



# MODEL OF CARE FOR INTEGRATED CARDIAC REHABILITATION

2023







## Clinical Design and Innovation Document Cover Sheet

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## Foreword

The evidence for cardiac rehabilitation is clear: it has consistently been demonstrated to significantly reduce morbidity, hospitalisations, and mortality among patients with established cardiovascular disease, while also increasing their quality of life. Despite this, ensuring equitable and timely access to cardiac rehabilitation services for all eligible patients has remained challenging due to under-resourcing and more recently, the COVID-19 pandemic.

The *Integrated Model of Care for the Prevention and Management of Chronic Disease* is being rolled out nationally as part of the *Enhanced Community Care Programme*. Reflecting the *Sláintecare* vision, it recognises the importance of a robust cardiac rehabilitation service as part of an integrated service for chronic cardiovascular disease. It is envisaged this service will offer patients a continuum of health promotion, disease prevention, diagnosis, treatment, disease management and rehabilitation services that are coordinated across different healthcare providers and healthcare settings. This represents a new approach to the prevention and management of chronic disease, placing patients at the centre of care. Services are to be planned around patients according to need; so as to support and empower them to optimise their health, actively address and minimise their risk factors for chronic disease, and to live well with chronic disease.

The evidence base indicates that in order to optimise outcomes for patients eligible for cardiac rehabilitation, consideration must be given to maximising recruitment and retention of such patients. Offering increased flexibility in how people can participate in cardiac rehabilitation is key in this regard. The *Model of Care for Integrated Cardiac Rehabilitation in Ireland* describes how such a service may be delivered across hospital and community. This document sets out best evidence and practice in the design, delivery, monitoring, and evaluation of phases I, II and III of cardiac rehabilitation in Ireland. It will support healthcare professionals to provide a high quality, equitable, person-centred, and evidence-based cardiac rehabilitation service to the eligible population living in Ireland. It will also inform patients and their families as to what they can expect from their cardiac rehabilitation service. Furthermore, it is important to note that cardiac rehabilitation is but one important component of an integrated, end-to-end pathway for the prevention and management of chronic disease in Ireland. To optimise patient outcomes, the cardiac rehabilitation services must be underpinned by a robust primary care service and timely access to diagnostic services and specialist multidisciplinary review, as set out in the *National Framework for the Integrated Prevention and Management of Chronic Disease in Ireland*.

This document is not intended as a detailed formal guideline document. Nor does it strive to outline the specific interventions to be used in each of the varied clinical circumstances to consider when managing patients with chronic cardiovascular disease. In this regard, the National Heart Programme endorses the guidelines produced and updated regularly by societies such as the European Society of Cardiology. Instead, this document reviews how patients should be able to access and use contemporary cardiac rehabilitation services in Ireland, and also reviews the duties of the healthcare professionals who play important roles in delivering end-to-end care for patients living with chronic cardiovascular disease.

We would like to thank all those who have contributed to the development of this model of care. Going forward, the National Heart Programme will support local implementation of integrated cardiac rehabilitation services to deliver the best possible outcomes for patients.



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## Executive summary

Cardiac rehabilitation is a complex intervention that consists of “the coordinated sum of activities required to influence favourably the underlying cause of cardiovascular disease, as well as to provide the best possible physical, mental and social conditions, so that patients may, by their own efforts, preserve or resume optimal functioning in their community and through improved health behaviour, slow or reverse progression of disease.”<sup>(1-5)</sup> It is typically composed of four phases. Phase I occurs during the inpatient period following a qualifying acute cardiac event: patients are given support and information about heart disease and addressing their own specific risk factors. Phase II is the immediate post-discharge period, which further builds on the information the patient received during phase I. Phase III constitutes a structured comprehensive prevention and rehabilitation programme and is often the most intensive phase of cardiac rehabilitation. Phase IV aims to facilitate long-term habits to support maintenance of cardiovascular disease prevention and management.

Cardiac rehabilitation is an evidenced-based and cost-effective approach that helps patients to manage their own condition in partnership with their healthcare professionals and has consistently been demonstrated to significantly reduce morbidity, hospitalisations, and mortality among patients with established cardiovascular disease<sup>(6-11)</sup> while also increasing their quality of life.<sup>(12,13)</sup> Participation in a medically supervised cardiac rehabilitation programme is a Class 1A recommendation in international guidelines for patients hospitalised after an acute coronary event, coronary revascularisation procedure, or heart failure.<sup>(11,14-17)</sup>

Despite the robust evidence base for cardiac rehabilitation, ensuring equitable and timely access to this service for all eligible patients living in Ireland has been challenging.<sup>(18)</sup> To address this challenge, the *Enhanced Community Care Programme* has provided significant additional resources to uplift existing hospital-based cardiac rehabilitation services. However, it is clear that beyond additional resourcing, action is also required to support recruitment and retention of patients who are likely to benefit from cardiac rehabilitation to support optimisation of patient outcomes.<sup>(3,19)</sup> The aim of the national *Model of Care for Integrated Cardiac Rehabilitation* is to review best practice in the design, delivery, monitoring and evaluation of phases I, II and III cardiac rehabilitation in Ireland. It is intended that the model of care will support healthcare professionals to provide a high quality, equitable, person-centred and evidence-based cardiac rehabilitation service to the eligible population living in Ireland.

With implementation of this model of care, a patient can expect the following from their cardiac rehabilitation service:

- A person-centred service
  - A patient’s cardiac rehabilitation journey is tailored as much as possible to meet their specific needs.
- Early inpatient contact
  - Early contact with one or more members of the cardiac rehabilitation team during the patient’s episode of hospitalisation to begin their cardiac rehabilitation journey.
- Automatic referral to the cardiac rehabilitation service
  - A referral to cardiac rehabilitation should be automatically generated as part of discharge planning for all eligible patients.
- Early and standardised initial assessment
  - A standardised initial assessment with each patient will support the joint development of a patient-centred care plan by the cardiac rehabilitation team in partnership with the patient.
- A standardised set of core components delivered as part of the phase III service
  - A standardised set of components, as shown in the table below, should be delivered in all cardiac rehabilitation programmes.

Standardised set of core components of cardiac rehabilitation
Initial assessment and development of a person-centred care plan
Health behaviour change
Education
Lifestyle risk factor management including physical activity, smoking, dietetics and psychosocial health
Medical risk factor management
End of programme assessment

- A standardised end of programme assessment and discharge planning
  - All participants should be offered and encouraged to undergo a standardised end-of-programme assessment with their cardiac rehabilitation team to assess progress and to set goals for the ongoing management of their condition following completion of phase III cardiac rehabilitation.

- A service which measures and evaluates its service and engages in quality improvement activities
  - Each cardiac rehabilitation service should collect, review, and act on data as part of a systematic quality improvement programme for their service.

For healthcare professionals, the model of care sets out seven key steps that must be attended to in order to deliver a high quality, integrated cardiac rehabilitation service across hospital and community (Figure I).

The final chapter of this document sets out the recommended actions to support the implementation of this *Model of Care for Integrated Cardiac Rehabilitation*.



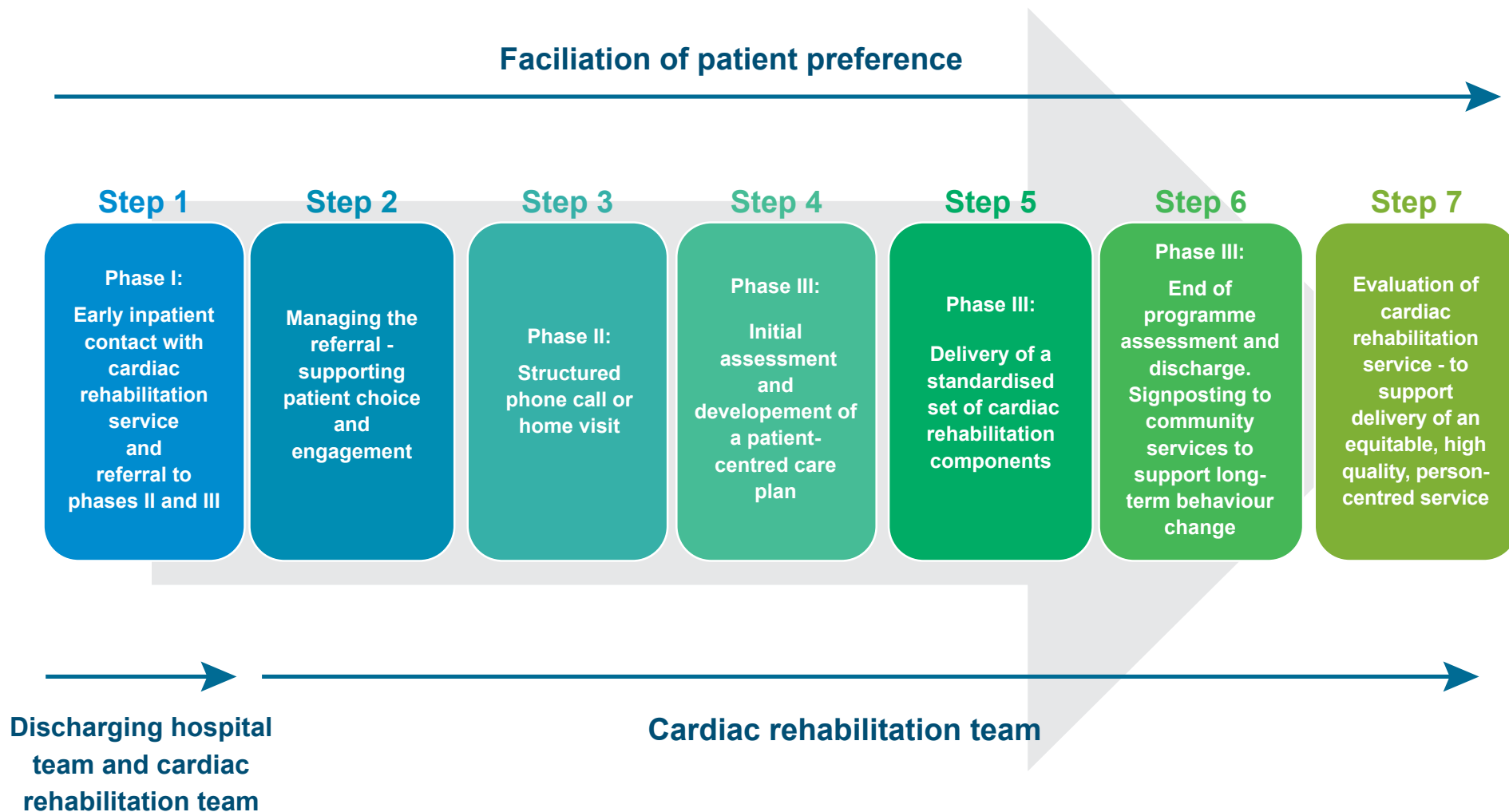


Figure I: Seven steps in the *Model of Care for Integrated Cardiac Rehabilitation*

# 1. Background

## 1.1 Introduction

Irish people are living longer than ever before and, as a result, the average age of the population is rising.<sup>(20)</sup> Reflecting this trend, significant progress has been achieved in reducing mortality due to cardiovascular disease. However, along with cancer, it remains one of the leading causes of death in Ireland.<sup>(21,22)</sup> The ageing population and longer survival rates following acute myocardial infarction have led to an increased number of patients living with chronic cardiovascular disease and heart failure in Ireland.<sup>(23,24)</sup> Moreover, the prevalence of cardiovascular disease and its risk factors both increase with age,<sup>(25,26)</sup> and the incidence of cardiovascular disease is predicted to continue to increase by 4-5% per year.<sup>(27)</sup> Thus, demographic pressures, improved survival following cardiac events, and an increase in cardiovascular disease risk factors, will result in an increased burden of clinical cardiovascular disease on the health service.<sup>(28)</sup>

*Sláintecare*, our ten-year plan to transform the Irish health service, outlines the urgent need to shift the focus of Ireland's health services.<sup>(29)</sup> Specifically, the current reactive and hospital-centric model of care for chronic disease needs to move towards a more integrated model of care that encompasses both the prevention and management of chronic disease.<sup>(30)</sup> Any such model should aim to provide person-centred, proactive care as close to home as possible and focus on empowering individuals who live with chronic disease so that they are enabled to contribute to the management and optimisation of their own chronic conditions.<sup>(30)</sup>

## 1.2 A new approach to the prevention and management of chronic disease in Ireland

Reflecting the *Sláintecare* vision, the *National Framework for the Integrated Prevention and Management of Chronic Disease in Ireland 2020-2025* describes a whole-system approach to integrated care for chronic disease that encompasses population health and wellbeing, preventive, acute, non-acute and community-based services.<sup>(29,30)</sup>

At the heart of the Framework, the *Model of Care for the Integrated Prevention and Management of Chronic Disease* demonstrates how “end-to end” care can be provided for four major chronic diseases (cardiovascular disease, type 2 diabetes mellitus, chronic obstructive pulmonary disease and asthma) within the Irish health services.<sup>(30)</sup> The model of care (Figure 1) describes the five levels of service, and examples of each service, that need to be provided to a population in order to deliver integrated end-to-end care for chronic disease. Cardiac rehabilitation is an important component of this overarching model of care.

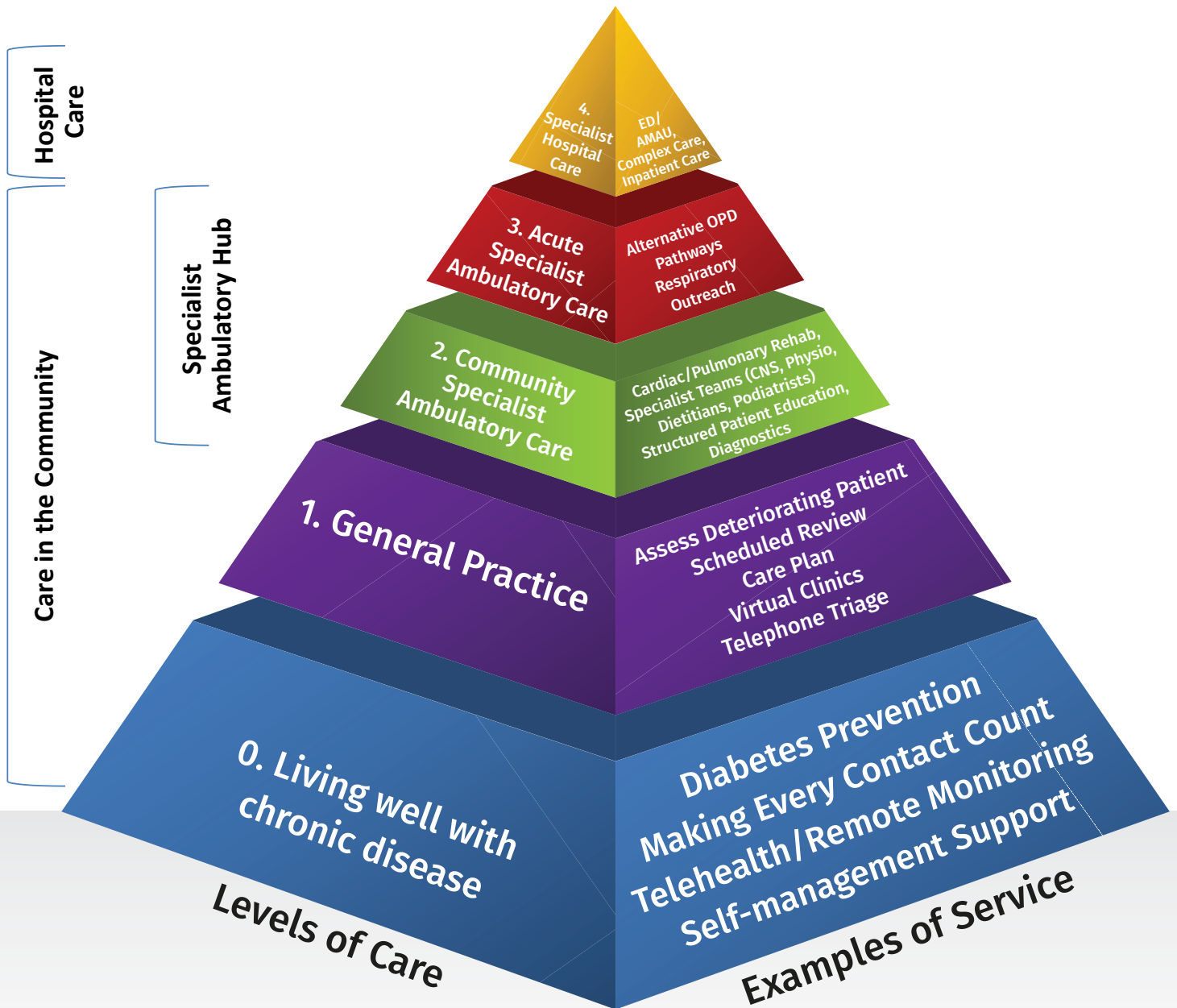


Figure 1: The Model of Care for the Integrated Prevention and Management of Chronic Disease<sup>(30)</sup>

The *Model of Care for the Integrated Prevention and Management of Chronic Disease* supports people to live well within the community, with ready and equitable access to General Practitioner review, diagnostics, healthcare professional input and specialist opinion, as required. The focus is on keeping people well and on providing care as close to home as possible.

#### **Level 0: Living well with chronic disease**

The *Integrated Care Programme for the Prevention and Management of Chronic Disease* is working to develop services to support and empower individuals living in the community to prevent and/or manage their chronic disease and associated complications. Such services include education sessions, goal-setting and the development of action plans to support chronic disease management at home.

#### **Level 1: General Practice**

General Practice care is provided at Community Healthcare Network level. The *Structured Chronic Disease Management Programme in General Practice* provides additional supports to GPs in caring for individuals living with chronic disease in the community.

#### **Level 2: Community specialist ambulatory care**

Chronic Disease Community Specialist Teams will provide a further layer of support to the GP to care for patients in the community through ready access to services including chronic disease diagnostic services such as echo and spirometry, as well as self-management education services such as diabetes self-management education. There will also be cardiac and pulmonary rehabilitation teams based in the ambulatory care hubs to uplift existing hospital-based and outreach rehabilitation services across the country.

#### **Level 3: Acute specialist ambulatory care**

The Chronic Disease Community Specialist Teams will offer specialist services such as outpatient services from the ambulatory care hub.

#### **Level 4: Specialist hospital care**

Specialist hospital care may be required for the management of complex issues requiring hospital resources. However, an emphasis on early supported discharge home, with the appropriate supports in place in the community, will be a priority for the health services.

