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Guidance for setting up a Virtual Pulmonary Rehabilitation Programme

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* Refer to HSE National Framework for developing Policies, Procedures, Protocols and Guidelines (PPPGs)

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Abbreviations

6MWT	Six Minute Walk Test
ABC Questionnaire	Activities-specific Balance Confidence Questionnaire
ABC Score	Activities-specific Balance Confidence Score
ACT	Asthma Control Test
ANP	Advanced Nurse Practitioner
ATS	American Thoracic Society
Borg	Borg rating of perceived breathlessness
BMI	Body Mass Index
BTS	British Thoracic Society
CAT	COPD Assessment Test
CNS	Clinical Nurse Specialist
COPD	Chronic Obstructive Pulmonary Disease
ERS	European Respiratory Society
ESWT	Endurance Shuttle Walk Test
FITT	Frequency, Intensity, Time and Type
GAD-7	Generalised Anxiety Disorder Assessment Test
GDPR	General Data Protection Regulation
GP	General Practitioner
HADS	Hospital Anxiety and Depression Score
HEP	Home Exercise Programme
HR	Heart Rate
HSCP	Health and Social care professional
HSE	Health Service Executive
ISWT	Incremental Shuttle Walk Test
IT	Information Technology
MECC Framework	Make Every Contact Count framework
mMRC	Modified Medical Research Council
NCP	National Clinical Programme
NICE	National Institute for Clinical Excellence
PAH	Pulmonary Artery Hypertension
PHQ-7	Patient Health Questionnaire
PR	Pulmonary Rehabilitation
PPG	Policy, Procedures and Guidelines
PRP	Pulmonary Rehabilitation Programme
SGRDQ	St Georges Respiratory Disease Questionnaire
SOP	Standard Operating Procedure
SpO2	Saturation of Peripheral Oxygen
STS	Sit to Stand
TUG	Timed Up and Go test
QOL	Quality of Life Score
VPR	Virtual Pulmonary Rehabilitation

Glossary of Terms

- Telerehabilitation is a term used for the remote delivery of various methods of exercise programmes using virtual platforms and/or telephone support.
- Virtual Pulmonary Rehabilitation (VPR) refers to a supervised PR 6-8 week programme completed via a live virtual platform.
- Face-to-face PR refers to traditional 6-8 week PRP where patients physically attend a hospital/community setting and are supervised by a respiratory physiotherapist/nurse during the PRP.
- Home based exercise programme is carried out by the patient in their home with support from respiratory physiotherapist/ nurse and may include home visits and/or telephone support.
- Web based PR refers to computer/app based PR available for patients to work through independently.

1.0 Purpose

The purpose of this guidance document is to inform all staff working in the Health Service in particular those referring to Pulmonary Rehabilitation services about the VPR programme and also to provide direction and guidance both for staff currently working in established VPR services and for those who wish to establish a VPR service.

1.1 Scope

1.1.1 Target users include:

- VPR service providers (Physiotherapists, Nurses, Managers and Medical Staff) within the Health Service Executive (HSE).
- All those referring patients to the VPR service.
- Organisations and Service Managers who may be setting up new VPR services.

1.1.2. Population to who it applies:

- All patients referred to or enrolled in the VPR service.

1.2 Objective(s)

- To facilitate clinical evaluation of the service provided.
- To promote best practice within the VPR service.
- To ensure the service is equitable and accessible to a wide range of patients.
- To ensure safe provision of the VPR service, protecting patients and staff from avoidable adverse incidents.
- To ensure standardisation of practice at a local level in line with national and international guidelines.
- To ensure an alternative choice in service provision for patients who may not be able to attend face-to-face PR for different reasons e.g. geographical, transport or potential medical issues.

2.0 Introduction

2.1 Pulmonary Rehabilitation

The American Thoracic Society (ATS) /European Respiratory Society (ERS) Pulmonary Rehabilitation Statement (Spruit et al., 2013) defines Pulmonary Rehabilitation (PR) as "a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies that include, but are not limited to, exercise training, education, and behaviour change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health enhancing behaviours".

PR has established itself as a key management strategy in the treatment of people with chronic respiratory disease (British Thoracic Society (BTS), 2014). It is one of the most cost effective treatments for Chronic Obstructive Pulmonary Disease (COPD) and leads to an increase in exercise capacity, improved quality of life and decrease in emergency admissions and hospitalization rates (Ozmen et al., 2018).

