronic diseases?

- Yes
 No (skip to next question)

9b. **If yes**, please check for which non-cardiac conditions you provide services (i.e., not just cardiac comorbidities):

- Stroke or TIA patients
 Diabetes
 Peripheral vascular disease
 Cancer
 Joint replacements
 Arthritis
 Renal patients
 Pulmonary
 Other, please specify: _____

10. What is your program process for participant medication changes (check all that apply)?
- We make medication changes within our program
 - We send a note to an external physician with medication change recommendations or options
 - Other, please specify: _____

11. Does your program systematically screen patients for depressive symptoms?
- Yes
 - No

11b. **If yes**, what instrument or survey do you use (i.e., Hospital Depression and Anxiety Scale, Patient Health Questionnaire-9)?:

11c. **If yes**, how do you determine, or what responses do you consider to be indicative of a potential depression diagnosis? _____

11d. **If yes**, what percentage of patients do you estimate screen positive for elevated depression? _____ %

11e. **If yes**, and the patient screens positive, what do you do (check all that apply)?

- Refer to within-program psychologist, social worker or psychiatrist
- Refer to external psychologist, social worker or psychiatrist
- Refer to primary care physician
- Discuss context of results with patient, and re-screen at a later interval
- Discuss results at CR team meeting
- Recommend the patient start an anti-depressant
- Recommend the patient seek counseling
- Provide educational pamphlet or refer patient to website for more information on depression
- Nothing, we are not sure how to score the tool or what constitutes "elevated depression"
- Other, please specify: _____

12. If a patient referred to your program has longer than a 30-minute travel time to participate in your program, or if the patient reports travel time will be a barrier to participating, what do you do?