### 1.3 Cardiac rehabilitation in Ireland

Cardiac rehabilitation is a complex intervention that consists of “the coordinated sum of activities required to influence favourably the underlying cause of cardiovascular disease, as well as to provide the best possible physical, mental and social conditions, so that the patients may, by their own efforts, preserve or resume optimal functioning in their community and through improved health behaviour, slow or reverse progression of disease”.<sup>(1-5)</sup> It is an evidenced-based and cost-effective approach that helps patients to manage their own condition in partnership with their healthcare professionals. It has consistently been demonstrated to significantly reduce morbidity, hospitalisations and mortality among patients with established cardiovascular disease<sup>(6-11)</sup> while also increasing their quality of life.<sup>(12,13)</sup> Participation in a cardiac rehabilitation programme is a Class 1A recommendation for patients hospitalised after an acute coronary event, coronary revascularisation procedure or heart failure.<sup>(11,14-17)</sup>

Cardiac rehabilitation programmes are typically comprised of four phases (Figure 2).<sup>(1,2)</sup> Phase I occurs during the inpatient period following the acute event and is the optimal time to start patients





on their cardiac rehabilitation journey: patients are given support and information about heart disease and addressing their own specific risk factors. It is also the phase when assessment of patient needs and goal-setting should be initiated with the patient. Phase II is the immediate post-discharge period, the aim of which is to further build on the information the patient received during phase I and to highlight the importance of adopting healthy lifestyle habits. Phase III constitutes a comprehensive education and exercise programme, which has traditionally been conducted in-person with patients attending cardiac rehabilitation centres, and is often the most intensive phase of cardiac rehabilitation. Phases II and III take place in the outpatient setting following discharge from hospital. Phase IV aims to facilitate long-term habits to support maintenance of cardiovascular disease prevention and management.<sup>(1,2)</sup>

There is a growing body of evidence to support the provision of increased choice in how patients engage with cardiac rehabilitation services.<sup>(31-33)</sup> Cardiac rehabilitation requires that patients are active participants in the programme, with a particular focus on the development of goals that are jointly agreed between the patient and the cardiac rehabilitation team and support provided to help patients achieve these goals.<sup>(3,16)</sup> Programmes must take the individual needs of each patient into account and so there is a pressing requirement to offer patients more choice in how, when and where evidence-based cardiac rehabilitation is delivered.<sup>(3)</sup>

As we move towards a new way of working to prevent and manage chronic disease, it is important that the *Model of Care for Integrated Cardiac Rehabilitation* for patients living in Ireland is defined and that it uses best available evidence to outline how cardiac rehabilitation should be delivered to the eligible population living with cardiovascular disease in Ireland.

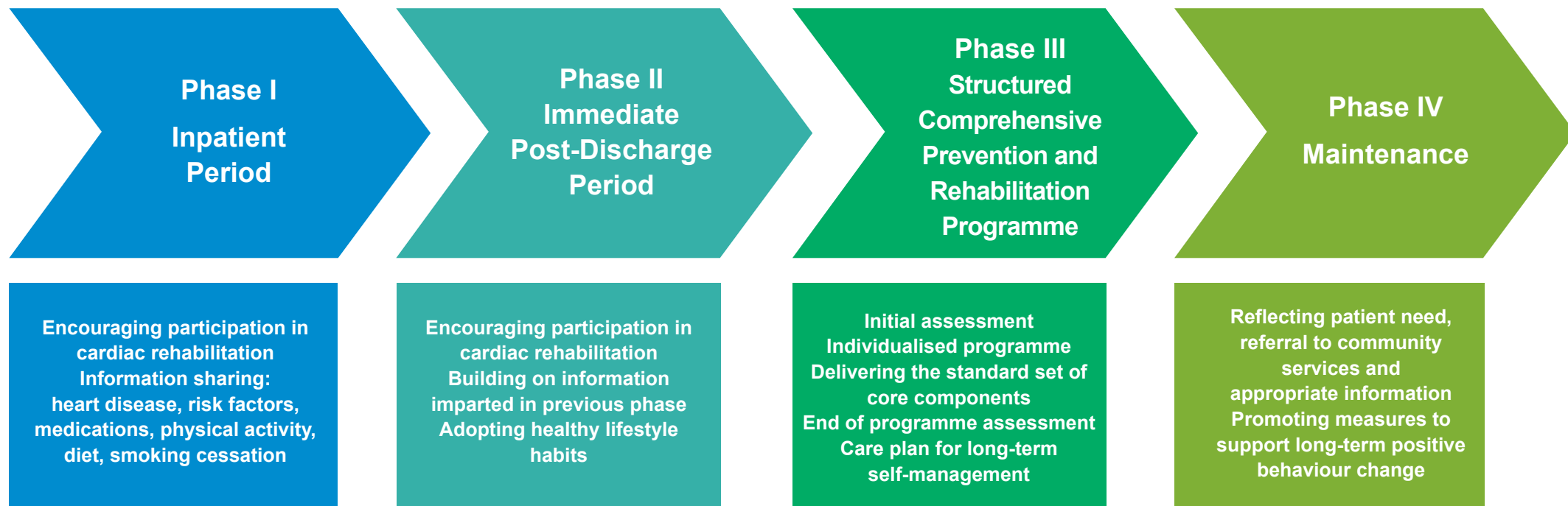


Figure 2: The four phases of cardiac rehabilitation

## **1.4 Aim and objectives of the *Model of Care for Integrated Cardiac Rehabilitation***

The aim of the national *Model of Care for Integrated Cardiac Rehabilitation* is to establish best practice in the design, delivery, monitoring and evaluation of phases I, II and III cardiac rehabilitation in Ireland. The model of care will support healthcare professionals to provide a high quality, equitable, person-centred and evidence-based cardiac rehabilitation service to the eligible population living in Ireland, regardless of the setting.

The objectives of this model of care are:

1. To describe the evidence base to support the delivery of a high quality, person-centred comprehensive cardiac rehabilitation programme.
2. To describe the standard components of a comprehensive cardiac rehabilitation programme that should be offered, regardless of setting and mode of delivery.
3. To set out indicators of performance and related data to facilitate performance management and clinical audit across cardiac rehabilitation settings in Ireland.

The principles underpinning the model of care are:

1. Cardiac rehabilitation programmes should be delivered by multidisciplinary teams and should offer a standard set of evidence-based core components, as set out in this model of care.
2. Cardiac rehabilitation should offer a patient-centred service, with an emphasis placed on optimising patient uptake and completion of cardiac rehabilitation courses. To that end, flexibility in how, when and where patients engage with cardiac rehabilitation services is advised.
3. Cardiac rehabilitation should be accessible in a timely and equitable manner to all eligible patients.
4. Cardiac rehabilitation should be monitored and outcomes evaluated so that quality of care is maintained and improved and that the service is accountable to patients.

## 2. Epidemiology of cardiovascular disease and its impact on cardiac rehabilitation

Ireland's population is growing, with the most significant growth observed in the older age groups.<sup>(20,22)</sup> This growth is expected to continue for the next two decades (Table 1). Furthermore, unfavourable trends in risk factors for cardiovascular disease are also expected to have an impact on chronic disease incidence and prevalence.<sup>(34-37)</sup>

Table 1: Population 2022 and projected population to 2042 ('000s) by age group, Ireland

Age Group	2022(e)	2027	2032	2037	2042	% Change 2022-2042
0-14	1,001.0	921.1	869.6	853.5	874.9	-12.6
15-64	3,330.4	3,432.1	3,535.2	3,587.3	3,590.7	7.8
65-84	680.0	786.2	884.2	983.7	1,088.2	60.0
≥ 85	88.9	106.1	141.2	182.2	222.1	149.8
<b>Total</b>	<b>5,100.2</b>	<b>5,245.5</b>	<b>5,430.2</b>	<b>5,606.7</b>	<b>5,775.9</b>	<b>13.3</b>

Source: CSO.<sup>(20)</sup> Projections are based on the Central Statistics Office's M2F2 assumption of moderate growth in migration and a decrease in the total fertility rate to 1.6 by 2031, remaining constant thereafter. The projections should not be considered as forecasts. Projections were produced using data for 1 January 2016 as a starting point. The current CSO population estimate was used for 2022 figures.

### 2.1 Mortality

There were 9,652 deaths, or 27.2% of all deaths, attributed to circulatory diseases in Ireland in 2022, which is similar to deaths due to malignant neoplasms (10,280 or 29.0%).<sup>(21)</sup>

Cardiovascular disease continues to be the leading cause of death in older age groups (75 years and over).<sup>(21)</sup> Despite this, Ireland has experienced a substantial fall in cardiovascular disease mortality rates over the past 35 years.<sup>(22,38,39)</sup> This downward trend is reflected in the National Audit of Hospital Mortality 2020, which shows a significant reduction in the crude in-hospital mortality for acute myocardial infarction in Ireland, from 69 deaths per 1000 admissions in 2011 to 49 deaths per 1000 admissions in 2020 (Figure 3).<sup>(40)</sup>

This improved cardiovascular disease survival rate leads to a higher prevalence of chronic cardiovascular disease, and without focused interventions, may lead to increased hospital admissions for recurrent events.<sup>(41)</sup>

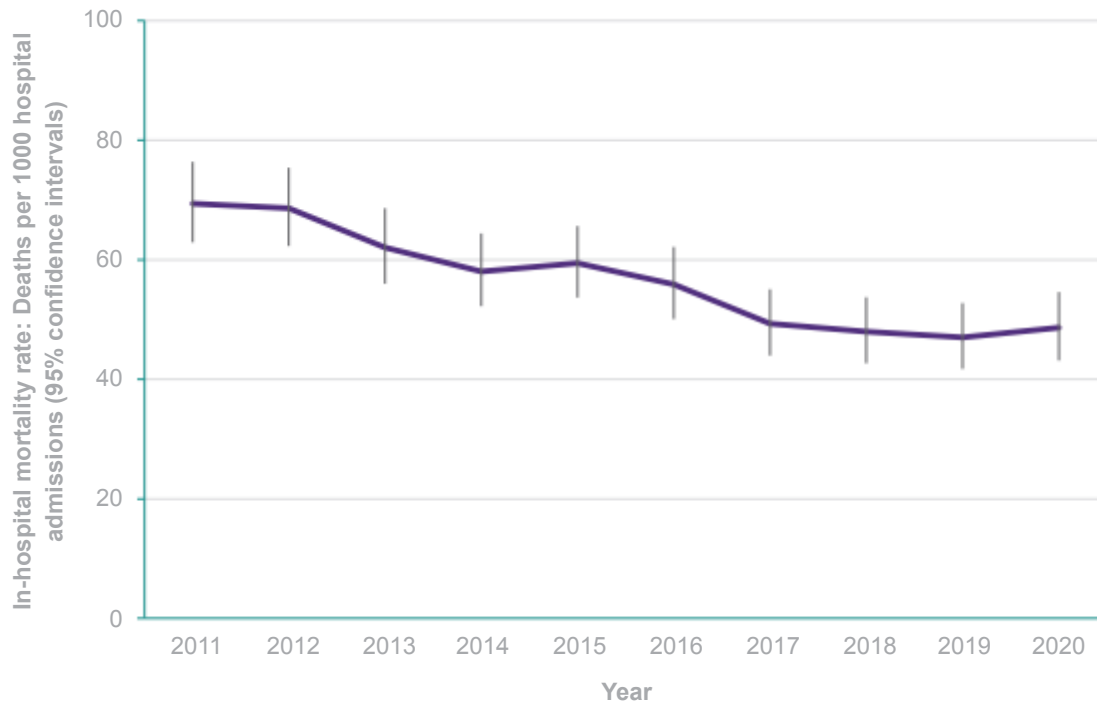


Figure 3: National in-hospital mortality following admission with principal diagnosis of acute myocardial infarction, 2011-2020. Source: National Audit of Hospital Mortality 2020 Report<sup>(40)</sup>

## 2.2 Hospitalisations

There were over 63,000 hospital discharge episodes recorded for acute coronary syndrome and revascularisation between 2016 and 2021.<sup>(42)</sup> Additionally, there were over 39,000 discharge episodes for heart failure for the same period.<sup>(42)</sup> From 2019 to 2020, there were varying degrees of reduction in discharge episodes for acute coronary syndrome, revascularisation and heart failure, in line with the COVID-19 pandemic (Figure 4). These findings were reflected in a study which concluded that there was a 60% drop in admissions for all types of cardiovascular disease in the first wave of COVID-19, with a 14% reduction in admissions for acute myocardial infarction during the same period.<sup>(43)</sup> While the reasons for this drop remain unclear, it is possible that opportunities for early intervention in cardiovascular disease were lost during the pandemic and this may have a knock-on effect on the burden of chronic cardiovascular disease and, thus, on demand for cardiac rehabilitation services going forward.

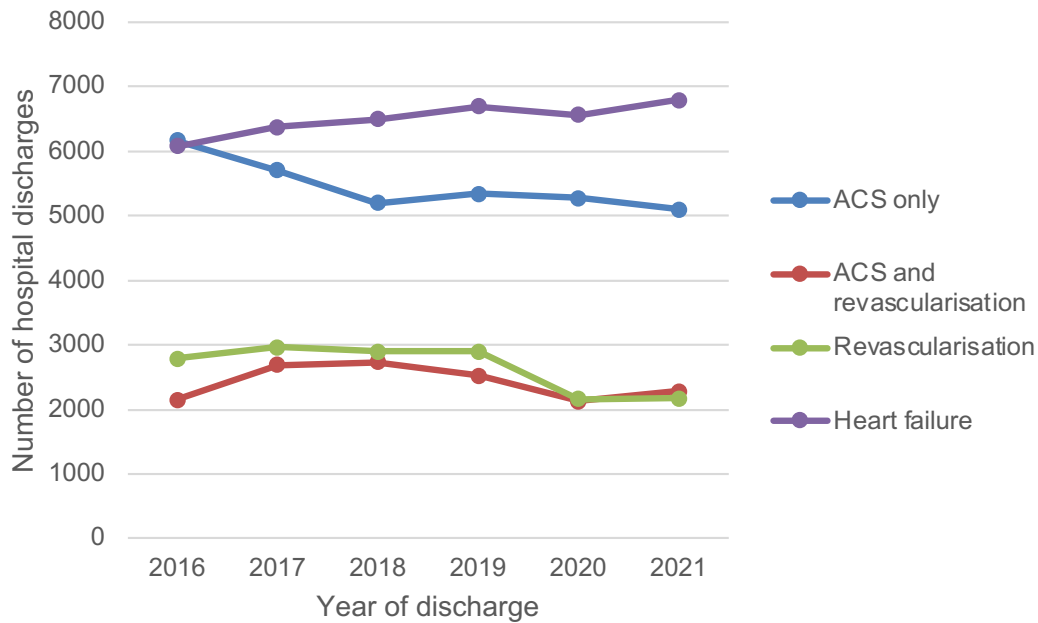


Figure 4: Number of discharge episodes for ACS and/or revascularisation procedures and heart failure 2016-2021. Source: Hospital In-Patient Enquiry, 2022

### 2.3 Health needs assessment

A health needs assessment based on 2014 data showed that cardiac rehabilitation services in Ireland had the capacity to provide cardiac rehabilitation for 39% of the need for acute coronary syndrome, coronary revascularisation, and heart failure.<sup>(18,44)</sup> The study found that whilst there were approximately 19,220 discharges due to these conditions in 2014, there were only 4,990 cardiac rehabilitation course places available annually across the country. Accessibility to cardiac rehabilitation varied greatly depending on geography, with an average waiting time of 14 weeks (range 4 – 60 weeks).<sup>(18)</sup> Staff whole time equivalents and facilities also varied based on geography.<sup>(18)</sup> Furthermore, the study found that only 36% of eligible patients from the core priority patient groups were being referred to cardiac rehabilitation, as per national and international guidelines.<sup>(18)</sup>

A follow-up study, using the same methodology, found that in 2019 there were 18,957 discharges due to acute coronary syndrome, coronary revascularisation and heart failure, similar to the 2014 figure, thus highlighting that the need for cardiac rehabilitation appears to have remained relatively stable over these years.

Furthermore, the *iASPIRE* study, a multi-centre study, published in 2021, which examined standards of secondary coronary heart disease in Ireland, found marked differences in outpatient risk factor control and management on the basis of hospital location and index coronary heart disease presentation type (acute vs chronic).<sup>(45)</sup> These findings highlighted the need to reduce hospital-level and patient-level variability in preventive care to improve outcomes in Ireland.<sup>(45)</sup>

### 3. Cardiac rehabilitation: what are we building on?

#### 3.1 Policy context

The enduring evidence for cardiac rehabilitation has long been recognised in Irish policy (Table 2). Unfortunately this has not been reflected consistently in cardiac rehabilitation resources on the ground.<sup>(46)</sup> Despite an increase in resources for cardiac rehabilitation between 2001 and 2005, cardiac rehabilitation services suffered significant cutbacks with a 37% loss in whole time equivalent personnel at the time of the economic downturn.<sup>(18)</sup> Subsequent challenges have served to aggravate the situation. In parallel to a reduction in cardiac rehabilitation personnel, the population of Ireland has continued to expand and to age and the need for cardiac rehabilitation services has increased.<sup>(18,27)</sup>

Table 2: Timeline of policies supporting cardiac rehabilitation

1978	The first cardiac rehabilitation service was established in Ireland.
1999	<i>Building Healthier Hearts</i> provided for expansion of Phase III cardiac rehabilitation centres.
2008	The <i>Chronic Illness Framework</i> promoted the concept of chronic disease management with a focus on prevention. It recognised the value of cardiac rehabilitation in achieving positive health outcomes for individuals with cardiovascular disease.
2010	<i>Changing Cardiovascular Health 2010-2019</i> set out the importance of cardiac rehabilitation for all eligible patients across the spectrum of cardiac services.
2015	The Integrated Care Programmes were established to develop integrated disease-specific ‘Models of Care’.
2017	<i>Sláintecare</i> emphasised the need for an integrated approach to healthcare with a focus on prevention and the proactive management of chronic disease.
2017	<i>Living Well with a Chronic Condition: Framework for Self-Management Support</i> recommended increasing national provision of a standardised cardiac rehabilitation service.
2017	The <i>Integrated Model of Care for the Prevention and Management of Chronic Disease</i> was approved by the HSE Design Reform Board and <i>Integrated Care Programme for Chronic Disease</i> Steering Committee. Cardiac rehabilitation was recognised as a central aspect of an end-to-end model of care for the prevention and management of chronic disease.
2020	The <i>National Framework for the Integrated Prevention and Management of Chronic Disease</i> was published. This framework described cardiac rehabilitation as a central service underpinning the national approach to the prevention and management of chronic cardiovascular disease in Ireland. It identified the core resources required in the community to uplift the existing hospital-based and outreach cardiac rehabilitation services.
2020	The <i>Enhanced Community Care Programme</i> which included implementation of the <i>Integrated Model of Care for the Prevention and Management of Chronic Disease</i> was approved for funding and is now a central aspect of the HSE Winter Plan and the HSE National Service Plan 2021-2024. Resources have been provided for 30 cardiac rehabilitation teams to be based in the specialist ambulatory care hubs in the community across Ireland.

### 3.2 The *Enhanced Community Care Programme*

The *Enhanced Community Care Programme*, as outlined in the HSE Corporate Plan 2021-2024, aims to transform the way healthcare is delivered.<sup>(46)</sup> A central tenet of the *Enhanced Community Care Programme* is the implementation of the *National Framework for the Integrated Prevention and Management of Chronic Disease*.<sup>(30,46)</sup>

With implementation of the *Enhanced Community Care Programme*, 96 community healthcare networks and 30 specialist ambulatory care hubs are being established.<sup>(46)</sup> Community healthcare networks are geographically-based units which serve an average population of 50,000 each.<sup>(30)</sup> Each specialist ambulatory care hub accommodates a chronic disease community specialist team which is a multidisciplinary team serving approximately three community healthcare networks or a population of 150,000.<sup>(30)</sup> The specialist ambulatory care hub, which is a clinical site identified outside of the hospital setting, but which works in partnership with an aligned hospital, supports access to diagnostics, specialist services, and specialist opinions in order to support early intervention and specialist care within the community, with a particular focus on chronic disease prevention and management. Each chronic disease community specialist team includes cardiology specialist nurses and healthcare professionals (Table 3).