Pulmonary rehabilitation provided to individuals with chronic respiratory diseases other than COPD (i.e. interstitial lung disease, bronchiectasis, cystic fibrosis, asthma, pulmonary hypertension, lung cancer, lung volume reduction surgery, and lung transplantation) and has demonstrated improvements in symptoms, exercise tolerance, and quality of life (Spruit et al., 2013).

PR programmes are comprised of individualized exercise programs and education (NICE, 2010) and have traditionally been delivered as face-to-face group sessions running over a 6-12 week period, with patients attending an exercise and educational session in a hospital/community setting twice a week. There is no consensus on the optimal duration of PR (McCarthy et al., 2015) however it is recommended that it runs for a minimum of 6 weeks (National Clinical Programme (NCP), 2020).

2.2 Virtual Pulmonary Rehabilitation

Virtual Pulmonary rehabilitation (VPR) is an ideal model to support respiratory PR services during periods of service disruption. Although the Covid-19 pandemic provided serious challenges to the provision of traditional face-to-face PR throughout Ireland, it provided us with an opportunity to further develop the role of tele-rehabilitation in the area of PR. Through local innovation, several centres developed VPR programmes. VPR was utilised to minimise the impact of restrictions on PR services and for those in quarantine or where social distancing measures were recommended. VPR now offers continued access for service users, prevents service interruption and is a viable alternative choice for those patients who may not be able to attend face-to-face PR. This guideline now provides a standardised approach to VPR.

It is important to make an informed decision to offer VPR, practitioners should ensure that they know and comply with local PPGs and have the appropriate technological capability to ensure safety and privacy. Patient's privacy and consent are of primary importance when offering VPR.

We strongly recommend you link in with experts in the field and read all guidelines proposed by the HSE and your professional associations prior to launching this VPR delivery model. These guidelines are referenced at the end of this document. We strongly recommend you complete the HSEland Module on PR prior to delivering a programme.

2.3. Access to VPR

VPR has the potential to improve access to PR as it removes the requirement for transport to/from PR venues and the associated time and costs associated with travelling to a venue. It also allows patient preference for home-based care. Providing patients with choice through the availability of multiple effective models of PR may allow patients to be offered the program in which they are most likely to succeed (Holland et al., 2021). Consistent with the vision of Sláintecare, VPR truly provides 'Right Care, Right Place, at the Right Time' (Government of Ireland, 2021). However, it is important to consider VPR uptake rates locally to ensure that patients aren't affected by digital health inequity, particularly if VPR is the only option offered to patients. Health literacy may be a barrier to participation in VPR and there may also be a shift of expenses to the patient regarding the purchase and upkeep of IT equipment and internet access. See Appendix 6 for resources to support digital inclusion.

2.4. Evidence base

Guidance on options for the safe provision of PR programs via telehealth modalities is outlined in this document. The information included is based on current available evidence. We acknowledge that the evidence for telehealth PR is not as strong as for centre-based PR.

Cox et al., (2021) conducted a Cochrane review on telerehabilitation for chronic respiratory disease. Their findings suggest that primary PR programs delivered by telerehabilitation can provide a clinically effective alternative to centre-based rehabilitation models. However, these results should be interpreted with caution due to the limited number of studies, and the relatively small number of participants. The review suggests that PR, or maintenance rehabilitation, delivered via telerehabilitation for people with chronic respiratory disease, probably achieves outcomes similar to those of traditional in-person, centre-based pulmonary rehabilitation. No safety issues were identified. A comprehensive initial assessment is an essential factor in ensuring patient safety (see section 8.0 for further information).

In November 2019 the first VPR service in Ireland was launched in Our Lady of Lourdes Hospital, Drogheda for patients living with COPD. This alternative model of PR demonstrated a positive completion rate, positive clinical outcomes and was well accepted by patients. For further information please see the Telehealth Practice Examples in Clinical Services (HSCP, 2021).

During the COVID-19 pandemic many services incorporated VPR into their practice to enable service delivery during periods of restrictions. The World Health Organisation (2020) recommends that tele-rehabilitation should be used to deliver rehabilitation services wherever appropriate and feasible during the Covid-19 pandemic. Since then the BTS (2021) recommends that in situations where it is possible to restart face-to-face training this is preferable due to the extensive and robust evidence of efficacy plus the added value that can be gained from face-to-face interaction. However, telerehabilitation has the potential to allow more people to access PR programmes and thus overcome common barriers to centre-based PR attendance, including issues associated with travel, transport and a lack of suitably qualified professionals to delivery programs (Cox et al., 2021).