Table 3: Chronic Disease Community Specialist Team based in each specialist ambulatory care hub

Specialist Chronic Disease Team member	Whole time equivalent per 150,000 population (approx.)
<b>Diabetes</b>	
Clinical Nurse Specialist Diabetes	3.0
Clinical Specialist Podiatrist	1.0
Senior Grade Podiatrist	1.0
Basic Grade Podiatrist	1.0
Senior Dietitian	3.0
Staff Grade Dietitian	3.0
<b>Cardiology</b>	
Clinical Nurse Specialist Cardiovascular Disease	3.0
Cardiac Rehabilitation Coordinator	1.0
Senior Physiotherapist (Cardiology)	1.0



Staff Nurse Cardiac Rehabilitation	1.0
Cardiac Rehabilitation Administrative Assistant (Grade IV)	0.5
Clinical Psychologist	0.2
<b>Respiratory</b>	
Clinical Nurse Specialist Respiratory	3.0
Senior Physiotherapist	3.0
Clinical Specialist Physiotherapy Rehabilitation Coordinator	1.0
Clinical Nurse Specialist Pulmonary Rehabilitation	1.0
Staff Grade Physiotherapist Pulmonary Rehabilitation	1.0
Pulmonary Rehabilitation Administrative Assistant (Grade IV)	0.5
<b>Management and administrative staff</b>	
Service Improvement Lead	1.0
Project Officer	1.0
Administration Staff	2.0

## 4. The model of care for an integrated cardiac rehabilitation service

This model of care builds on current guidelines and incorporates both national and international consensus on the delivery of a timely and effective cardiac rehabilitation programme.<sup>(1-4,6,16,17,47)</sup>

The model of care recommends how to organise the delivery of services to all patients eligible for cardiac rehabilitation so that they receive timely, equitable and evidence-informed care. It describes the care required, sets out who should provide it, and outlines where the service or care should be delivered.<sup>(48)</sup>

### 4.1 An integrated cardiac rehabilitation service

In recognition of the value of cardiac rehabilitation as part of the *Model of Care for the Integrated Prevention and Management of Chronic Disease*, and the long-acknowledged requirement to expand cardiac rehabilitation services to provide a national cardiac rehabilitation service that is accessible and equitable, the *Enhanced Community Care Programme* has provided ring-fenced resources to support the provision of cardiac rehabilitation in the specialist ambulatory care hubs.<sup>(30)</sup> The initiation of these hubs commenced in late 2020. Across each hub area (i.e. three community healthcare networks with aligned hub and hospital), it is anticipated that the hospital-based and ambulatory care hub-based cardiac rehabilitation staff (community-based) will work together to provide a singular, integrated cardiac rehabilitation service that reflects local structures and patient need in their catchment area. To that end, one Consultant Cardiologist will provide clinical governance to both the hospital- and community-based components of the cardiac rehabilitation service in each area; each cardiac rehabilitation service will develop and implement an agreed pathway for accepting and managing referrals for all patients referred to the cardiac rehabilitation service within their catchment area; and it is envisaged that the hospital- and community-based cardiac rehabilitation staff will work together to deliver an integrated, person-centred cardiac rehabilitation service, regardless of the setting. To reflect this intention, where this document refers to a *cardiac rehabilitation service* or a *cardiac rehabilitation team*, it is describing both the hospital- and community-based staff.

### 4.2 The patient pathway: seven key steps

As cardiac rehabilitation is a complex intervention, it is important that the recommended patient care pathway designed to achieve best health outcomes is set out and clear to all (patients and their families/carers, healthcare professionals and managers). This document sets out the model of care for phases I, II and III cardiac rehabilitation services in Ireland.

Figure 5 outlines the seven key steps in the patient pathway for integrated cardiac rehabilitation: a detailed pathway is described in Appendix 1.

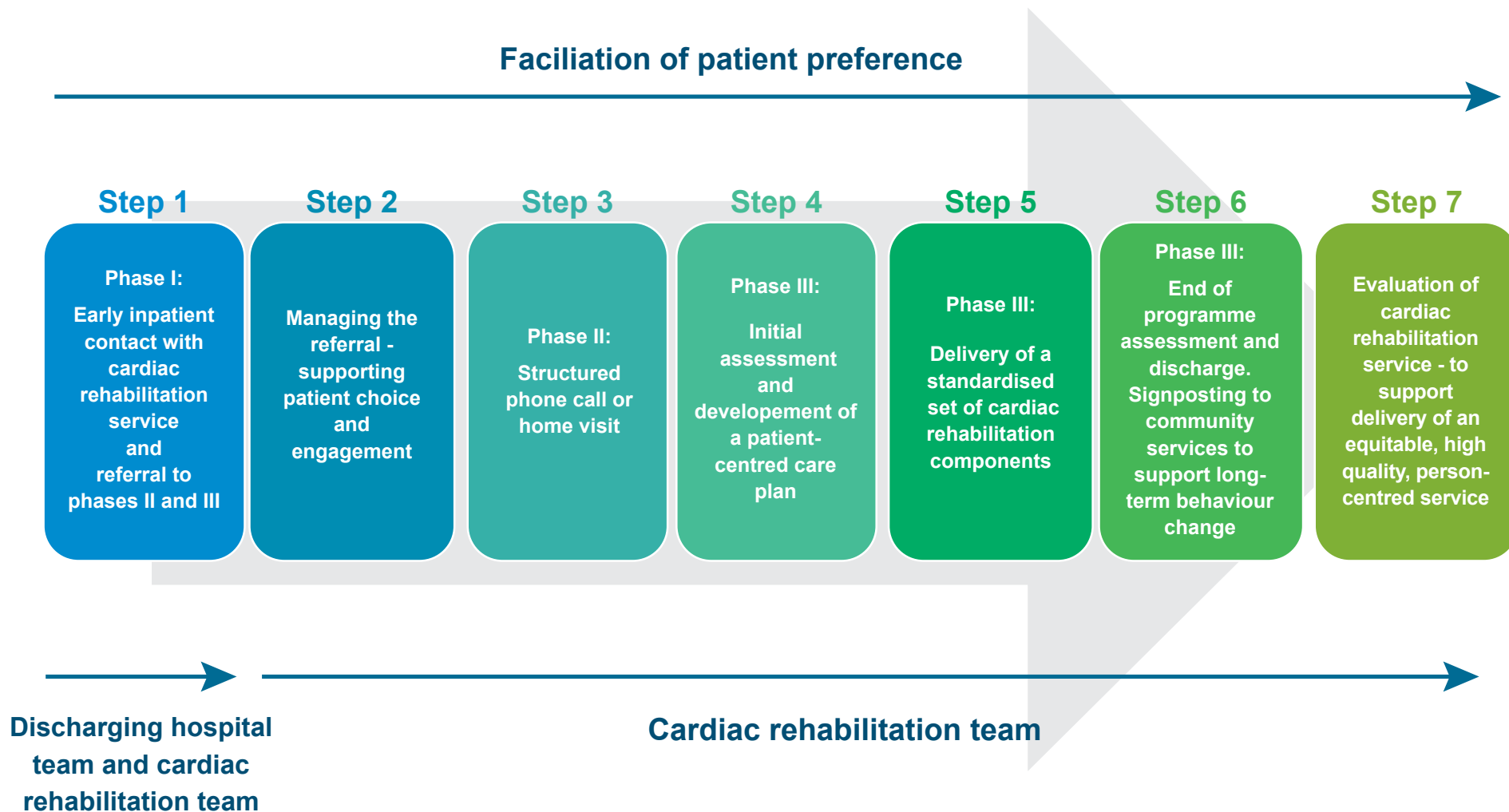


Figure 5: Seven steps in the *Model of Care for Integrated Cardiac Rehabilitation*

## Seven steps in the Model of Care for Integrated Cardiac Rehabilitation

**A person-centred approach** is a cornerstone of the *Model of Care for Integrated Cardiac Rehabilitation*. This starts with a discussion between referrer and patient as to their preference for hospital-based or community-based cardiac rehabilitation. International evidence and best practice underlines the importance of taking an individualised approach to cardiovascular disease prevention and rehabilitation.<sup>(3,4,16,19)</sup> A holistic programme of cardiac rehabilitation that takes a biopsychosocial approach and which sets out goals, and the methods by which to achieve such goals, should be developed and agreed in partnership with each patient.<sup>(1-4)</sup> This approach will require that all patients be offered more choice in when, where and how they participate in cardiac rehabilitation. A patient-centred approach underpins the seven steps in the model of care, as follows:

### Step 1:

**Early inpatient contact with cardiac rehabilitation services, for phase I cardiac rehabilitation, and onward referral to phases II and III cardiac rehabilitation.** Early contact with one or more members of the cardiac rehabilitation team during the patient's episode of hospitalisation for their index event can support increased uptake of subsequent phases of cardiac rehabilitation.<sup>(49,50)</sup> All inpatients who are eligible for cardiac rehabilitation services should receive this early contact from the cardiac rehabilitation service during their hospital stay and ongoing engagement with cardiac rehabilitation services should be encouraged as part of their discharge planning. After this initial contact, a **referral to the patient's preferred cardiac rehabilitation centre should be automatically generated** to optimise uptake of phases II and III cardiac rehabilitation for all eligible patients. Some patients may not have a preference and may be willing to attend hospital-based or community-based services. Indeed, the patient's preference may be to attend the service with the shortest current waiting list. It is the responsibility of the discharging medical/surgical team to ensure that this referral is sent prior to, or within 24 hours of, patient discharge. This referral should preferably be sent by electronic means e.g. via Healthlink or Healthmail.

### Step 2:

The cardiac rehabilitation team should **actively manage referrals** to ensure patients in priority groups are offered an initial assessment within two weeks (but no later than four weeks) of discharge from hospital. Referrals should be triaged using the information provided by the referrer and patients should be offered a flexible programme using a menu of options to support patient choice and engagement.

### **Step 3:**

Phase II cardiac rehabilitation should be undertaken via a **structured phone call or home visit** to further highlight the importance of adopting healthy lifestyle habits and addressing the patient's cardiovascular disease risk factors.

### **Step 4:**

The cardiac rehabilitation team should undertake a **standardised initial assessment** with each patient, which will support the joint development of a **patient-centred care plan** by the cardiac rehabilitation team in partnership with the patient.

### **Step 5:**

All cardiac rehabilitation teams should deliver a **standardised set of components in their cardiac rehabilitation programmes**, regardless of the setting (e.g. hospital, hospital outreach, specialist ambulatory care hub, home or combination thereof).

### **Step 6:**

All participants should be offered and encouraged to undergo a **standardised end-of-programme assessment**. A cardiac rehabilitation **discharge protocol** should be implemented which **signposts** participants to long-term maintenance supports and other available programmes. A discharge report should be shared with the patient and their GP and/or cardiologist.

### **Step 7:**

**Evaluation** of the cardiac rehabilitation service to support delivery of an equitable, high quality, patient-centred service is a fundamental element of this model of care. All cardiac rehabilitation centres should return data on the organisational key performance indicators to the Local Governance Group and the Office of the Enhanced Community Care Programme (see Table 11 on page 67). Data on clinical indicators (see Table 12 on page 67), patient reported experience and outcome measures and a minimum cardiac rehabilitation dataset (See Table 13 on page 68) should also be collected, reviewed and acted upon at the local level to support the delivery of a high quality, safe cardiac rehabilitation service. It is recommended that a national audit of cardiac rehabilitation be established whereby regional cardiac rehabilitation data is returned in order to support quality improvement activities at the local, regional and national levels.

## 4.3 Steps in the Model of Care

### 4.3.1 Step 1: Phase I cardiac rehabilitation and referral

The optimal time to start patients on their cardiac rehabilitation journey is during the inpatient hospital period.<sup>(1-3,9)</sup> It is the responsibility of all members of the medical or surgical multidisciplinary team who are caring for the patient during their inpatient stay to encourage and support them to adopt healthy lifestyle habits and to address their risk factors.<sup>(1,2,9)</sup> Early inpatient contact from the cardiac rehabilitation team (phase I cardiac rehabilitation) can support the patient to begin to set goals to address their risk factors and necessary lifestyle modifications. The purpose of phase I cardiac rehabilitation includes:<sup>(1,2)</sup>

- Providing information to the patient (and family or identified support person, if desired) about cardiovascular disease
- Assisting the patient in identifying their own personal risk factors for cardiovascular disease
- Discussing with the patient how they might begin to address their identified risk factors for cardiovascular disease and develop a personalised care plan to manage these risk factors
- Involving family or an identified support person in the rehabilitation process, if desired by the patient
- Co-producing a personal hospital discharge activity programme with the patient
- Discussing any impending surgical procedures with the patient, if clinically indicated
- Informing patients about phases II and III cardiac rehabilitation services, promoting the benefits of attending a cardiac rehabilitation programme and encouraging them to attend
- Discussing the guidelines regarding safe return to driving with the patient and signposting them to appropriate resources
- Involving other members of the multidisciplinary team in the patient's care, where clinically indicated e.g. referral to the smoking cessation officer, social work, psychology service, etc.

Automatic and early referral to cardiac rehabilitation at the stage of hospitalisation for the index event/diagnosis has been shown to impact favourably on the numbers who go on to attend and adhere to cardiac rehabilitation.<sup>(49-53)</sup> It is the responsibility of the discharging medical or surgical team to refer all eligible patients, regardless of age, sex, ethnic group and clinical condition, to the cardiac rehabilitation service. Each cardiac rehabilitation service should develop a cardiac rehabilitation referral form to be used by all healthcare professionals for referral of a patient to their service. It is recommended that the referral form summarises the patient's salient medical history, medications, physical examination and medical intervention results, all of which will inform a tailored approach to each patient's cardiac rehabilitation course. A template referral form is provided in the Irish Association of Cardiac Rehabilitation's 2020 guidelines which may assist services in identifying what information they wish to include on the referral form.<sup>(2)</sup>

The Cardiovascular Disease Discharge Bundle, as set out in Appendix 2, should be completed by a member of the discharging team for every patient who is being discharged from hospital following an admission for cardiovascular disease or heart failure. This discharge bundle is not a replacement for the discharge summary, nor is it intended to act as a referral form for cardiac rehabilitation: it is simply intended to act as a prompt to discharging teams to consider cardiac rehabilitation referral for all eligible patients as part of the discharge process. A copy of the completed discharge bundle should be kept as a clinical record in the patient's chart.

Many groups are frequently under-represented in cardiac rehabilitation and may benefit from early, automatic referral. These groups include women, older patients and those from ethnic minority groups.<sup>(54-58)</sup> Additionally, social deprivation and poverty are barriers to participation in cardiac rehabilitation with unemployed people, individuals with lower educational attainment and those with lower income showing lower participation and lower adherence to cardiac rehabilitation courses.<sup>(55,57)</sup> Moreover, distance can act as a barrier to accessing cardiac rehabilitation, with potential participants who live farther from cardiac rehabilitation centres, who do not have transportation, or do not drive, also shown to attend less.<sup>(49,57)</sup> Individuals with elective percutaneous coronary intervention and unstable angina, and those with a previous history of coronary disease, heart failure, hypertension or dysglycaemia are less likely to be advised to follow a cardiac rehabilitation programme.<sup>(55)</sup> People smoking prior to the index event for cardiac rehabilitation may also be less likely to participate in cardiac rehabilitation.<sup>(55)</sup>

Individuals who are not immediately referred to cardiac rehabilitation during their initial hospitalisation for the index event/diagnosis, or who initially decline an invitation to participate, may benefit from a referral up to one year following the initial event.<sup>(51,59)</sup>

## **Referral to a cardiac rehabilitation service: the Model of Care**

### **1. All eligible patients**

- A locally agreed process for identifying, referring and offering all eligible patients a cardiac rehabilitation course should be implemented. The cardiac rehabilitation programme should commence for all eligible patients during the inpatient stay for the acute index episode.
- The discharging medical/surgical team is ultimately responsible for ensuring that their eligible patients are referred to, and encouraged to attend, cardiac rehabilitation.

- Individuals eligible for cardiac rehabilitation include the following:
  - Individuals in the priority patient groups, which are those having:
    - Acute coronary syndrome
    - A post coronary-revascularisation procedure
    - A hospitalisation for heart failure with reduced ejection fraction

These individuals should all be offered a cardiac rehabilitation programme following their index cardiovascular event/diagnosis.

- Individuals within priority patient groups who were not referred to, or who declined a referral to cardiac rehabilitation following their index event/initial diagnosis, should be offered the opportunity to attend cardiac rehabilitation for up to one year following their index event. Therefore, referrals to cardiac rehabilitation should be accepted from the patient's discharging team, GP or chronic disease community specialist team.
- Where there is sufficient capacity, individuals outside of the priority patient groups with the following conditions should also be offered a cardiac rehabilitation course:<sup>(60-66)</sup>
  - Chronic stable angina without revascularisation, symptomatic peripheral arterial disease, post-cerebrovascular event (stroke)
  - A hospitalisation for heart failure with preserved ejection fraction
  - Pre- and post-implantation of cardiac defibrillators and resynchronisation devices
  - Post-heart valve repair/replacement (where cardiac rehabilitation not already provided for a heart failure indication)
  - Post-heart transplantation and ventricular assist devices (where cardiac rehabilitation not already provided for a heart failure indication)
  - Adult congenital heart disease
  - Spontaneous coronary artery dissection
- All cardiac rehabilitation centres should have a plan in place to target the under-represented population groups to support their uptake and adherence to cardiac rehabilitation.



## 2. Person-centred referral

- Information about how patients can engage with their local cardiac rehabilitation services should be provided to patients during phase I cardiac rehabilitation.
- All eligible patients should be encouraged and supported to attend cardiac rehabilitation. Patients should also be included in the decision as to whether they are referred to hospital-based or community-based cardiac rehabilitation. Patient preference should guide this decision. There may be cases where the clinical care team feel the hospital-based or community-based cardiac rehabilitation option is best for a given patient, in which case this rationale should be discussed with the patient and used to inform the referral. Patient preference for site of cardiac rehabilitation should be recorded on the cardiac rehabilitation referral form.
- There may also be cases where the clinical team feel that particular aspects of the cardiac rehabilitation programme should occur in a particular setting e.g. in-person in the hospital or community and in such cases, healthcare professionals should use their professional judgement to guide patients to the most appropriate option.

## 3. Early referral

- The cardiac rehabilitation programme should commence during the inpatient stay for all eligible patients (phase I).
- Eligible individuals should be referred to phases II and III cardiac rehabilitation during their inpatient hospital stay or within 24 hours of their discharge.
- Use of the Cardiovascular Disease Discharge Bundle (Appendix 2) will prompt discharging medical/surgical teams to consider referral of all eligible patients to phases II and III cardiac rehabilitation services, as part of the discharge process.

## 4. Automatic referral

- To support increased uptake, it is recommended that all eligible patients be automatically referred by the discharging team after their index event/diagnosis.
- It is the responsibility of the team who care for the patient during the inpatient episode to discuss cardiac rehabilitation referral with the patient as part of their approach to empower the patient to manage their condition going forward. An automatic referral that reflects the joint decision by patient and discharging team should be generated by the team for each discharge. If a patient refuses to engage with cardiac rehabilitation during their admission for an index event and/or refuses subsequent referral to phases II and III, this should be noted on their discharge summary and within their clinical notes so that the GP/chronic disease

community specialist team/hospital team are informed and can re-refer the patient at a later date (within one year of the index event), in line with patient preference.

- The Cardiovascular Disease Discharge Bundle template (Appendix 2) will support automatic referral for all eligible patients.
- In line with the *Integrated Model of Care for the Prevention and Management of Chronic Disease*<sup>(30)</sup> and based on clinical need, the hospital-based discharging team will work closely with the cardiac rehabilitation team, the Integrated Care Cardiology Clinical Nurse Specialist, the wider chronic disease community specialist team, and the general practitioner and primary care team, to support the management of patients as close to home as possible

## 5. Electronic referral

- Electronic referral (e.g. using Healthlink or Healthmail) of eligible patients to cardiac rehabilitation is the preferred method as this will promote timely referral and triaging of the patient. Referral methods and pathways must be agreed and embedded at local level.

### 4.3.2 Step 2: Managing the referral

Upon receipt of referral, all patients deemed eligible should be triaged and offered phase II cardiac rehabilitation as well as being offered an appointment for the initial assessment as per sections 4.3.3 and 4.3.4 below.

Cardiac rehabilitation services in Ireland are currently provided, in the main, in publicly funded hospitals, with two hospital outreach services in existence (Arklow and Drumshambo), as well as limited community- and home-based programmes. Internationally, cardiac rehabilitation is provided in settings including publicly or privately funded hospitals, outreach, community centres and gyms, in order to provide greater capacity and to facilitate patient choice.<sup>(54,67,68)</sup> Home-based programmes appear to be effective options for most patients and should be available to patients who would prefer this approach, most particularly when the patient may otherwise not receive any cardiac rehabilitation at all.<sup>(69-73)</sup> Notably, telerehabilitation and virtual models for the delivery of cardiac rehabilitation are increasingly being used in Ireland and further afield, particularly since the emergence of COVID-19.<sup>(33,74-77)</sup> With up to 75% of cardiac rehabilitation services being suspended across the globe during the pandemic, these digital interventions became essential to providing appropriate and timely rehabilitation care.<sup>(78,79)</sup> Consequently, there are increasing calls for these

interventions to play a role in future cardiac rehabilitation delivery.<sup>(80)</sup> Evidence to date supports the similar efficacy of these home-based and virtual programmes to more traditional in-person programmes.<sup>(3,31-33,67,73)</sup>

In Ireland, outcomes from *Croí MySláinte*, a digital cardiac rehabilitation programme demonstrated measurable improvements in medical, lifestyle and psychosocial risk factors which compared favourably to the in-person programme, upon which it was based.<sup>(81)</sup> Facilitating patient choice by offering multiple modes of participation may support recruitment and retention of patients, particularly those patients who typically are harder to reach.<sup>(3,67,74,77,82)</sup> Recognising the encouraging evidence to date, particularly for improved cardiac risk factors and quality of life, current guidelines from the European Society of Cardiology and the American College of Cardiology/American Heart Association state that home-based or virtual programmes may be considered (Class 2B) for patients traditionally referred to centre-based in-person cardiac rehabilitation.<sup>(16,72)</sup>

Interventions aimed at increasing enrolment in cardiac rehabilitation have been shown to be successful, for example, a structured phone call or home visit after discharge.<sup>(50)</sup> Some intervention strategies are more effective than others, but interventions are more successful if delivered by nurses or other healthcare professionals and if delivered face-to-face.<sup>(50)</sup> Cardiac rehabilitation programmes should additionally consider a variety of approaches to meeting the health literacy requirements of attendees.<sup>(83)</sup>



## Managing the Referral: the Model of Care

- Each hub area and aligned hospital should ensure that they are able to accept referrals, preferably by electronic means, from hospital, hub and GP colleagues. It is expected that each local cardiac rehabilitation service will develop a locally agreed integrated referral pathway which takes account of local structures and pooled resources and includes a process for optimally managing cardiac rehabilitation referrals across hub and hospital locations.
- An electronic booking system should be put in place for cardiac rehabilitation centres to facilitate efficient management of referrals.
- Referrals should be triaged using the information provided by the referrer.
- Contact should be made with the patient to invite them to participate in phases II and III and to discuss their preferences for cardiac rehabilitation, with the aim of commencing phase III (i.e. the initial assessment) within two weeks following referral, but no later than four weeks following referral.
- Offering flexibility in when, how and where phases II and III cardiac rehabilitation are delivered will support the delivery of a more inclusive, person-centred service which may enhance patient engagement. Locations for cardiac rehabilitation may include the hospital setting, hospital outreach, and specialist ambulatory care hub setting (including virtual cardiac rehabilitation). All cardiac rehabilitation teams should offer cardiac rehabilitation services across these environments. Where possible, patients should be offered a flexible programme using this menu of options to support patient choice and engagement. It is also recognised that home-based cardiac rehabilitation options will be desirable to many patients and, based on current evidence supporting similar efficacy for these home-based options,<sup>(3,31-33,69,73)</sup> such services should be made available, as local expertise and resources allow, in order to improve cardiac rehabilitation uptake and retention.
- Efforts to identify and overcome barriers to participation in cardiac rehabilitation should occur early on in the cardiac rehabilitation process, for example, meeting health literacy requirements.
- An approach to re-offering a cardiac rehabilitation programme to individuals who initially decline or who fail to complete the programme should be agreed at the local level.
- A flexible and collaborative approach to delivering a singular, integrated cardiac rehabilitation service across hospital and aligned hub(s) should be implemented to support and encourage patient referral, uptake and ongoing patient engagement with cardiac rehabilitation.

### 4.3.3 Step 3: Phase II cardiac rehabilitation

Phase II cardiac rehabilitation describes the phase following hospital discharge, prior to commencing phase III cardiac rehabilitation. The aim of phase II cardiac rehabilitation is to further build on the information the patient received during phase I regarding the importance of adopting healthy lifestyle habits and addressing their specific cardiovascular disease risk factors.<sup>(1,2)</sup> The patient's family, carer or identified support person may also be provided with education regarding cardiovascular disease and its prevention and management. The involvement of family, carers or other support persons can influence an individual's decision as to whether they participate in cardiac rehabilitation and may help to embed positive lifestyle changes for the patient.<sup>(3,4,84)</sup> This phase may be delivered remotely or in person.<sup>(1,2)</sup> It is recommended that this phase be administered by a healthcare professional, preferably a member of the cardiac rehabilitation team. A structured phone call or home visit by a nurse or healthcare professional following a patient's discharge from hospital is positively associated with increased uptake of phase III cardiac rehabilitation.<sup>(4,50)</sup>



## Phase II Cardiac Rehabilitation: the Model of Care

- Following referral, phase II cardiac rehabilitation should be offered to all eligible patients following their discharge from hospital, post-index qualifying event.
- Phase II cardiac rehabilitation should be delivered by either a nurse or healthcare professional from the local cardiac rehabilitation team.
- Phase II can be delivered via the following modalities:
  - Telephone or video consultation
  - Provision of educational sessions on an individual or group basis with emphasis on risk factor reduction by means of focused information, education and counselling
  - Review by a member of the cardiac rehabilitation team in the outpatient clinic setting
  - Home visit by member of the cardiac rehabilitation team or allied health professional
  - Use of the Cardiac Rehabilitation for All<sup>(85)</sup> programme or other comparable home information programmes
- Subject to the patient's permission, family/carer/identified support person involvement should be encouraged.
- A gradual return to exercise at a low-to-moderate intensity may be commenced at this stage, once the patient is free from symptoms that could be expected to hinder exercise tolerance or worsen with exercise. Depending on the patient's history, exercise of increasing intensity over time may be advised during this phase.
- Commencement of phase III cardiac rehabilitation should occur within four weeks, and preferably within two weeks, of discharge from hospital.

#### 4.3.4 Step 4: Phase III cardiac rehabilitation - initial assessment and the development of a person-centred care plan

The initial assessment is the foundation for identifying baseline patient cardiovascular disease risk factors and establishing the lifestyle changes that are required by the individual for cardiovascular disease risk reduction.<sup>(2-4)</sup> The initial assessment underpins a person-centred and individualised approach to cardiac rehabilitation for each person who is referred to the service and can support adherence to the programme.<sup>(3,86)</sup> The National Institute for Health and Care Excellence (NICE) describes the initial assessment as the ‘first session of a cardiac rehabilitation programme’ and should include information on risk modification and lifestyle whilst also assessing the individual’s cardiac function and suitability for the various components of the programme.<sup>(53)</sup> The initial assessment also facilitates identification of any physical, psychological or behavioural issues that have the potential to impact on the patient’s ability to make the desired lifestyle changes, as well as identification of the patients’ preferences for the setting of personalised goals.<sup>(3,19)</sup>

The initial assessment should take place within two to four weeks of the patient’s discharge from hospital due to their acute index event/initial diagnosis. In cases where the initial assessment cannot be completed in its entirety (e.g. a temporary contra-indication to physical activity), it is recommended that this should not delay assessment of the remaining components and/or the commencement of the other components of the phase III programme, as starting within this time frame is associated with increased uptake of phase III cardiac rehabilitation.<sup>(3)</sup>

##### **Initial Assessment and Development of a Person-Centred Cardiac Rehabilitation Care Plan: the Model of Care**

- The initial assessment should be undertaken within two to four weeks of the patient’s discharge from hospital following the index event.
- The patient voice should be central to the initial assessment and subsequent goal-setting and care plan development.
- While the initial assessment will consist of an individualised patient-tailored interview between the core multidisciplinary cardiac rehabilitation team and the patient, there are certain core components that should be standard for all initial assessments:<sup>(2,3)</sup>
  - Demographic information and social determinants of health
  - A full medical history, current health status and symptoms, review of relevant investigations

- Prescribed medication along with review of medication adherence
  - Medical risk factor review with discussion of body composition including BMI and waist circumference, blood results (lipids, glucose control), current blood pressure and heart rate, and the identification of any arrhythmias
  - Comprehensive assessment of dietary risk factors
  - Review of lifestyle risk factors e.g. smoking, physical activity and alcohol
  - Functional capacity testing, risk stratification and exercise prescription
  - Holistic review of psychosocial status including assessing for the presence of anxiety and/or depression, illness perception, social support, psychological stress, sexual wellbeing and quality of life. Levels of anxiety and depression are typically evaluated using the Hospital Anxiety and Depression (HAD) Scales. Other screening tools may be utilised as clinically appropriate including the PHQ9, GAD 7 or CORE. When higher levels of distress are identified, it is usual to liaise with the patient's primary care practitioner (e.g. GP) to ensure continuity of care, with recommendations made to address presenting concerns as per best practice and relative to the patients' needs.
- Functional exercise testing should be undertaken face-to-face by a trained professional in a healthcare setting (hospital, specialist ambulatory care hub or outreach cardiac rehabilitation centre).
  - Programme duration and logistical aspects of the programme should be explained to the patient and the patient should set realistic goals, individualised to the extent necessary, which should be reviewed, developed and progressed throughout the duration of the programme. A comprehensive cardiac rehabilitation programme should then be jointly developed and agreed with the patient.



### 4.3.5 Step 5: Delivering a standardised set of core components for phase III cardiac rehabilitation

Robust international evidence and examples of best practice have identified the core components that should be incorporated into any cardiac rehabilitation programme, regardless of the setting, in order to deliver high quality care, achieve positive patient outcomes and empower patients with the self-management techniques and tools to sustain positive behavioural changes: these components are outlined in Table 4.<sup>(1-3,11,16,59,87,88)</sup>

Table 4: The core components of cardiac rehabilitation<sup>(1-3,11,16,59,87,88)</sup>

Standardised set of core components of cardiac rehabilitation
Initial assessment and development of a person-centred care plan
Health behaviour change
Education
Lifestyle risk factor management, including physical activity, smoking, dietetics and psychosocial health
Medical risk factor management
End of programme assessment

The delivery of holistic cardiac rehabilitation requires input from a diverse range of healthcare professionals which may include cardiovascular medicine, nursing, physiotherapy, dietetics, psychology, social work and pharmacy.

A consultant cardiologist will provide clinical governance to the cardiac rehabilitation team and should:

- Provide leadership in service development and management, with a key focus on quality improvement
- Promote the value of cardiac rehabilitation as a key part of cardiology service provision
- Work collaboratively with consultant cardiologist and physician colleagues to ensure that all eligible patients are referred to cardiac rehabilitation in a timely manner
- Provide clinical oversight of service delivery and support the medical management of patients to ensure achievement of the recommended medical risk factor and therapeutic targets.

The Cardiac Rehabilitation Co-Ordinator should provide clinical, administrative leadership and vision to the programme, ensuring that all aspects of the service are delivered according to the nationally agreed standard.

Supporting cardiac rehabilitation teams to deliver on the core components of cardiac rehabilitation should be advanced at both the regional (e.g. identification of staff educational needs and providing time and opportunities for further education, supporting use of national and international guidelines, encouraging audit and research activities) and national levels (e.g. identifying and advocating for appropriate resources to meet population need).

#### **4.3.5.1 Behaviour change**

Adopting healthy behaviours and maintaining lifestyle changes are essential to cardiovascular disease risk reduction.<sup>(1-3,9,89)</sup> Consequently, health behaviour change and patient education are essential components of any cardiac rehabilitation programme as a person's lifestyle is usually based on long-standing behavioural patterns that are inherent to that person and are maintained by the social environment.<sup>(16,90,91)</sup> The evidence for helping patients to achieve health behaviour change is compelling and all recent international guidelines advocate that behaviour change should be central to all encounters with patients attending cardiac rehabilitation.<sup>(3,90,92)</sup> The European Society of Cardiology guidelines make specific recommendations for facilitating behaviour change.<sup>(9,16,89)</sup>

In order to support patients to adopt new behaviours, the patient's expectations and personal goals should be considered.<sup>(89,93)</sup> Shared decision-making between the healthcare professional and the patient, and their family, carer or identified support person ensures that individuals are supported to make decisions based on their personal preferences and are, therefore, more likely to adhere to treatment and more likely to experience improved outcomes.<sup>(9,89,94)</sup> Where appropriate, the accompanying identified support person may be encouraged to actively participate in rehabilitation activities in order to maximise patient behaviour change and address their own health behaviours.<sup>(3,4,84)</sup> Furthermore, while still a relatively new area, the evidence to date for digital health technologies such as smartphones and fitness wearables, as well as tools such as home-based blood pressure monitors, indicates a positive impact on supporting patients to make the appropriate behavioural changes and to improve their self-management of cardiovascular disease.<sup>(81,95-101)</sup>

Cardiac rehabilitation programme durations at or above 12 weeks are common to optimise success in terms of behaviour change, as patients are given sufficient time to make the required lifestyle change.<sup>(9,14,91,102)</sup> Practical elements impacting on service delivery and patient management suggest

that delivering a minimum of an eight week programme moving towards the desirable 12 week programme is recommended in the current Irish cardiac rehabilitation setting.

### **Behaviour change: the Model of Care**

- Behaviour change techniques such as brief intervention and motivational interviewing should be utilised and embedded by healthcare professionals in all aspects of patient care throughout the cardiac rehabilitation journey.
- The patient's expectations and personal goals should be explored in a structured, relaxed, open and non-judgemental manner. It is important that decision-making is shared, realistic and planned between the patient and healthcare professional. Goal-setting should be guided by best practice guidelines and the patient's wishes.
- Where appropriate, the involvement of a family member, carer or identified support person who may support the patient in behaviour change should be encouraged.
- The use of digital interventions to support patients in achieving positive behavioural change may be considered on a case by case basis. Multimodal behavioural interventions may elicit change, especially for those at very high risk.<sup>(9,89)</sup>
- There is evidence that longer, more extensive interventions lead to more sustained long-term results with respect to behaviour change.<sup>(9)</sup> The duration of the phase III cardiac rehabilitation course should be between eight and 12 weeks.
- Regular follow up sessions to access feedback and advice, coupled with ongoing joint goal-setting is also advised over the cardiac rehabilitation programme timeframe.<sup>(3)</sup>

### 4.3.5.2 Education

The purpose of the education component of the cardiac rehabilitation programme is to improve the patient's knowledge of cardiovascular disease risk factors, to improve patient confidence, and to encourage self-management and personal control.<sup>(1-3)</sup>

A key aim of cardiac rehabilitation, through behaviour change and education, is to equip and support people to develop the necessary skills to successfully self-manage their chronic condition(s).<sup>(3,16)</sup> Self-management support is the systematic provision of education and supportive interventions, to increase patients' skills and confidence in managing their health problems, including regular assessment of progress and problems, goal setting, and problem-solving support.<sup>(103)</sup> The principles which underpin self-management support are that patients are seen as active partners in their own healthcare and that supporting self-management is inseparable from high-quality care for people with long term conditions.<sup>(103)</sup>

Educational interventions, in a variety of modes and intensities, have been demonstrated to be effective in improving disease knowledge and healthy behaviours at <6 and 6–12 months follow-up.<sup>(91)</sup> Education programmes, which are planned and include goals, preferably theoretical based, and have clearly defined descriptions of intervention characteristics such as provider and duration, are recommended for implementation in clinical practice.<sup>(91,104)</sup> The core subjects which should be covered in cardiac rehabilitation education are listed in Table 5.<sup>(3,19)</sup>

It is important that the educational component is delivered by skilled healthcare professionals who utilise the current evidence base to deliver high quality content and use a variety of teaching methods to engage the patient.<sup>(16,105,106)</sup> Information should be presented in different formats using plain language, as recommended by the National Adult Literacy Agency (NALA), and clear design and tailored to the learning needs of each individual.<sup>(107,108)</sup> The education component may be delivered in an in-person group setting or remotely using written materials and online sessions that are also available to view on demand.<sup>(91)</sup> One-to-one phone or video calls may also be used depending on patient need/preference and resources available.<sup>(109)</sup>

Table 5: The core subjects of patient education for cardiac rehabilitation<sup>(3,19)</sup>

The core subjects of patient education for cardiac rehabilitation
The patient's condition
Making and sustaining behavioural changes
Physical activity
Cardio-protective dietary pattern
Obesity management
Smoking cessation
Management of risk factors including biomedical risk factors
Medication adherence
Psychosocial self-management
Stress management
Return to work/occupational factors
Sexual health

## Education: the Model of Care

- The educational component of the cardiac rehabilitation programme should be delivered so as to empower individuals to self-manage and make positive changes to their lifestyle and should include the subjects outlined in Table 5.
- While existing levels of knowledge should be assessed, patients should be encouraged to play an active role in highlighting and addressing their own learning needs. A focus of the educational component should be to empower patients to take an increased role in actively managing their chronic condition(s) e.g. monitoring their symptoms and signs such as weight gain in heart failure, exercise tolerance, pulse rate and rhythm and knowing when to seek medical assistance and from whom.<sup>(103)</sup> As part of this approach, patients should be encouraged to “know their numbers”.<sup>(110,111)</sup>
- Educators should be culturally sensitive and aware of current health literacy guidelines from the National Adult Literacy Agency (NALA).
- Education programmes, which are planned and include goals, preferably theoretical based, and have clearly defined descriptions of intervention characteristics such as provider and duration, are recommended.
- To take account of a wide range of patient need, multiple methods of delivery of the information should be considered and utilised as appropriate (written, audio, visual). Where available, digital platforms may be used to deliver online learning modules to individuals who have chosen to undertake part/all of their cardiac rehabilitation course via virtual means.