The BTS Guideline (2021) recommends that post-exacerbation PR programmes should be delivered in the format of a supervised i.e. face to face intervention as there is insufficient evidence to support remote post-exacerbation pulmonary rehabilitation at this time.

3.0 Service Provision

3.1 Patient Population

VPR programmes are designed for patients with chronic respiratory disease who are currently on PR waiting lists or are suitable for a new referral and meet the inclusion criteria as outlined in section 6.0.

4.0 Resources Required for VPR

Appendix 6 contains information for those who may require support and education in using online devices and/or resources.

4.1. Required patient resources are:

- Access to an I.T. device- smart phone, tablet or laptop
- Internet access
- An email address
- A quiet room with a space suitable for exercise
- Equipment requirements will be discussed on enrolment

4.2. Service provider resources for VPR:

The HSE Telehealth Equipment Catalogue (2021) contains information regarding equipment and room setup for Telehealth. Recommended resources include:

- A large SMART TV screen IT device with cables to connect TV to computer.
- A computer/ laptop connected to the screen will be required to deliver the class.
- Use of WebEx/ MS Teams/Attend Anywhere platform (using a professional license) will support VPR delivery. Other platforms may become available to the HSE in the future that may also be appropriate for use.
- Wireless headphones with microphone and an external camera are optional but may reduce noise disruption and improve view.
- Systems should be put in place locally so that patients can return questionnaires without cost.

4.3. Staffing:

- The current PR guideline from the NCP Respiratory (2020) recommends the staff to patient maximum ratio is 1:8 for face-to-face exercise training.
- For VPR, a second person for IT and emergency support is recommended. This may be particularly important for the first number of classes.
- Other considerations regarding determining staffing resources include developing a concise escalation plan and SOP hould emergency support be required.
- Completing a trial run with IT system locally to ensure relevant staff and patients are competent with its use may help to determine staff requirements.

5.0 Roles and Responsibilities

Roles and Responsibilities should be discussed and adapted locally as appropriate. The following disciplines may be involved in VPR delivery:

Respiratory Consultant	Provides support and Clinical Governance to the VPR Programme. They will oversee and maintain clinical responsibility for the VPR Programme and will be available to discuss patient care if required. The Respiratory Consultant is responsible for decisions made by the team and for the performance of the service.
GP with Extended Role (GPwER)	A new evolving role which has the potential to provide support and Clinical Governance to a VPR Programme.
GP	Where agreed locally, GP will maintain clinical responsibility for patients they refer to the PR Programme and will be available to discuss patient care if required.
Clinical Specialist/Senior Physiotherapist The level of input in the VPR service from the Physiotherapist will depend on their roles and responsibilities and local arrangements. The following list of roles and responsibilities may vary in different teams.	PR Service Planning. Develop and manage referral, assessment and education pathways of VPR. Delivery of the exercise and educational components of the programme. Evaluation and review of the VPR service keeping abreast of latest developments in PR evidence and inform the future development of the service locally. Deliver care in line with programme guidelines. Record dataset for patients. Exercise prescription. Provide feedback as required to Respiratory Consultant/GP providing governance in collaboration with Local Governance/Oversight Group.
Staff Grade Physiotherapist	Delivery of the exercise and educational components of the programme. Deliver care in line with programme guidelines. Exercise prescription.
Respiratory Clinical Nurse Specialist The level of input in the VPR service from the Respiratory CNS/ANP will depend on their roles and responsibilities and local arrangements. The following list of roles and responsibilities may vary in different teams.	PR planning. Develop and manage referral, assessment and education pathways of VPR. Delivery of the exercise and educational components of the programme. Evaluation and review of the VPR service keeping abreast of latest developments in PR evidence and inform the future development of the service locally. Deliver care in line with programme guidelines. Record dataset for patients. Provide feedback as required to Respiratory Consultant/GP providing governance in collaboration with Local Governance/Oversight Group.
Physiotherapy Manager	Support the PR programme and VPR Physiotherapy team
Director/ Assistant Director of Nursing	Support the PR programme and VPR Nursing team
Operational Team Lead	Support the PR programme and VPR team

6.0 Referral pathway for VPR

6.1. Referral Source

The overall vision of the National Clinical Programme Respiratory, demonstrated within the End to End Models of Care for COPD (NCP Resp 2019) and Asthma (NCP Resp 2021) is to provide PR and VPR in an integrated fashion, ideally in a community setting. However, we acknowledge how some existing PR services are currently delivered in the footprint of an acute hospital. Regardless of the setting, all PR services should aspire to the provision of a single point of referral for PR within their wider Integrated Respiratory Service.