### 4.3.5.3 Lifestyle Risk Factor Management

#### 4.3.5.3.1 Physical Activity

The exercise component in a cardiac rehabilitation programme is proven to reduce cardiovascular mortality, hospital re-admission and improve overall quality of life.<sup>(3,4 7,19)</sup> Exercise therapy in cardiac rehabilitation programmes is a Class 1A recommendation from the European Society of Cardiology.<sup>(9)</sup> Regular physical activity has both a preventive and therapeutic effect on many chronic conditions including cardiovascular disease.<sup>(19)</sup> Benefits include increase in exercise tolerance,<sup>(14,112)</sup> reduction in blood pressure,<sup>(113)</sup> positive impact on lipid profile,<sup>(114)</sup> improvements in body weight, and an increase in insulin sensitivity.<sup>(115)</sup> Exercise is also very beneficial in heart failure: it reduces heart failure-related hospital admissions as well as all-cause hospital admissions and may confer improvements in patients' health-related quality of life.<sup>(116-118)</sup> Recent guidelines from the World Health Organisation and the European Society for Cardiology recommend that all adults should undertake regular physical activity, at least 150-300 minutes of moderate-intensity aerobic physical activity per week.<sup>(119,120)</sup> Furthermore, it is recommended that adults should limit the amount of time spent being sedentary, and to help reduce the detrimental effects of high levels of sedentary behaviour, adults should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity.<sup>(119)</sup>



Prior to embarking on physical activity as part of cardiac rehabilitation, a face-to-face assessment of physical capacity and functional status should be undertaken. Consideration of potential contraindications to the exercise component of cardiac rehabilitation is also required (Table 6). This will inform risk assessment, the exercise prescription and the setting of realistic goals.<sup>(1-3,16,19)</sup> The assessment should preferably be completed in a healthcare setting (i.e. the hospital, outreach cardiac rehabilitation centre or specialist ambulatory care hub) when the patient is stable and on optimum medication therapy for their condition. Functional exercise testing is important for all cardiac rehabilitation patients to inform their recommended intensity of exercise (the exercise prescription) and the treatment plan. It ensures that, to the extent possible, the exercise prescription is accurate and individualised.<sup>(19)</sup>

The assessment of physical capacity should take the form of a maximal exercise tolerance test. However, if a maximal exercise test is unable to be undertaken, sub-maximal testing procedures can be performed e.g. Six Minute Walk Test.<sup>(3)</sup> The Short Physical Performance Battery or similar should be considered for patients who are more frail or who have limited mobility.<sup>(88)</sup> Whatever choice of test is deployed in the initial assessment should be repeated at the end-of-programme assessment so that change can be interpreted accurately.

Table 6: Exclusion criteria for the exercise component of cardiac rehabilitation, as outlined by the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR), adapted by and from the Irish Association of Cardiac Rehabilitation<sup>(1,2,19), a</sup>

Condition
Unstable angina
New ischaemic changes on resting ECG
Resting systolic blood pressure $\geq 200$ mmHg or resting diastolic $\geq 110$ mmHg should be evaluated on a case by case basis
Orthostatic blood pressure drop $>20$ mmHg with significant orthostatic symptoms
Critical aortic stenosis (peak pressure gradient $>50$ mmHg with aortic valve orifice $<0.75$ cm <sup>2</sup> in average-size adult)
Acute systemic illness or fever
Uncontrolled atrial or ventricular arrhythmias
Uncontrolled sinus tachycardia ( $>120$ bpm)
Uncompensated heart failure
Acute systemic illness
3rd-degree atrioventricular (A-V) block (without pacemaker)
Active pericarditis or myocarditis with moderate to severe symptoms

Aortic dissection
Recent pulmonary or other major arterial embolism (<3 months)
Severe thrombophlebitis
Severely uncontrolled diabetes
Severe orthopaedic problems that would prohibit exercise, including falls risk
Other metabolic problems, such as acute thyroiditis, hypo-hyperkalaemia, hypovolaemia etc. (until adequately treated)

<sup>a</sup> *The ultimate decision regarding suitability for the exercise component of cardiac rehabilitation should lie with the local cardiac rehabilitation team in consultation with the cardiologist who provides governance to the service.*

Evidence-based standards and guidelines will support the exercise professional in developing an individualised exercise prescription for each patient.<sup>(19,121,122)</sup> Dose, intensity and delivery of exercise varies across a wide range of studies and recommendations, but benefits appear to be in large part independent of whether it takes place in the hospital, hospital outreach, community or home-setting.<sup>(32,33)</sup> The exercise professional should use their professional judgement in guiding patients to the safest and most appropriate option.<sup>(3)</sup> The exercise prescription will be informed by risk assessment, and where applicable, any specific measures required to ensure patient safety.<sup>(19)</sup>

All cardiac rehabilitation programmes should include a structured exercise component led by a trained exercise professional.<sup>(123-126)</sup> This should include aerobic activity and resistance training, which is proven to significantly increase cardiorespiratory fitness when performed frequently over weeks and months.<sup>(3,89,127,128)</sup> Guidelines at present advise the use of the FITT (Frequency, Intensity, Time, Type) principle for exercise (Table 7).<sup>(14,88,121,129)</sup> Specific FITT recommendations for particular patient groups (e.g. individuals with heart failure) are also set out in the guidelines.<sup>(121,129)</sup> As with all aspects of a comprehensive cardiac rehabilitation programme, and the nature and complexities of the patient populations attending rehabilitation, it is advised that individualised and tailored adaptations of FITT should be recommended on a case-by-case basis by the trained exercise professional.<sup>(86,129,130)</sup>



Table 7: FITT principle for individuals with cardiovascular disease participating in phase III cardiac rehabilitation (American College of Sports Medicine)<sup>(129)</sup>

FITT principle for aerobic training	
<b>Frequency</b>	Minimally 3 days a week, preferably up to 5 days a week
<b>Intensity</b>	With an exercise test, use 40-80% of exercise capacity using HRR, VO <sup>2</sup> R or VO <sup>2peak</sup> . Without an exercise test, use seated or standing resting heart rate +20 to +30 beats per minute or RPE of 12-16 on a scale of 6-20
<b>Time</b>	20-60 minutes
<b>Type</b>	Arm ergometer, combination of upper and lower (dual action) extremity cycle ergometer, upright and recumbent cycle ergometer, recumbent stepper, rower, elliptical, stair climber, treadmill
FITT principle for resistance training	
<b>Frequency</b>	2-3 non-consecutive days per week
<b>Intensity</b>	Perform 10-15 repetitions of each exercise without significant fatigue; RPE 11-13 on a 6-20 scale or 40%-60% of 1RM
<b>Time</b>	1-3 sets; 8-10 different exercises focused on major muscle groups
<b>Type</b>	Select equipment that is safe and comfortable for the individual to use
FITT principle for flexibility training	
<b>Frequency</b>	≥2-3 days per week, with daily being the most effective
<b>Intensity</b>	To the point of feeling tightness or slight discomfort
<b>Time</b>	10-30 second hold for static stretching; ≥4 or more repetitions of each exercise
<b>Type</b>	Static and dynamic stretching focused on the major joints of the limbs and the lower back. Consider PNF technique
<p>HRR: heart rate reserve            VO<sup>2</sup>R: oxygen uptake reserve            VO<sup>2peak</sup>: peak oxygen uptake            RPE: rating of perceived exertion            1-RM: one repetition maximum            PNF: proprioceptive neuromuscular facilitation</p>	

A focus on reducing sedentary behaviour is important for all individuals enrolled in cardiac rehabilitation.<sup>(16)</sup> Aiming to increase energy expenditure by reducing periods of inactivity throughout the day may be the preferred method of introducing physical activity into patients' lives, particularly patients who are high-risk, very de-conditioned or who have limited mobility.<sup>(119)</sup>

For exercise, as well as other components of cardiac rehabilitation, the current research illustrates that programme durations, at eight to 12 weeks or longer, are common to success as patients are given sufficient time to make the required lifestyle change.<sup>(14,16,131)</sup>

### **Physical Activity: the Model of Care**

- A baseline cardiovascular fitness level for each patient, including functional capacity testing, should be established as part of the initial assessment.
- An individually tailored and prescribed exercise component, focussing on the patient's goals, is recommended.
- A menu-based approach to delivery of the exercise component should be used to support patient engagement. Staff should use their professional judgment in guiding patients to the safest, most appropriate option.
- When prescribing exercise, the optimal FITT principle is a helpful guide.
- The exercise programme should include aerobic and resistance exercises to the extent possible.
- Each patient should participate in a structured activity programme at least three times a week: this can be achieved through a combination of supervised in-person sessions, virtually-delivered sessions and home-based exercise prescription.
- It must be emphasised to all patients that any exercise is better than none, even when achieving the recommended duration and frequency of exercise is not possible.
- Patients should be encouraged to reduce periods of sedentary behaviour throughout their day.

#### 4.3.5.3.2 Smoking Cessation

In Ireland, approximately 4,500 deaths annually are attributable to smoking.<sup>(132)</sup> It is estimated that 12% of deaths from cardiovascular disease in Ireland in 2019 (in persons aged 35+ years) were attributable to smoking.<sup>(132)</sup> In addition, approximately 44,000 hospital admissions in 2019 were estimated to be attributable to smoking, with 10% of these hospitalisations secondary to cardiovascular disease.<sup>(132)</sup>

While smoking increases the risk of acute myocardial infarction, continued active tobacco smoking following acute myocardial infarction results in an up to 50% risk of another cardiovascular disease event within the first year of the index event.<sup>(133,134)</sup> Therefore, tobacco cessation and relapse prevention is an essential component of a cardiac rehabilitation programme for patients who smoke. The *EUROASPIRE IV* survey found that evidence-based treatment for smoking cessation in secondary prevention was underused.<sup>(135)</sup> Evidence from other studies suggest that patients who are likely to quit smoking do so rapidly after their cardiovascular disease diagnosis, as this is the main motivator for quitting.<sup>(136-138)</sup> A referral to cardiac rehabilitation and the presence of an inpatient smoking cessation programme have been associated with successful smoking cessation outcomes among smokers who experienced an acute myocardial infarction.<sup>(139)</sup>

In January 2022, the Department of Health published Ireland's first National Stop Smoking Clinical Guideline (Guideline No.28).<sup>(140)</sup> The Guideline recommends that healthcare professionals routinely:

- ask people about their smoking
- advise them to stop and
- provide or arrange safe and effective support.

These three steps when delivered routinely during care can increase the chance that someone will quit and remain smoke-free by two- to three-fold. The Guideline also sets out the recommended behavioural and pharmacological supports that can help people who smoke quit.

## Smoking cessation: the Model of Care

- A particular focus on actively referring, following up, and encouraging enrolment of current smokers into cardiac rehabilitation after their qualifying index event/initial diagnosis is strongly recommended. In addition, the discharging medical/surgical team have an important role in the early identification, prescribing of nicotine replacement therapies and/or stop smoking medications, for a period of up to 12 weeks from hospitalisation.
- Assessment of all cardiac rehabilitation patients should incorporate current tobacco use, including frequency and quantity, preferably using the Fagerstrom nicotine dependence test,<sup>(141)</sup> recent and past quit attempts including switching products and exposure to second hand smoke. Tobacco use should be discussed at each visit to cardiac rehabilitation.
- A referral should be made to the smoking cessation officer assigned to the specialist ambulatory care hub. If this is not possible, a referral to the HSE QUIT Smoking Services will ensure patients receive timely and effective support.
- Regardless of the provision of intensive stop smoking support services, all cardiac rehabilitation multi-disciplinary team members have a professional responsibility at every consultation to ask about smoking status, to advise on the best way to quit<sup>(140)</sup> and to address smoking cessation as a core treatment to improve cardiovascular disease outcomes.

Additional information on the HSE QUIT Smoking Services, including how to make a referral, can be found in **Appendix 3**.

### 4.3.5.3.3. Dietary Intervention

Dietetic resourcing in cardiac rehabilitation services in Ireland has been lacking for many years, with only a small number of cardiac rehabilitation centres having access to a dedicated dietetic service.<sup>(18)</sup> This is despite evidence supporting the clinical- and cost- effectiveness of medical nutrition therapy delivered by a dietitian in the management of dyslipidaemia, hypertension, glycaemic control and obesity when delivered one-to-one and as part of a multi-disciplinary team.<sup>(142-146)</sup>

#### 4.3.5.3.3.1 *Impact of dietary intervention on cardiovascular disease*

Dietary interventions play an important role and have long been recognised as key in the prevention and management of cardiovascular disease, through their influence on modifiable risk factors including cholesterol, blood pressure and body weight. Suboptimal diet is responsible for more deaths than any other risks globally, including tobacco smoking.<sup>(147)</sup> Cardiac rehabilitation guidelines state that all patients should be offered high quality, evidence-based dietary advice.<sup>(3,4,15,88)</sup>

Dietary intervention in the medical management of cardiovascular risk factors is effective. Reduction in LDL cholesterol of up to 17% is achieved through the synergistic effect of a cardio-protective eating pattern that includes a high proportion of fruits and vegetables, fibre from wholegrain cereals and legumes, nuts and seeds, fish, low levels of red and processed meat, moderate dairy and low alcohol consumption, with dietary fats mainly from unsaturated fat sources (e.g. olive oil in Mediterranean countries or rapeseed oil in Ireland).<sup>(148,149)</sup> Dietary salt reduction to less than 5 grams per day is associated with a mean 4.2/2.1 mmHg reduction in SBP/DBP, with a more pronounced effect in people with hypertension.<sup>(150)</sup> Adherence to cardio-protective dietary patterns including the dietary approaches to stop hypertension (DASH) and the Mediterranean dietary pattern have demonstrated consistent improvements in blood pressure, lipid profile and glycaemic control as well as up to a 30% reduction in cardiovascular disease mortality and incidence of stroke in prospective cohort studies and randomised controlled trials.<sup>(150-153)</sup>

#### 4.3.5.3.3.2 Cardio-protective dietary guidelines

Current clinical guidelines support a cardio-protective dietary pattern as a core intervention to reduce incidence of all-cause and cardiovascular mortality.<sup>(3,4,88)</sup> The dietary recommendations for secondary prevention of cardiovascular risk factors are summarised in Table 8. The complexity of secondary cardiovascular disease prevention requires an individualised approach that targets the diet-related risk factors that are unique to each patient.

Table 8: Overview of core components of a cardio-protective diet in secondary prevention of cardiovascular disease

Nutrient/food group	Dietary guidelines that underpin food-based interventions
<b>Saturated Fats</b>	≤ 10% of total energy intake <sup>(16,154)</sup> <7% of total energy intake in presence of dyslipidaemia, through replacement with unsaturated fats <sup>(149)</sup>
<b>Trans fats</b>	<1% of total energy intake. Preferably no trans-fat intake from processed foods <sup>(88,149)</sup>
<b>Dietary Cholesterol</b>	< 300mg / day <sup>(149)</sup>
<b>Salt</b>	< 5g / day <sup>(16,150)</sup>
<b>Fruit and vegetables</b>	Fruit ≥200 g (≥ 2–3 servings) / day <sup>(15,149)</sup> Vegetables ≥200 g (≥ 2–3 servings) /day <sup>(149)</sup>
<b>Fish</b>	Twice a week one of which to be oily <sup>(154)</sup>
<b>Red and processed meats</b>	Red meat should be a maximum of 350 - 500 g a week, in particular processed meat should be limited <sup>(16)</sup>
<b>Nuts</b>	30g unsalted nuts per day <sup>(88,149)</sup>

<b>Added sugars</b>	Added sugar should not exceed 10% of total energy <sup>(155)</sup> Sugar sweetened beverages should be discouraged in presence of high plasma triglycerides, metabolic syndrome or diabetes <sup>(149)</sup>
<b>Fibre</b>	30–45 g per day preferably from wholegrains <sup>(88)</sup> Soluble fibre ≥ 7-13g per day in presence of dyslipidaemia <sup>(149)</sup>
<b>Alcohol</b>	20 g/day of alcohol (2 units) for men and 10 g/day of alcohol for women (1 unit). Note: alcohol consumption limits are lower for those with hypertension <sup>(150)</sup> and abstinence may be advised in heart failure and in hypertriglyceridemia. <sup>(149,156)</sup> Irish guidance on alcohol for general population: less than 17 standard drinks (170g alcohol) per week for men and 11 standard drinks (110g alcohol) per week for women. 2-3 alcohol free days per week to minimise tolerance and habit formation. Avoid consuming more than 6 standard drinks on any one occasion <sup>(157)</sup>

The frequency and mode of delivery of dietetic intervention varies widely in current cardiac rehabilitation programmes in Ireland. A recent review of nutrition interventions in cardiac rehabilitation has recommended a minimum of three individualised nutrition-focused sessions as best practice.<sup>(158)</sup> Internationally there is wide variation in the mode of delivery shown to improve dietary adherence, which can include; in-person group-based educational sessions, one-to-one nutrition counselling sessions, home visits and/or remote dietary counselling via phone or online.

#### 4.3.5.3.3.3 *Dietetic intervention in specific cardiac rehabilitation groups*

There is a strong evidence base for the role of nutritional intervention in specific cardiac, cerebral, and peripheral vascular conditions and concomitant complex co-morbidities. Table 9 below provides a summary of nutrition and dietetic considerations in specific cardiac rehabilitation groups. Dedicated access to dietitians who can provide specialist medical nutrition therapy and co-ordination of care across acute and community services is essential to optimise health outcomes and manage evolving nutritional issues related to disease progression and co-morbidities.