The NCP PR Guidance document (2020) states that if patients have a respiratory work-up and stable disease the following clinicians can refer patients to Pulmonary Rehabilitation:

- Respiratory specialists including physicians, surgeons, physiotherapists and nurses.
- General practitioners e.g. via Healthlink, email or letter.
- General physicians.
- Other Health and Social Care professionals.
- Community health professionals.

In all cases a standard PR referral form should be completed (Appendix 1).

6.2. Inclusion/Exclusion Criteria for Virtual PR Programmes

Inclusion Criteria	Exclusion Criteria
• Confirmed diagnosis of a chronic lungcondition#. • Functionally limited by dyspnoea despite optimal medical management (mMRC ≥2). • Motivated to participate and change lifestyle. • Ability to exercise independently and safely i.e. balance ABC score >67% or other validated Balance assessment tool. • Email/IT access and suitable device to view the class i.e. phone, tablet or laptop access* • Agreeable to download the relevant application for accessing the IT platform. • Agreeable to signing a disclaimer in which they agree that they are voluntarily taking part in the exercise class at their own risk and assume all risk of injury themselves.	• Uncontrolled cardiovascular conditions limiting participation in an exercise programme. • Significant orthopaedic, psychological or neurological conditions that reduce mobility or cooperation with physical training. • Suspected underlying malignancy. • New COVID-19 symptoms**.

#If a patient has been diagnosed with Long COVID it is recommended each case is discussed with the appropriate Respiratory Consultant or GP to ensure safety and suitability for the programme.
*Consideration for those with hearing or eyesight impairment who may require further support to access the service.
**If patients who meet the eligibility criteria and have had a recent hospital admission due to COVID-19 please consult with the patient's Consultant or GP to ensure safety and suitability for the programme.

Locally agreed inclusion/exclusion criteria, together with a clear understanding of the contraindications to exercise is vital and should be clearly documented in local departmental guidelines.

7.0 VPR Recruitment Process

- Patients will be contacted by the PR team and the following discussed prior to assessment.
- Patients referred to PR may be given the option of being assessed for a VPR programme if unable to attend a face-to-face PR or if they would prefer to access VPR. The structure and purpose of VPR will be explained to them and they will then be asked if they would like to take part.
- Patients must sign a disclaimer in which they agree that they are voluntarily taking part in the exercise class at their own risk and assume all risk of injury themselves.
- It is recommended that patients attend a face-to-face pre and post assessment. In certain circumstances and if clinically appropriate this may be completed online.
- Patients must be motivated to log in twice weekly for the duration of the programme.
- Good practice point from the BTS (2013): in the setting of pulmonary rehab, the skill mix of the team and other comorbidities should always be considered in the risk assessment of patients entering a pulmonary rehab programme.

8.0 VPR Pre-Assessment

Patients who fulfil the above criteria an appropriate PR assessment will be arranged.
A PR assessment is used to individualise exercise prescription, evaluate the potential need for supplemental oxygen, out rule contraindications and ensure safety of the pulmonary rehabilitation programme. It is the overall clinical responsibility of the PR Co-ordinator / designated lead physiotherapist / nurse to ensure all clients are exercised safely and triaged appropriately.
Patient assessment and outcome measurement are essential features of PR and should at a minimum include exercise capacity, symptoms (dyspnoea) and health related quality of life (Holland et al., 2021, BTS Quality Standards 2014). See the NCP PR Guideline 2020 for more information.