Table 9: Summary of dietetic intervention in special cardiac rehabilitation groups

Group	Specific dietetic interventions
<b>Heart Failure</b> <sup>(159,160)</sup>	<ul style="list-style-type: none"> <li>• Malnutrition and sarcopenia risk screening, diagnosis, treatment, and monitoring</li> <li>• Sodium and fluid education and, where needed, restriction</li> <li>• Managing gastro-intestinal symptoms arising from splanchnic hemodynamic changes causing abdominal discomfort, nausea, constipation, and diarrhoea common in advanced heart failure<sup>(161)</sup></li> <li>• Dietary management of co-morbidities (high incidence of diabetes and CKD in older heart failure population)<sup>(156)</sup></li> </ul>
<b>Post cardiac surgery</b> <sup>(162)</sup>	<ul style="list-style-type: none"> <li>• Malnutrition and sarcopenia risk screening, diagnosis, treatment, and monitoring (pre, peri and post-operatively)</li> <li>• Wound healing (up to 6 months post-op)</li> <li>• Heart failure sodium and fluid management post-op</li> <li>• Drug-nutrient interactions; anticoagulation and vitamin K rich food and other drugs e.g. warfarin</li> <li>• Working in partnership with the patient's GP to monitor micronutrient status as appropriate (iron, folate, vitamin B12) and need for supplementation</li> <li>• Dietary management of co-morbidities (e.g. CKD, diabetes)</li> <li>• Post-discharge nutrition care plan to optimise recovery and long term secondary prevention</li> </ul>
<b>Transient ischaemic attack/ Stroke</b> <sup>(163,164)</sup>	<ul style="list-style-type: none"> <li>• Malnutrition and sarcopenia screening, diagnosis, treatment and monitoring</li> <li>• Dysphagia and hydration – modified consistency diet and fluids</li> <li>• Dietary strategies and/or artificial nutrition support regimens to optimise nutritional intake in the presence of functional (motor and cognitive) impairments</li> </ul>
<b>Chronic Kidney disease (CKD)</b> <sup>(88,165)</sup>	<ul style="list-style-type: none"> <li>• Malnutrition and sarcopenia screening, diagnosis, and monitoring</li> <li>• Stage based dietary interventions for CKD; reduction in intake of electrolytes (phosphate, potassium), micronutrient status and supplementation, fluid restriction</li> </ul>
<b>Diabetes</b> <sup>(166,167)</sup>	<ul style="list-style-type: none"> <li>• Malnutrition and sarcopenia screening, diagnosis, and monitoring</li> <li>• Dietary intervention to optimise glycaemic control</li> <li>• Self-management education and support</li> </ul>
<b>Older persons</b> <sup>(168,169)</sup>	<ul style="list-style-type: none"> <li>• Malnutrition and sarcopenia screening, diagnosis, treatment and monitoring</li> <li>• Nutritional support to optimise higher protein requirements and maintain energy balance as appropriate</li> <li>• Prioritise optimisation of body composition over weight reduction in overweight/obesity</li> <li>• Working in partnership with the patient's GP to monitor micro-nutrient status, and to prescribe supplementation as appropriate, particularly vitamin D<sup>(170)</sup></li> </ul>
<b>Obesity</b> <sup>(172)</sup>	<ul style="list-style-type: none"> <li>• Sarcopenic Obesity screening, diagnosis, and monitoring</li> <li>• Consider the range of neuro-biological drivers of obesity that may influence eating behaviours</li> <li>• Identify and address the presence of micronutrient deficiencies e.g. vitamin D, vitamin B12 and iron, linked with restrictive eating patterns and obesity treatments (e.g., medications, bariatric surgery)</li> </ul>

## Dietary intervention: the Model of Care

- There is no dedicated dietetics resource for cardiac rehabilitation in the specialist ambulatory care hubs, nor is there capacity for in-depth dietetics input in most hospital-based cardiac rehabilitation services at this point in time. This means that in some instances, the dietetic assessment and intervention is being delivered by members of the wider cardiac rehabilitation team. This model of care recommends as best practice, and in line with international standards, that dedicated dietetics input be made available as soon as possible to all cardiac rehabilitation services.
- Individuals should be offered a dietetic assessment, including measurement of their weight, body mass index (BMI) and waist circumference, preferably conducted by a dietitian with specialist knowledge of medical nutrition therapy in pan-vascular disease, on commencing a cardiac rehabilitation programme. Further details are outlined in Appendix 4.
- The nutrition care process,<sup>(171)</sup> a systematic approach to delivering high quality nutrition care, should guide the dietetic assessment along with the use of appropriate diet assessment tools (e.g. Mediterranean diet score tool) to assess dietary quality and current eating habits. Weight history, co-morbidities, food preferences and psychosocial factors are also included in the assessment to establish a nutrition diagnosis and inform individualised goal-setting and agree a care-plan with patients.
- The focus should be on making healthy dietary changes for the purpose of lowering cardiovascular risk as well as achieving overall health and wellbeing. In addition, misconceptions about dieting, energy balance and weight management should be addressed and corrected.<sup>(3,4)</sup>
- Weight management will form an important component of each patient's care plan and may include weight gain, loss or maintenance, depending on the patient's needs and requirements. A pathway for onward referral to specialist Level 2, 3 and 4 obesity management and bariatric surgery services for patients should be in place as per the *Model of Care for Management of Overweight and Obesity*.<sup>(172)</sup>
- Specific groups in cardiac rehabilitation requiring specialist medical nutrition therapy will require one-to-one or modified group based intervention delivered by a dietitian. Referral pathways and service agreements for one-to-one dietetic counselling and modified group education sessions for cardiac rehabilitation patients with complex co-morbidities are recommended.



#### 4.3.5.3.4 Psychosocial Health

The psychological impact of heart disease is considerable, and psychological distress is highly prevalent in patients with cardiovascular disease. Anxiety, depression and insomnia disorder affect approximately one-third of people with cardiovascular disease, and up to one in four cardiac patients experience clinically significant levels of post-traumatic stress.<sup>(16,173-175)</sup>

Psychosocial risk factors are likely to arise following a significant coronary event, irrespective of premorbid history, placing patients at heightened risk of further cardiac events and mortality.<sup>(176)</sup> Psychosocial risk factors have been shown to act as barriers to lifestyle changes and treatment adherence, thereby, having an indirect effect on cardiac condition and recovery.<sup>(177)</sup>

Clinically significant psychological distress is linked to increased future cardiac events and mortality, poorer quality of life, increased suicide risk, greater healthcare costs and poorer long-term psychological adjustment.<sup>(16)</sup> Many cardiac patients also present with unique and complex psychological needs that are best managed by an experienced clinician (e.g. device-related shock anxiety, post-traumatic stress disorder).

The goals of cardiac rehabilitation have expanded in recent decades with an increased appreciation for the role of psychosocial management to include the recovery of lost function and reconditioning, reducing recurring events (secondary prevention), and psychosocial recovery.<sup>(59)</sup> International guidelines recommend that comprehensive cardiac programmes provide psychological interventions to promote patients' psychosocial wellbeing to address presenting risks.<sup>(16)</sup>

Systematic reviews have demonstrated that the psychological component drives the benefit achieved by cardiac rehabilitation and that psychological interventions not only improve psychological distress and quality of life, but also reduce future cardiac events and hospitalisations.<sup>(178-181)</sup>

When fully integrated within a cardiac rehabilitation team, psychological interventions are also proven to be highly cost effective (e.g. group sessions) and deliver an incremental benefit on hard endpoints (mortality, morbidity and hospitalisation).<sup>(182)</sup>

In addition to routine assessment of psychosocial risk factors, and pairing risk with the appropriate interventions based on current best practice, cardiac psychologists can also provide expertise in weight management, psychosexual counselling, insomnia treatment, medication adherence, family support (e.g. care-giver burden) and longer-term maintenance of behavioural changes (e.g. smoking cessation, exercise).<sup>(183)</sup>

It is well established that the mind and body are inextricably linked and psychological well-being has direct effects that mediate improvements in cardiovascular health. Better psychological functioning is associated with lower blood pressure, a lower prevalence of metabolic syndrome, a more favourable lipid profile, a lower likelihood of smoking, increased exercise levels and greater adherence to a heart-healthy diet.<sup>(184)</sup>

## **Psychosocial health: the Model of Care**

- Psychological health and the presence of potential psychosocial risk factors should be assessed for every patient as part of the initial assessment. Determinants of health including social deprivation, socioeconomic status and levels of social support should be considered as part of the initial assessment as such factors can have a bearing on patient engagement, quality of life and mortality.<sup>(185,186)</sup> Screening tools employed as part of standard pre- and post-assessment often include examination of presenting psychological distress (e.g. symptoms of anxiety and depression) and may also include clinical interview and other assessments where clinically indicated.
- The role of psychology has application across the four phases of the cardiac rehabilitation process, from involvement in the in-patient setting where high impact distress can be ameliorated as part of processes of normalisation and aid prevention of further distress and risk; to hubs and community settings with a focus on prevention, early intervention, and the provision of support to live well with chronic disease. Stress management training, when fully integrated within a cardiac rehabilitation team, not only helps patients to reduce stress but is proven to deliver an incremental benefit on cardiac outcomes (e.g. reduction in recurrent events and hospital readmissions) when compared to exercise-based rehabilitation alone.
- Additional and essential expertise provided by psychologists working as part of the cardiac rehabilitation team include weight management, psychosexual counselling, interventions to support medication adherence and the maintenance of positive lifestyle changes, as well as leading and supporting research and quality improvement activities.
- Available social supports in the community may also be discussed with participants to support and empower them to manage their own chronic conditions,<sup>(103)</sup> as well as utilising other self-management programmes, including available stress control programmes and mindfulness groups.

- When higher levels of distress are identified, it is usual to liaise with the patients' primary care practitioner (e.g. GP) to ensure continuity of care, with recommendations made to address presenting concerns as per best practice and relative to the patient's needs.
- Where a clinical need is identified but the cardiac rehabilitation service has no direct access to psychology services, it is best practice to liaise with the patient's GP to recommend that a referral to psychology services be made by the GP.

#### 4.3.5.4 Medical risk factor management and medication adherence

The vitally important role of the biomedical risk factors – hypercholesterolemia (e.g., low density lipoprotein cholesterol [LDL-C]), elevated blood pressure, arrhythmias such as atrial fibrillation and diabetes mellitus in the development of cardiovascular disease is well established.<sup>(149,167,187)</sup> Accordingly, the importance of controlling these risk factors, as well as lifestyle risk factors, to reduce cardiovascular events is fundamental to cardiovascular health and is set out in international guidelines.<sup>(16,149,187,188)</sup> Furthermore, the importance of cardio-protective medication in patients with established cardiovascular disease is clear.<sup>(16,188)</sup> Consequently, the importance of ensuring appropriate prescription of preventive medication and promoting patient adherence to relevant medication is an essential component of any cardiac rehabilitation programme. Best practice evidence and guidelines from the European Society of Cardiology should be followed.<sup>(16,149,167,187)</sup>

##### Medical risk factor management: the Model of Care

- An initial assessment of the patient's blood pressure, lipids, and glucose/HbA1c should be made, along with establishing heart rate and rhythm.
- Best practice in managing medical risk factors including blood pressure, atrial fibrillation, lipids and glucose should be used by healthcare professionals.<sup>(16,149,167,187)</sup>
- An initial assessment of current medication and doses should also be ascertained along with a review of adherence to those medications. Screening and assessing compliance with medications and reasons for non-adherence need to be identified early during the rehabilitation programme. Beliefs, worries and concerns about medication may contribute to non-adherence. Detailed discussion with the patient can play a role in assisting the patient to accept and adhere to medications.
- Targets for LDL-C, blood pressure and HbA1c that reflect international guidelines should be discussed and agreed with the patient and their progress towards achieving these goals reviewed regularly.

- Cardio-protective medications should be prescribed in accordance with up-to-date guidelines and should be titrated to the maximally recommended doses as required by skilled and appropriately trained staff.
- Sexual activity and function may be discussed, if desired by the patient. Erectile dysfunction in patients with cardiovascular disease is often multifactorial in nature. Consider medication review and onward referral where appropriate.
- If essential hypertension has been diagnosed, appropriate goals for blood pressure control should be agreed with the patient and a plan put in place to review progress throughout the duration of the cardiac rehabilitation programme e.g. 24 hour blood pressure monitor, home blood pressure monitor, in-person blood pressure monitor readings.
- For patients with inadequate blood pressure control, appropriate goals for blood pressure control should be set with the patient and lifestyle and pharmacological interventions introduced in line with national and international guidelines.
- Clarifying the status and settings of implantable devices may be relevant for a subgroup of cardiovascular patients.
- Onward referral may be indicated for further cardiology assessment or review.



### 4.3.6 Step 6: End-of-programme assessment and discharge

An end-of-programme assessment is indicated in most cardiac rehabilitation guidelines.<sup>(2-4)</sup> It is also a logical conclusion to a rehabilitation process of eight to 12 weeks where the goal is to assist the patient in making changes that will be maintained in the long-term, including setting his/her own individual goals and learning how to achieve ongoing self-management. Where appropriate, healthcare professionals may signpost patients to local resources such as peer support groups, smoking cessation services or community exercise programmes.

In addition, a patient centered, multi-disciplinary approach to discharge planning is essential to manage patient expectations and encourage them to engage in long-term behaviour change supported by healthcare professionals.<sup>(1-4,103,189-191)</sup>

#### **End-of-programme assessment and discharge: the Model of Care**

- The end-of-programme assessment should follow a similar process as the initial assessment and should be undertaken across all risk factor and clinical areas.
- Standardised assessment tools used at the initial assessment should be repeated at the end-of-programme assessment.
- Referral to services for issues identified during the programme should be considered and finalised with the patient e.g. psychology, vocational services etc.
- It is important to reinforce the central role of the patient's own goal setting, the need for self-care, self-management and ownership of relevant strategies including adherence to medication in order to reduce cardiovascular disease risk and maximise return to work or other pursuits. Cardiac rehabilitation staff should highlight the importance of ongoing patient self-management activities as a central component of the long-term management of a patient's chronic condition(s), as opposed to it being a short-term practice alone. A joint care plan between the patient and the cardiac rehabilitation team will be developed to support the patient's needs and their ongoing self-management going forward. The care plan should be shared with the patient and their GP.
- There are a range of resources within and beyond the healthcare system which can provide additional support for self-management of cardiac conditions. The cardiac rehabilitation team has a key role in signposting patients to such services:
  - Each cardiac rehabilitation team should be aware of facilities local to the patient and be able to signpost patients to established services in their communities. To that end, the team should work closely with their local Self-Management Support Co-ordinator, Health Promotion Officer and Smoking

Cessation Officer in their aligned hubs. The local Sports Partnership and Health and Wellbeing team in their Community Health Organisation are further key contacts.

- The Self-Management Support webpage ([www.hse.ie/selfmanagementsupport](http://www.hse.ie/selfmanagementsupport)) is a repository of self-management support resources, with separate sections for healthcare professionals and for people living with long term health conditions, including heart conditions. It also has a listing of contact details for Self-Management Support Coordinators.
- The Self-Management Support Directories are an online resource for healthcare professionals that identify a range of services and programmes available by region for individuals living with long-term conditions such as cardiovascular disease.<sup>(192)</sup>
- Patients can also be signposted to HSE-hosted information to support them in self-managing their chronic condition(s). The available information includes details about voluntary groups such as the Irish Heart Foundation, Croí and The Heartbeat Trust; self-management tools such as the Heart Failure Traffic Light Guide and the fluid tracker app; links to National Heart Programme videos and other trusted sources of information on cardiovascular disease; exercise resources; and information on psychosocial supports including counselling services, social prescribing and employment supports.<sup>(193)</sup>
- As part of discharge planning, the cardiac rehabilitation team should inform eligible patients about the HSE's *Structured Chronic Disease Management Programme in General Practice* which is available to all patients aged over 18 years of age who have a Medical Card or GP Visit Card and who have a diagnosis of at least one of the following chronic conditions: heart failure, ischaemic heart disease (heart attack, angina), atrial fibrillation and stroke, as well as type 2 diabetes mellitus, COPD and asthma.<sup>(194)</sup> This programme permits each patient up to four visits per year with their practice nurse and GP to monitor their chronic disease(s) and provides opportunity to work in partnership with the patient to identify and agree goals as part of the development of an ongoing care plan that supports proactive care and self-management of their cardiovascular condition and co-morbidities.
- A discharge letter, including the care plan, should be sent to the patient's GP and Cardiologist following the cardiac rehabilitation programme.

### 4.3.7 Step 7: Performance monitoring and service improvement

Audit and evaluation are core components of cardiac rehabilitation and are recommended to improve cardiac rehabilitation participation, delivery and outcomes.<sup>(3,9,17,127,195,196)</sup> The American College of Cardiology recommends that performance measures used for audit and evaluation should span the inpatient and outpatient care setting to measure communication and care co-ordination as well as effective clinical care.<sup>(195)</sup>

#### **Performance monitoring and service improvement: the Model of Care**

- Each cardiac rehabilitation centre will be required to collect and report data on key performance indicators to the Local Governance Group within their region on a regular basis for the purpose of performance monitoring and service improvement (Table 12, page 67). The Chronic Disease Community Specialist Team Operational Lead aligned to the hub will oversee the return of data in line with nationally agreed pathways.
- All cardiac rehabilitation services should undertake at least one audit of its service per year to continuously improve the quality of the service.

## 4.4 Enablers and infrastructure

To provide a safe, functional and effective environment for cardiac rehabilitation, recommendations outlined in national<sup>(197-201)</sup> and international policies and procedures should be taken into consideration.<sup>(3,4,19,202)</sup>

Education and training for cardiac rehabilitation staff is also a critical enabler for delivery of high quality cardiac rehabilitation. Staff must be supported to engage in training and professional development activities to enable them to deliver a comprehensive, evidence-based multimodal cardiac rehabilitation programme to patients.

### Infrastructure: the Model of Care

Table 10 outlines the infrastructural requirements for cardiac rehabilitation delivery within the *Model of Care for Integrated Cardiac Rehabilitation*.

Table 10: Infrastructure for cardiac rehabilitation delivery

Space and facilities
Space must meet the requirement of the activity (exercise area, education room and consultancy room). Furthermore, there should be a confidential area where patient records and charts can be securely stored.
There must be emergency access to all patient areas.
Floor space must allow easy access of personnel and equipment (recommended 3.7-4.2 sq.m per patient) and ceiling height in exercise areas at a minimum of 3 metres.
Humidity at or below 60% and temperature not in excess of 22°C.
Water source immediately available to exercising patients and sound levels kept to comfortable level for patients.
Regularly checked telephone and emergency call system available in all exercise areas.
Separate office for cardiac rehabilitation staff equipped with phones, computers, office furniture.
Separate education room for cardiac rehabilitation.
Accessible toilet and shower facilities for patients.
Confidential space to facilitate patient consultations.
Equipment
Working and correctly maintained AED should be available (Resuscitation trolley available if in an acute hospital setting). <sup>(203-205)</sup>
Equipment should be commercial grade, with rigorous maintenance guidelines to ensure patient safety. Scheduled maintenance, preventive maintenance and cleaning programs for all exercise equipment should be documented. Damaged equipment or equipment not functioning should be designated as out of service until repairs are completed.



Regular calibration for treadmills, cycle ergo meters should occur as recommended by the manufacturer.

Staff should be thoroughly trained in the use of the equipment and manufacturer information and advice on use, calibration and troubleshooting should be readily available.

An examination plinth and a chair should be available onsite.

Equipment for patient assessment should be available and accessible including:

- stethoscope
- 24 hour BP monitors
- weighing scales
- measuring tape
- height measure
- portable sphygmomanometer
- electrocardiogram (ECG) monitors
- pulse oximeters
- portable oxygen
- rating of perceived exertion (RPE) charts
- telemetry monitoring, depending on local team preference and/or patient need

Exercise equipment should include:

- Treadmill
- Rowing machine
- Bicycle
- Climber
- Cross trainer
- Stepper
- Step
- Weights
- Theraband

## IT Infrastructure

Equipment, including docking station, headset and monitor, to enable video conferencing and recording of cardiac rehabilitation education and exercise sessions.

Access to broadband and a secure online portal to support the delivery of cardiac rehabilitation sessions remotely, as required. This IT solution should also include a platform where patients can access information specific to them or online learning modules.

An electronic booking system to facilitate efficient management of referrals.

IT hardware.

IT software (stand alone with web enabled systems) including access to a reliable, secure, HSE-approved teleconferencing platform, as well as a digital platform that acts as an information repository for patient information, previous classes and educational videos.

Patient wearable devices as appropriate with the supporting hardware and software.

Relevant IT license tools.

Facilities to ensure compliance with General Data Protection Regulation (GDPR) including awareness training.

## 5. Clinical indicators and performance measures in cardiac rehabilitation

It is important that this clinical model of care includes a mechanism for monitoring cardiac rehabilitation programmes. This is advocated across many guidelines for cardiac rehabilitation to ensure the delivery of a safe, high-quality, evidence-informed and equitable service.<sup>(3,17,196,206,207)</sup>

In the first instance, the cardiac rehabilitation service will be monitored and evaluated as part of the wider *Integrated Care Programme for the Prevention and Management of Chronic Disease* as it is rolled out as part of the *Enhanced Community Care Programme*. However, this model of care proposes that a dedicated national quality improvement process be implemented through the establishment of a national body to support collection, collation, analysis and reporting of a suite of structure, process and outcome metrics which draw on best evidence for cardiac rehabilitation and are outlined below. This process would support service improvement initiatives and best practice in cardiac rehabilitation by:

- Providing data that would support national and regional service planners to design, resource and implement cardiac rehabilitation services to meet population need
- Identifying accessibility challenges or identifying hard to reach groups in a particular area so that adaptations could be made to support increased accessibility and equity of the services
- Supporting research to improve and expand cardiac rehabilitation services to optimise patient experience and outcomes e.g. describing the clinical and cost effectiveness of cardiac rehabilitation services and new initiatives.

While the need to establish a national audit is clear, it will take time to introduce such a service. In the interim, a set of organisational metrics (Table 11) are required to be collected and reported to the Local Governance Group and the Office of the *Enhanced Community Care Programme* on a regular basis. In addition to the organisational metrics, it is recommended that additional data to inform on activity and outcomes be collected by all cardiac rehabilitation teams and be reviewed, discussed and acted upon at local level. Tables 12 and 13 below propose a set of clinical key performance indicators and a minimum cardiac rehabilitation dataset that may be adopted/adapted by cardiac rehabilitation services. The introduction of the community patient care record in time will support electronic data collection, collation and reporting.

Table 11: Organisational key performance indicators for cardiac rehabilitation

Organisational metrics for phase III cardiac rehabilitation
n referrals received and accepted
n referrals received but not accepted
% patients offered a cardiac rehabilitation course who attend an initial assessment
average wait time (weeks) from receipt of referral to initial assessment
n cardiac rehabilitation sessions delivered (monthly)
n (%) of patients who had an initial assessment who attend the end of programme assessment

Table 12: Clinical key performance indicators for phase III cardiac rehabilitation

	Clinical Indicator	Indicator Statement
1	Waiting time from referral to date of initial assessment for patients in priority groups (Process measure)	% of patients in priority groups having an initial assessment within two weeks of referral per year
2	Waiting time from referral to date of initial assessment for patients in priority groups (Process measure)	% of patients in priority groups having an initial assessment within four weeks of referral per year
3	Improvement in exercise capacity at end of programme (Outcome measure)	% achieving physical activity target, as agreed in patient care plan, by end of programme per year
4	Smoking quit rate at end of programme (Outcome measure)	% of patients who are smokers who achieve a four week quit period by end of programme per year
5	Change in depression or anxiety score with HADS (or PHQ9, GAD7 or CORE as appropriate) (Outcome measure)	% patients with change in HADS depression or anxiety score (or PHQ9, GAD7 or CORE as appropriate) by end of programme per year
6	Dietary change (Outcome measure)	% of patients achieving a 2 point increase in Mediterranean Diet Score from baseline to end of programme
7	Blood pressure (Outcome measure)	% of patients with BP at target by end of programme per year <sup>i</sup>
8	LDL-C <sup>ii</sup> (Outcome measure)	% of patients with LDL-C at target by end of programme per year*

9	HbA1c <sup>iii</sup> (Outcome measure)	% of patients with diabetes with HbA1c at target by end of programme per year*
10	Change in quality of life score (Outcome measure)	% of patients with improvement in QoL score by end of programme per year

i Definition of blood pressure “at target”: BP <140/90 mmHg and <130/80 mmHg if tolerated

ii Definition of LDL-C “at target”: LDL-C <1.8 mmol/L

iii Definition of HbA1c “at target”: HbA1c <53 mmol/mol in individuals with type 2 diabetes mellitus

\*Treatment targets in line with the ESC guideline 2021.<sup>(16)</sup> Please refer to this guideline when considering appropriate treatment targets with each patient.

Table 13: Minimum dataset for each cardiac rehabilitation service

Minimum dataset for cardiac rehabilitation	
Demographics	
1	Unique ID
2	Year of birth
3	Sex
4	Insurance status
5	Full address
6	Personal/family history of premature cardiovascular disease
Cardiac rehabilitation programme	
7	Referral date
8	Initiating event /diagnosis
9	Initiating event date
10	Cardiac rehabilitation phase III start date
11	Location of cardiac rehabilitation programme
12	Site of cardiac rehabilitation programme (i.e. hospital/community/home/hybrid)
Initial assessment	
13	Smoking status
14	Weight (kg)
15	Height (m)
16	Body mass index (kg/m <sup>2</sup> )
17	Waist circumference
18	AUDIT-C screening tool
19	Blood pressure systolic

20	Blood pressure diastolic	
21	Cholesterol LDL, HDL	
22	Diet Quality Score e.g. Mediterranean diet score	
23	HbA1c	
24	HADS depression or anxiety scores (or PHQ9, GAD7 or CORE as appropriate)	
25	Quality of life score	
26	Heart Failure (NYHA)	
27	Fitness level (METS)	
28	Aspirin or dual antiplatelet	Y/N/Contraindicated
29	Beta-blocker	Y/N/Contraindicated
30	ACE/ARB	Y/N/Contraindicated
31	Direct-acting oral anticoagulant	Y/N/Contraindicated
32	Other medications (free text)	Y/N/Contraindicated
33	Statin	Y/N/Contraindicated
34	Other lipid-lowering therapy (Ezetimibe, Bempedoic Acid, PCSK9)	Y/N/Contraindicated
<b>End of programme assessment</b>		
35	Smoking status	
36	Weight (kg)	
37	Height (m)	
38	Body mass index (kg/m <sup>2</sup> )	
39	Waist circumference	
40	AUDIT-C screening tool	
41	Blood pressure systolic	
42	Blood pressure diastolic	
43	Cholesterol LDL, HDL	
44	Diet score	
45	HbA1c	
46	HADS depression or anxiety scores (or PHQ9, GAD7 or CORE as appropriate)	
47	Quality of life score	
48	Heart Failure (NYHA)	
49	Fitness level (METS)	
50	Aspirin or dual antiplatelet	Y/N/Contraindicated

51	Beta-blocker	Y/N/Contraindicated
52	ACE/ARB	Y/N/Contraindicated
53	Direct-acting oral anticoagulant	Y/N/Contraindicated
54	Statin	Y/N/Contraindicated
55	Other lipid-lowering therapy (Ezetimibe, Bempedoic Acid, PCSK9)	Y/N/Contraindicated
56	Cardiac Rehabilitation phase III completed date	
57	Number of sessions completed	
58	Survival status at end of programme	
<b>Data relating to organisation of cardiac rehabilitation course</b>		
59	Duration of cardiac rehabilitation course (weeks)	
60	Number of sessions per course	
61	Data on staffing per course (further elaboration with managers)	
62	Telemetry offered by local team during exercise component of cardiac rehabilitation	(Y/N)

### *Experience and outcome measures*

Reflecting the move towards a person-centred integrated care system for the prevention and management of chronic disease, the *Integrated Care Programme for the Prevention and Management of Chronic Disease* has been working with the Office of the *Enhanced Community Care Programme* to ensure a focus on patient and staff experience measures as part of the national measurement and evaluation process for chronic disease services. Work is ongoing to implement a national approach to capturing staff experience, patient reported experience measures and patient reported outcome measures for all *Enhanced Community Care Programme*-funded services. This reflects the quadruple aim of high value care<sup>(208)</sup> and places an emphasis on taking a population health approach.

In the interim, it is essential that an approach to capturing patient experience and outcome measures as part of the above-described regional measurement and evaluation process should be agreed, implemented and acted upon at the local level. Patient-reported outcome measures (PROMs) are standardised validated instruments to measure patients' perceptions of their health status, their functional status, and their health-related quality of life and can assess the impact of a service such as cardiac rehabilitation on these dimensions of health e.g. Eq-5D-5L is a well-validated, reliable PROMs instrument suitable for measuring the impact of chronic disease on a patient.<sup>(209, 210)</sup> Patient experience measures such as patient surveys and patient narratives are often used in partnership with PROMs to provide more detail on patients' views on both the process and the outcome of care received.<sup>(211)</sup>

## 6. Recommendations to support implementation of the *Model of Care for Integrated Cardiac Rehabilitation*

The purpose of this chapter is to identify the issues which need to be addressed, and who should lead on addressing them, in the implementation phase of the *Model of Care for Integrated Cardiac Rehabilitation*.

Table 14: Recommendations to support the implementation of the *Model of Care for Integrated Cardiac Rehabilitation*

Recommendation to support implementation of the <i>Model of Care for Integrated Cardiac Rehabilitation</i>	Group responsible	Partners
Establish appropriate governance structures across hospital and community cardiac rehabilitation centres	<ul style="list-style-type: none"> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Operational Lead for aligned hubs</li> </ul>	<ul style="list-style-type: none"> <li>• Local Governance Group per Community Healthcare Organisation (CHO)/Regional Health Area (RHA)</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> <li>• Hospital Clinical Director/ Lead Cardiologist</li> <li>• Director of Nursing (DoN)/ Director Public Health Nursing (DPHN)</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>
Assess local service provision against Model of Care and estimated population need	<ul style="list-style-type: none"> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> </ul>	<ul style="list-style-type: none"> <li>• Operational Lead for aligned hubs</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> </ul>
Develop and progress plans to meet identified bottlenecks and service deficits	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Operational Lead for aligned hubs</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> </ul>	<ul style="list-style-type: none"> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Hospital Clinical Director/ Lead Cardiologist</li> <li>• DoN/DPHN</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>

<p>Develop an operational plan to support multidisciplinary and integrated working: identify, agree and implement joint ways of working across hospital -and community-based cardiac rehabilitation centres to deliver efficient, effective and person-centred cardiac rehabilitation services in line with Sláintecare, the National Service Plan 2021-2024, the Enhanced Community Care Programme and the Cardiac Rehabilitation Model of Care</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Operational Lead for aligned hubs</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> </ul>	<ul style="list-style-type: none"> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Hospital Clinical Director/ Hospital Cardiology Lead where available</li> <li>• DoN/DPHN</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>
<p>Work with the community cardiology specialist teams, primary care and acute hospital teams to develop locally-attuned end-to-end integrated care pathways in line with Sláintecare, the National Service Plan 2021-2024, the Enhanced Community Care Programme, the Heart Failure Model of Care and the Cardiac Rehabilitation Model of Care</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> <li>• Operational Lead</li> </ul>	<ul style="list-style-type: none"> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> <li>• Health and Wellbeing Teams</li> <li>• Health Promotion Officers based in the ambulatory care hubs</li> <li>• Self-Management Support (SMS) co-ordinators per CHO/RHA</li> <li>• DoN/DPHN</li> <li>• Clinical Director/ Lead Cardiologist</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>
<p>Identify and advocate for the necessary local resources to deliver the core components of cardiac rehabilitation in line with this Model of Care at every cardiac rehabilitation centre in Ireland (hospital and community) in order to meet population need</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology, Clinical Working Group per CHO/RHA</li> </ul>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> <li>• External partners (e.g. Irish Association for Cardiac Rehabilitation)</li> <li>• The Cardiology Interest Group of the Irish Nutrition and Dietetic Institute</li> <li>• Clinical specialists in cardiovascular disease</li> <li>• National Lead for Self-Management Education Chronic Disease</li> <li>• Dietitian Managers Group</li> </ul>



<p>Identify and advocate for the required level of dedicated dietetic specialist input to cardiac rehabilitation services across hospital and community to meet population need</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> <li>• Acute and Community Dietitian Managers</li> </ul>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> <li>• External partners (e.g. Irish Association for Cardiac Rehabilitation)</li> <li>• Cardiology Interest Group of the Irish Nutrition and Dietetics Institute</li> </ul>
<p>Identify staff training and education needs, including training required to deliver cardiac rehabilitation via multiple modes (face-to-face, virtual) and support staff to meet these training needs and to engage in professional development activities</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for the cardiac rehabilitation service</li> <li>• DoN/DPHN</li> <li>• Head of Discipline/Physiotherapy Manager</li> </ul>	<ul style="list-style-type: none"> <li>• Joint Local Governance Group per CHO/RHA</li> </ul>
<p>Ensure all eligible patients are offered phase I cardiac rehabilitation during their inpatient stay for their index event/diagnosis</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinator</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Medical/surgical team caring for patient</li> </ul>	<ul style="list-style-type: none"> <li>• DoN/DPHN</li> <li>• Cardiologist with clinical governance for the cardiac rehabilitation service</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>
<p>At time of discharge for index event, refer all eligible patients to a cardiac rehabilitation programme (phases II and III)</p>	<ul style="list-style-type: none"> <li>• Discharging medical or surgical team</li> </ul>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• DoN/DPHN</li> <li>• Hospital Clinical Director</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>

<p>Implement a locally agreed process for identifying, referring and offering all eligible patients a cardiac rehabilitation programme</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for the cardiac rehabilitation service</li> <li>• DoN/DPHN</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>	<ul style="list-style-type: none"> <li>• Joint Local Governance Group per CHO/RHA</li> </ul>
<p>Develop a cardiac rehabilitation referral form which summarises the patient's salient medical history, medication and physical examination and medical intervention results</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for the cardiac rehabilitation service</li> <li>• DoN/DPHN</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>	<ul style="list-style-type: none"> <li>• Joint Local Governance Group per CHO/RHA</li> </ul>
<p>Use a cardiovascular disease discharge bundle to support cardiac rehabilitation referral (phases II and III) at time of discharge for all eligible patients</p>	<ul style="list-style-type: none"> <li>• Discharging medical or surgical team</li> </ul>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinator</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• DoN/DPHN</li> </ul>
<p>Electronic referral to cardiac rehabilitation is preferred to support timely referral. It is recommended that hospitals and cardiac rehabilitation centres have access to a Healthlink/ Healthmail account so that they can send/receive referrals</p>	<ul style="list-style-type: none"> <li>• Hospital CEO</li> <li>• Operational Lead</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Leads per CHO/RHA and per acute hospital</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> </ul>

<p>Implement an electronic booking system for cardiac rehabilitation centres to facilitate efficient management of referrals</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Hospital CEO</li> <li>• CHO Chief Officer</li> <li>• Operational Lead for aligned hub</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Leads per CHO/RHA and per acute hospital</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• National Enhanced Community Care (ECC) Programme Office</li> </ul>
<p>Ensure provision of the necessary IT equipment and videoconferencing facilities in hubs and aligned hospital to ensure all patients are offered virtual cardiac rehabilitation for part/all of their cardiac rehabilitation programme as required</p>	<ul style="list-style-type: none"> <li>• Hospital CEO</li> <li>• CHO Chief Officer</li> <li>• Operational Lead for aligned hub</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Leads per CHO/RHA and per acute hospital</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• National Enhanced Community Care (ECC) Programme Office</li> </ul>
<p>Implement an initial assessment which takes a person-centred approach and addresses the core components of a comprehensive cardiac rehabilitation programme in line with this Model of Care</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> </ul>	<ul style="list-style-type: none"> <li>• DoN/DPHN</li> <li>• Hospital Clinical Director</li> <li>• CHO Chief Officer</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>
<p>Implement an end-of-programme assessment which is person-centred and reviews the parameters from the initial assessment, in line with this Model of Care</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> </ul>	<ul style="list-style-type: none"> <li>• DoN/DPHN</li> <li>• Hospital Clinical Director</li> <li>• CHO Chief Officer</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>
<p>At end of programme, support patients to sustain positive behavioural changes in the long-term by assessing their needs and referring them on to community-based programmes as appropriate e.g. Structured Chronic Disease Management Programme in General Practice, exercise programmes, patient support groups, smoking cessation services etc.</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> </ul>	<ul style="list-style-type: none"> <li>• Self-Management Support Co-Ordinator per CHO/RHA</li> <li>• Health Promotion Officer in the ambulatory care hub</li> <li>• Health and Wellbeing Teams per CHO/RHA</li> <li>• Smoking Cessation Officer based in the ambulatory care hub</li> </ul>

<p>Identify and support training needs for all cardiac rehabilitation staff to optimise use of evidence-based behaviour change techniques in cardiac rehabilitation services</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• DoN/DPHN</li> <li>• Head of Discipline/ Physiotherapy Manager</li> </ul>	<ul style="list-style-type: none"> <li>• Self-Management Support Co-ordinators per CHO/RHA</li> <li>• Making Every Contact Count (MECC) Programme</li> <li>• External partners</li> </ul>
<p>Develop a digital library of recommended resources for patient education</p>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> </ul>	<ul style="list-style-type: none"> <li>• Self-Management Support Co-ordinators</li> <li>• HSE Communications</li> <li>• External partners</li> </ul>
<p>Develop a set of nationally standardised information leaflets that can be printed to support patient engagement with phases I, II and III cardiac rehabilitation services</p>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> </ul>	<ul style="list-style-type: none"> <li>• HSE Communications</li> <li>• External partners</li> </ul>
<p>Develop and implement a digital platform where general and patient-specific information can be shared securely with individuals who are enrolled in a cardiac rehabilitation programme</p>	<ul style="list-style-type: none"> <li>• National ECC Programme Office</li> <li>• National Heart Programme</li> </ul>	<ul style="list-style-type: none"> <li>• Office of the Chief Information Officer (OoCIO)</li> </ul>
<p>Offer a cardiac rehabilitation programme of between eight and twelve weeks' duration</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation co-ordinators across hospital and aligned hubs</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> </ul>	<ul style="list-style-type: none"> <li>• Operational Lead</li> <li>• DoN/DPHN</li> <li>• Hospital Clinical Director</li> <li>• Head of Discipline/ Physiotherapy Manager</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> </ul>

<p>Develop and support implementation of a national curriculum to standardise the content of the educational component of the cardiac rehabilitation programme</p>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> </ul>	<ul style="list-style-type: none"> <li>• IACR and other external partners</li> </ul>
<p>Identify and describe the minimum standard of necessary training (both post-graduate training and CPD) required of cardiac rehabilitation service providers</p>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> </ul>	<ul style="list-style-type: none"> <li>• IACR and other external partners</li> </ul>
<p>Ensure access to dedicated space suitable for the delivery of cardiac rehabilitation in line with the specification outlined in this model of care</p>	<ul style="list-style-type: none"> <li>• CHO Chief Officer</li> <li>• Hospital CEO</li> <li>• Operational Lead per hub</li> </ul>	<ul style="list-style-type: none"> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Cardiac rehabilitation co-ordinators</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> <li>• National ECC Programme Office</li> </ul>
<p>Ensure access to full suite of equipment to support the delivery of cardiac rehabilitation in line with the specification outlined in this model of care</p>	<ul style="list-style-type: none"> <li>• CHO Chief Officer</li> <li>• Hospital CEO</li> <li>• Operational Lead per hub</li> </ul>	<ul style="list-style-type: none"> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Cardiac rehabilitation co-ordinators</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> <li>• National ECC Programme Office</li> </ul>