8.1 Location of Pre Assessment:

- An initial centre-based assessment by a health care professional was recommended as an essential component of PR by an Official AST Workshop Report (Holland et al., 2021). It is recommended that patients at risk of desaturation should be prioritised for centre-based exercise testing
- The BTS (2021) also advises that there is no evidence reported on the feasibility or safety of conducting these tests virtually in the patient's home. This is reiterated in GOLD 2022 where it highlights that the evidence based models from the Cox et al., Cochrane review (2021) all included an in-person exercise test for the purposes of assessing desaturation during exercise training and accurately prescribing exercise capacity.
- Taking the evidence into consideration, initial assessment should be carried out in a healthcare setting/centre to facilitate use of appropriate outcome measures, allowing for comprehensive assessment of oxygen requirements, safety to exercise and establishing recommended exercise prescription

If the patient cannot attend for a face to face assessment it can be carried out in the patient's home via a home visit if agreed locally. However, Holland et al (2020), found that the STS, step and TUG tests can be performed at home, but do not accurately document desaturation with walking or allow exercise prescription.

8.2. The VPR Assessment Process:

The VPR assessment form (Appendix 5) is completed with the patient. The assessment includes:

Subjective	Obtain patients consent for assessment and participation in VPR including onward referrals, data sharing and the recording of their data (outcome measures for service evaluation) in line with GDPR guidelines.
	A review of past medical history with special regard for respiratory history and comorbid conditions such as orthopaedic, neurology and cardiovascular conditions that may affect participation in programme.
	Documentation of the number of exacerbations and admissions over previous 12 months.
	Subjective assessment including respiratory symptoms, for example dyspnoea, cough, wheeze, fatigue, exercise tolerance, activities of daily living limitations, chest pain, current exercise routine.
	A review of inhaled medications to ensure they are optimal for the disease stage and a review of their inhaler technique to ensure it is adequate.
Objective	Physiological baseline measurement: Heart rate, blood pressure, respiratory rate, SpO2, BMI.
	Documentation of Pulmonary Function Tests or completion of Spirometry.
	Measurement of dyspnoea at rest and during activity using the Borg and mMRC.
	Measurement of exercise capacity: 6MWT or ISWT/ESWT.
	Measurement of health status using a disease specific outcome measure e.g.: SGRDQ, CAT score.

	A generic QOL score i.e. the PHQ-7 and GAD-7, HADS
	Balance assessment: Patients with a falls history or those deemed an increased risk of falling will be recommended to have another person present in the house to take part in the exercise class. The Activities-Specific Balance Confidence Scale (ABC) Questionnaire (Appendix 2) may be completed. The ABC Questionnaire is particularly useful if the assessment is completed virtually. A score of <67% on the ABC Questionnaire indicates an increased risk of falling and these patients must have another person present in the house to take part in the exercise class. For face-to-face assessments alternative validated Balance assessment tools may be used.
Plan	Discussion and agreement of the patient's goals and expectations for VPR programme.
	In between classes patients are also encouraged to walk daily if possible and, where possible, use pedometers to measure their daily steps 5 days a week excluding weekends.
	Discussion and advice on position and placement of patient's I.T. device during the exercise class to avoid the disclosure of personal information and for optimal viewing.
	If required demonstrate to the patient how to download and use the I.T. platform and SpO2 monitor.
	All patients participating should be asked to supply their Eircode and a contact number for a person in case of an emergency.

The following should be provided to the patient and its use discussed:

- The Safe Home Exercise Checklist (Appendix 4) and Disclaimer (Appendix 3).
- A copy of the exercise programme.
- A class schedule.
- A SpO2/HR monitor for the duration of the programme for use in VPR only.
- Information regarding safe self-monitoring tests during exercise (Borg score, talk test and pursed lip breathing).

Good practice point from the BTS (2013): The referral process and assessment for PR offers important opportunities to detect and consider referral for on-going support, medical optimisation and management for e.g.: smoking cessation services, dietician or psychology services, making every contact count (HSE MECC framework).

9.0 VPR Exercise Class structure

9.1. VPR class set-up for staff:

- Room private with door closed.
- Computer/phone set up.
- Exercise equipment available.
- Patient details available including contact details for patient and their contact person and the patient's Eircode.

See HSE Procedure for the Management of Virtual Outpatient Clinics (2020) for further information.

9.2 Class procedure for staff:

- Check patients ID and confirm if another person is attending the class with them.
- Explain to the group the main features of the virtual platform e.g. mute & unmute, keeping videos on to allow the therapist to monitor the patient exercising.
- Explain that the session is not being recorded and it is not permitted for them to record the session.
- Attendance log for each class is completed.