<p>Resource cardiac rehabilitation units to communicate effectively with patient's GP and Cardiologist utilising Healthmail and other technologies</p>	<ul style="list-style-type: none"> <li>• CHO Chief Officer</li> <li>• Hospital CEO</li> <li>• Operational Lead per CHO</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Lead per CHO/RHA</li> <li>• Cardiac rehabilitation co-ordinators</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> <li>• National ECC Programme Office</li> </ul>
<p>Commence collection and return of a minimum set of metrics by all CHOs to the Office of the ECC for collation, analysis and reporting</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation Co-ordinators</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> <li>• Operational Lead</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation</li> </ul>	<ul style="list-style-type: none"> <li>• CHO Chief Officer</li> <li>• Joint Local Governance Group per CHO/RHA,</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> </ul>
<p>Implement Patient Reported Experience Measures and Patient Reported Outcome Measures as part of the measurement and evaluation process for cardiac rehabilitation services nationally</p>	<ul style="list-style-type: none"> <li>• Integrated Care Programme for the Prevention &amp; Management of Chronic Disease</li> <li>• National ECC Programme Office</li> </ul>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> <li>• Regional cardiac rehabilitation services</li> <li>• External partners</li> </ul>
<p>Embed clinical audit within individual units and also at regional and national level</p>	<ul style="list-style-type: none"> <li>• Cardiac rehabilitation Co-ordinators</li> <li>• Cardiologist with clinical governance for cardiac rehabilitation service</li> <li>• Senior cardiac rehabilitation physiotherapists across hospital and aligned hubs</li> </ul>	<ul style="list-style-type: none"> <li>• Joint Local Governance Group per CHO/RHA</li> <li>• Cardiology Clinical Working Group per CHO/RHA</li> <li>• National Heart Programme</li> </ul>
<p>Identify and advocate for resources to establish a national audit of cardiac rehabilitation</p>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> </ul>	<ul style="list-style-type: none"> <li>• External partners</li> </ul>
<p>Support research to explore clinical and cost effectiveness of harnessing digital technology in the delivery of cardiac rehabilitation services</p>	<ul style="list-style-type: none"> <li>• National Heart Programme</li> </ul>	<ul style="list-style-type: none"> <li>• Regional cardiac rehabilitation services</li> <li>• External partners</li> </ul>

Lead on workforce planning activities to facilitate expansion and evolution of cardiac rehabilitation services to meet local population need	<ul style="list-style-type: none"><li>• National Heart Programme</li><li>• ECC Programme Office</li></ul>	<ul style="list-style-type: none"><li>• Regional cardiac rehabilitation services</li><li>• External partners</li></ul>
Promote and support national research into cardiac rehabilitation	<ul style="list-style-type: none"><li>• National Heart Programme</li></ul>	<ul style="list-style-type: none"><li>• Regional cardiac rehabilitation services</li><li>• External partners</li></ul>

## Acknowledgements

A National Heart Programme Clinical Advisory Group was established by the Royal College of Physicians to provide clinical oversight and strategic guidance to the National Heart Programme. The Prevention Sub-Group of the Clinical Advisory Group, charged with the development of this model of care, co-opted additional members to obtain expert input to the development and finalisation of this document. This document incorporates all feedback received from stakeholders and has been formally endorsed by the Chief Clinical Officer Clinical Forum, the National Heart Programme Clinical Advisory Group and the National Clinical Advisor and Group Lead for Chronic Disease. We would like to thank all stakeholders for their time and input to developing this document.

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<b>Attendees</b>	
Dr Linda Drummond	Programme Manager, National Heart Programme



## Subject matter experts

Name	Role	Subject matter expertise
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## National Heart Programme Clinical Advisory Group membership

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Dr Charles McCreery	Consultant Cardiologist, St Vincent’s University Hospital
Prof David Kerins	Consultant Cardiologist, Mercy University Hospital
Dr Deirdre Ward	Consultant Cardiologist, Tallaght University Hospital
Prof Emer Joyce	Consultant Cardiologist, Mater Misericordiae University Hospital
Dr Gerard Fahy	Consultant Cardiologist, Cork University Hospital
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Ms Michelle Carey	Former Nurse Lead, National Heart Programme
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Dr Linda Drummond	Programme Manager, National Heart Programme
Ms Regina Black	Programme Manager, National Heart Programme

## Glossary

**Acute coronary syndrome** - the term for a group of conditions that suddenly stop or severely reduce blood from flowing to the heart muscle. When blood cannot flow to the heart muscle, the heart muscle can become damaged. Heart attack and unstable angina are both acute coronary syndromes (ACS).

**Acute myocardial infarction (heart attack)** - The damage or death of an area of the heart muscle (myocardium) resulting from a blocked blood supply to the area. The affected tissue dies, injuring the heart.

**Angina or angina pectoris** - Chest pain that occurs when diseased blood vessels restrict blood flow to the heart.

**Angiography** - An x-ray technique in which dye is injected into the chambers of the heart which lets doctors measure the blood flow and blood pressure in the heart chambers and see if the coronary arteries are blocked.

**Arrhythmia (or dysrhythmia)** - An abnormal heartbeat.

**Blood pressure** - The force or pressure exerted by the heart in pumping blood; the pressure of blood in the arteries.

**Body mass index (BMI)** - A number that indicates an increased risk of cardiovascular disease from a person being overweight. BMI is calculated using a formula of weight in kilograms divided by height in meters squared ( $BMI = W [kg]/H [m^2]$ ).

**Cardiac catheterisation** - A procedure that involves inserting a fine, hollow tube (catheter) into an artery, usually in the groin area, and passing the tube into the heart.

**Cardiomyopathy** - A disease of the heart muscle that leads to generalized deterioration of the muscle and its pumping ability.

**Cardiovascular disease** - A general term referring to conditions affecting the heart (cardio) and blood vessels (vascular system).

**Cholesterol** - An oily substance that occurs naturally in the body, in animal fats and in dairy products, and that is transported in the blood. Limited amounts are essential for the normal development of cell membranes. Excess amounts can lead to coronary artery disease.

**Coronary artery bypass (CAB)** - Surgical rerouting of blood around a diseased vessel that supplies blood to the heart. Done by grafting either a piece of vein from the leg or a piece of the artery from under the breastbone.

**Coronary heart disease (CHD)** - Disease of the heart caused by a build-up of atherosclerotic plaque in the coronary arteries that can lead to angina pectoris or heart attack, also known as ischemic heart disease (IHD).

**Diabetes (diabetes mellitus)** - A disease in which the body doesn't produce or properly use insulin. Insulin is needed to convert sugar and starch into the energy used in daily life.

**Diastolic blood pressure** - The lowest blood pressure measured in the arteries. It occurs when the heart muscle is relaxed between beats.

**Exercise stress test (EST)** - A common test to help doctors assess blood flow through coronary arteries in response to exercise, usually walking, at varied speeds and for various lengths of time on a treadmill. A stress test may include use of electrocardiography, echocardiography, and injected radioactive substances.

**High density lipoprotein (HDL)** - A component of cholesterol, HDL helps protect against heart disease by promoting cholesterol breakdown and removal from the blood; hence, its nickname "good cholesterol."

**Hypertension** - High blood pressure.

**Low density lipoprotein (LDL)** - The body's primary cholesterol-carrying molecule. High blood levels of LDL increase a person's risk of heart disease by promoting cholesterol attachment and accumulation in blood vessels; hence, the popular nickname "bad cholesterol."

**Mortality** - The total number of deaths from a given disease in a population during an interval of time, usually a year.

**Non-ST-segment-elevation myocardial infarction (NSTEMI)** - The milder form of the 2 types of heart attack, an NSTEMI does not produce an ST-segment elevation on an electrocardiogram. See also STEMI.

**Obesity** - A complex chronic disease characterised by excess or dysfunctional adiposity that impairs health.

**Pacemaker** - A surgically implanted electronic device that helps regulate the heartbeat.

**Percutaneous coronary intervention (PCI)** - Any of the non-invasive procedures usually performed in the cardiac catheterization laboratory.

**Prevalence** - The total number of cases of a given disease that exist in a population at a specific time.

**Revascularization** - A procedure to restore blood flow to the tissues. Coronary artery bypass surgery is an example of a revascularization procedure.

**Risk factor** - When referring to heart and blood vessels, a risk factor is associated with an increased chance of developing cardiovascular disease, including stroke.

**ST-segment-elevation myocardial infarction (STEMI)** - The more severe form of the 2 types of heart attack. See also NSTEMI. A STEMI produces a characteristic elevation in the ST segment on an electrocardiogram.

**Stroke** - A sudden disruption of blood flow to the brain, either by a clot or a leak in a blood vessel.

**Systolic blood pressure** - The highest blood pressure measured in the arteries. It occurs when the heart contracts with each heartbeat.

**Transient ischemic attack** - A stroke-like event that lasts only for a short time and is caused by a temporarily blocked blood vessel.

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## Appendices

### Appendix 1: Detailed patient pathway for the *Model of Care for Integrated Cardiac Rehabilitation*

Patient Pathway for the <b>Model of Care for Integrated Cardiac Rehabilitation</b>		Responsibility
<b>Step 1:</b> Phase I Cardiac Rehabilitation and Referral to Phases II and III	<ul style="list-style-type: none"> <li>• Early inpatient contact with cardiac rehabilitation services and encouragement to engage in on-going cardiac rehabilitation post-discharge.</li> <li>• Automatic electronic referral of all eligible patients to the patient's preferred cardiac rehabilitation centre (for phases II and III) prior to discharge or within 24 hours of discharge: both patient preference and clinical judgement should be considered with respect to the preferred location for cardiac rehabilitation (i.e. hospital or ambulatory hub).</li> <li>• Completion of the cardiovascular disease discharge bundle.</li> </ul>	Hospital Team, Cardiac Rehabilitation Team
<b>Step 2:</b> Managing the Referral	<ul style="list-style-type: none"> <li>• Active management of the referral in line with locally agreed integrated referral pathway.</li> <li>• Triage, using information provided by the referrer.</li> <li>• Patient is contacted with invitation to participate in phases II and III and to discuss their preferences with regard to where and how phases II and III are delivered (i.e. hospital, ambulatory hub, virtual or combination thereof).</li> <li>• Initial assessment should be offered within two weeks of discharge and not later than four weeks.</li> <li>• Referrals from priority patient groups should be accepted up to one year following their discharge.</li> </ul>	Cardiac Rehabilitation Team
<b>Step 3:</b> Phase II Cardiac Rehabilitation	<ul style="list-style-type: none"> <li>• A structured phone call or home visit undertaken by a member of cardiac rehabilitation team.</li> <li>• Patient is encouraged to participate in cardiac rehabilitation.</li> <li>• Building on information imparted in phase I regarding healthy lifestyle habits and addressing specific cardiovascular risk factors.</li> <li>• Discussion regarding involvement of family, carers or other support persons.</li> </ul>	Cardiac Rehabilitation Team
<b>Step 4:</b> Phase III Initial Assessment and Person-Centred Care Plan	<ul style="list-style-type: none"> <li>• The patient voice should be central to the initial assessment and care plan development.</li> <li>• Individualised patient-tailored interview incorporating core components of initial assessment.</li> <li>• Functional capacity testing, risk stratification and exercise prescription undertaken by an exercise professional.</li> <li>• Comprehensive phase III cardiac rehabilitation programme jointly developed and agreed with the patient.</li> </ul>	Cardiac Rehabilitation Team



<p><b>Step 5:</b> Phase III Delivery of Standardised Set of Cardiac Rehabilitation Components</p>	<ul style="list-style-type: none"> <li>• Delivery of standard set of core components: behaviour change, education, physical activity, smoking cessation, dietary intervention, psychosocial health and medical risk factor management.</li> </ul>	<p>Cardiac Rehabilitation Team</p>
<p><b>Step 6:</b> End of Programme Assessment and Discharge</p>	<ul style="list-style-type: none"> <li>• A standardised end-of-programme assessment undertaken.</li> <li>• A joint care plan between the patient and the cardiac rehabilitation team agreed to support the patient's self-management going forwards.</li> <li>• Signposting to community-based services to support long-term adherence to positive behavioural changes.</li> <li>• A discharge letter, including the care plan, forwarded to the patient's GP and Cardiologist.</li> </ul>	<p>Cardiac Rehabilitation Team</p>
<p><b>Step 7:</b> Evaluation of Cardiac Rehabilitation Service</p>	<ul style="list-style-type: none"> <li>• Organisational metrics reported to Local Governance Group and Office of the <i>Enhanced Community Care Programme</i>.</li> <li>• Ongoing measurement and evaluation of cardiac rehabilitation service at local and national levels.</li> </ul>	<p>Cardiac Rehabilitation Team</p>

## Appendix 2: Example cardiovascular disease discharge bundle

# Cardiovascular Disease Discharge Bundle

Patient Details

1. This form should be completed for patients diagnosed with one or more of the following conditions: ACS, post-revascularisation procedure (elective or non-elective) and heart failure admission
2. This form must be completed by a member of the clinical team prior to discharge

<p><b>Medication</b></p>	<p>Medication review completed by pharmacist prior to discharge</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> Patient refused <input type="checkbox"/></p> <p>The patient is discharged on the following medications:</p> <p>ACE-i <input type="checkbox"/></p> <p>B-blocker <input type="checkbox"/></p> <p>Statin <input type="checkbox"/></p> <p>Other lipid-lowering agent <input type="checkbox"/></p> <p>Anti-thrombotic (antiplatelet or anticoagulant) <input type="checkbox"/></p> <p>If any of the above medications are not being prescribed on discharge- please indicate reasons why</p> <p>_____</p> <p>_____</p>
<p><b>Referral to cardiac rehabilitation service</b></p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Patient refused <input type="checkbox"/></p> <p>Already completed <input type="checkbox"/></p> <p>If "No" please indicate reasons why, noting that guidelines recommend all such patients attend cardiac rehabilitation</p> <p>_____</p> <p>_____</p>
<p><b>Referral to smoking cessation services</b></p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Patient refused <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p>

<b>Follow up for review arranged</b>	Yes <input type="checkbox"/> No <input type="checkbox"/> Patient refused <input type="checkbox"/>  N/A <input type="checkbox"/>  If yes, please state: _____ (Consultant, CNS, GP)
<b>A copy of this discharge bundle form has been shared with:</b>	The patient <input type="checkbox"/> Their nominated caregiver <input type="checkbox"/> The GP <input type="checkbox"/> The cardiac rehabilitation service <input type="checkbox"/>
Print name: _____ IMC Registration Number: _____  Signature: _____ Date: _____	

## Appendix 3: HSE QUIT Smoking Services

The HSE QUIT Smoking Service includes the provision of intensive stop smoking support, which is delivered by trained Stop Smoking Advisors. The Smoking Advisors' role includes the delivery of intensive behavioural support, using a client-centred approach, as well as administration or referral for stop smoking medications to support a quit attempt.

Intensive stop smoking support may be delivered in a variety of ways: face-to-face (individually or in a group), by telephone, online or a combination of these. An intensive intervention (session) is a consultation which lasts in excess of 10 minutes. The Standard Treatment Programme outlined here consists of a minimum of nine sessions as follows:

Session Number	Type of Session
1	Pre-Quit Assessment
2	Quit Date
3	1 week post Quit Date
4	2 Weeks post Quit Date
5	3 Weeks post Quit Date
6	4 Weeks post Quit Date
7	12 weeks post Quit Date
8	26 weeks post Quit Date
9	52 weeks post Quit Date

There are a number of ways to make a referral to local or national HSE QUIT Smoking Services. The majority of services use the national IT patient management system to record service provision and monitor service users quitting progress.

1. Referrals can be made using the HealthLink application (by selecting HSE QUIT Smoking Services from the drop-down menu). The HealthLink application is now in a number of acute and community services.
2. Any healthcare professional can apply to become a Referrer on QuitManager (the national patient management system for HSE QUIT Smoking Services). Once the health professional or admin staff member is registered to refer clients, referrals can quickly and easily be made using a web link. In this way a report can be created subsequently by the Tobacco Free Ireland Programme from the QuitManager system to track and monitor referral uptake within cardiac rehabilitation programmes and Chronic Disease hubs.
3. Referrals can also be made by completing the QUIT referral form and emailing the completed form to the secure email at [QUIT@healthmail.ie](mailto:QUIT@healthmail.ie). Referrals can also be made by emailing the referral to a local service, details of which are available [here](#).

## Appendix 4: Initial assessment for diet and weight management

The nutrition care process (NCP) is a validated process for assessment and provision of nutrition and dietetic care, undertaken by a registered dietitian.<sup>(i)</sup> The 'Core Competences for the Diet Component for cardiovascular disease prevention and rehabilitation Services' (BACPR, 2019) outline the competences of the dietitian in conducting an assessment of the individual.<sup>(ii)</sup> The 'Medical Nutrition Therapy in Obesity Management' Chapter in the ASOI guidelines also provide an outline of the NCP assessment of individuals living with obesity.<sup>(iii)</sup>

This is summarised as follows:

- A review of medical history, social history, relevant co-morbidities, surgical and diagnostic procedures completed to date
- Biochemistry including lipid profile, blood glucose, any electrolyte or micronutrient abnormalities
- Medications
- Nutrition focused physical findings
- Anthropometry and nutritional requirements/targets (as per evidence based guidelines, based on gender, age and disease related reference standards)
- Food and nutrition related history (assess current and past dietary patterns and food related behaviours (e.g. disordered eating) utilising diet history recording methods e.g. 24 hour recall, food diary, food frequency questionnaire and/or dietary quality assessment tools e.g. Mediterranean diet score tool<sup>(iv)</sup>)
- Assess and discuss patient's understanding of nutrition knowledge in relation to risk factors and in line with current dietary guidelines and evidence
- Review alcohol intake utilising AUDIT-C screening tool
- Identification and summary of nutritional issues and barriers to change
- Individualised goal setting and recording of agreed nutrition care plan
- Monitor, review and adapt the nutrition care plan in response to the individual's motivation, needs, ability and medical status

i. Nutrition care process and model part I: the 2008 update. J Am Diet Assoc. 2008;108(7):1113-7. Available from: <https://dx.doi.org/10.1016/j.jada.2008.04.027>

ii. British Association for Cardiovascular Prevention and Rehabilitation. Core Competences for the Diet Component: Healthy Eating and Body Composition for Cardiovascular Disease Prevention and Rehabilitation Services 2019. Available from: [https://www.bacpr.org/\\_data/assets/pdf\\_file/0023/39434/633\\_BACPR\\_Dietetic\\_Compentences\\_FINAL\\_2019.pdf](https://www.bacpr.org/_data/assets/pdf_file/0023/39434/633_BACPR_Dietetic_Compentences_FINAL_2019.pdf)

- iii. Breen C, O'Connell J, Geoghegan J, O'Shea D, Birney S, Tully L, et al. Obesity in Adults: A 2022 Adapted Clinical Practice Guideline for Ireland. *Obes Facts*. 2022;15(6):736-52. Available from: <https://dx.doi.org/10.1159/000527131>
- iv. McEvoy CT, Moore SE, Appleton KM, Cupples ME, Erwin CM, Hunter SJ, Kee F, McCance D, Patterson CC, Young IS, McKinley MC, Woodside JV. Trial to Encourage Adoption and Maintenance of a Mediterranean Diet (TEAM-MED): Protocol for a Randomised Feasibility Trial of a Peer Support Intervention for Dietary Behaviour Change in Adults at High Cardiovascular Disease Risk. *Int J Environ Res Public Health*. 2018 May 31;15<sup>(6)</sup>:1130. Available from: <https://www.mdpi.com/1660-4601/15/6/1130>





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