9.3. VPR class set-up for patients:

- WebEx/ MS Teams / Attend Anywhere will be the platform used to deliver the classes.
- Patients log onto the live class from their home twice weekly for between 6-12 weeks (timeline decided locally).
- Ensure they have a quiet room with a space suitable for exercise
- The patient will receive an invitation via email to allow them enter the class.
- Set-up camera in a stable position to ensure that the clinician can view the patient exercising at all times.
- Class participants must check their symptoms prior to each class and be advised not to exercise if they have a fever or systemic illness or have become suddenly unwell.
- The patient must be made aware that they have a responsibility to monitor their own symptoms prior to attending classes and to seek medical advice when appropriate.
- If the patient is unwell during the course of the programme, they will be able to recommence the programme once recovered. Medical clearance from their GP or medical team may be required.
- If the patient becomes unwell during the VPR class see below 9.4.

9.4. Safety Equipment:

As prescribed, ensure patients have their reliever inhaler (with volumetric spacer if relevant) nearby and a glass of water.
If patients are prescribed Glyceryl Trinitrate spray they are advised to have it nearby during the class.
Diabetic patients are advised to have a glucose supplement nearby in-case of a hypoglycaemic event.
In the case of an emergency event during the class:
The class is stopped

- All patients except for the unwell patient exit the platform.
- The person in the house with the patient is advised on how to attend to the patient OR the patient's emergency contact person is notified by the physiotherapist or nurse.
- It is essential for the health care professional giving the class to have the Eircode for each patient in case they need to contact an ambulance.
- The physiotherapist or nurse will remain in contact with the patient via video- link until they are stable and/or have received medical attention.
- Local areas will adopt their own local safety/emergency policy.

10.0 Conducting a VPR Class

10.1. Exercise component:

Exercise classes involve aerobic and endurance training. Intensity for aerobic training is monitored using the Borg score with the aim of moderate and somewhat severe intensity (Borg 3-4) level of dyspnoea. The FITT principles should be followed in line with the NCP PR Guidelines (2020).

10.2. Monitoring:

Patients are advised to stop exercise immediately if they experience air hunger, if chest pain develops or they experience dizziness, nausea, extreme shortness of breath, excessive wheezing or if coughing up blood occurs.
Patients are advised that if they report increased breathlessness or worsening symptoms prior to the exercise class they need to delay exercise until this has improved.

A patient Borg of >4 during the exercise programme would indicate a need to rest and check SpO2 reading. The physiotherapist will then reduce the training intensity as appropriate.

11.0 VPR Education

Education is a core component of PR. Patients may be emailed a link to videos of the talks during the programme or alternatively members of the MDT may be able to deliver live interactive educational sessions.
The NCP has developed a suite of PR Education Videos that can be accessed here:
https://www.hse.ie/eng/about/who/cspd/ncps/copd/resources/video-based-pulmonary-rehabilitation-education-support-programme.html

Examples of education sessions are as follows (NCP 2020):

- Respiratory anatomy, physiology and disease education.
- Nutritional advice.
- Chest clearance and breathing control techniques.
- Role of medication and inhaler therapy.
- Self-management knowledge and skills.
- Psychological and behavioural intervention, anxiety management and goal setting.
- Symptoms control and exacerbation management.
- Smoking cessation.
- Incontinence management.
- Relaxation and energy conservations.
- Advance care planning and planning for the future.

Other local arrangements for the provision of the educational sessions/topics may be put in place for example delivered by speech and language therapy, health promotion officers or occupational therapy etc.

12.0 VPR Post-Assessment

- At the end of the programme patients will be invited for a post assessment where the measurements of exercise capacity, breathlessness at rest and during activity and health status are repeated. This should be completed in person.
- A discharge summary is sent to the patient's consultant, G.P. and/or referrer.
- The patient's pre and post outcome measures are recorded on the PR database.
- Patients will be provided with an anonymous patient experience survey.
- Patients should be given information on pulmonary rehabilitation maintenance programmes Appendix 7.

13.0 PR for patients who do not have access to I.T.

13.1 Face-to-face PR

See NCP Guidance for setting up Pulmonary Rehabilitation (2020) for further information.

13.2. Home based PR

The number of existing clinical trials of alternative rehabilitation models is small and there is currently no standardised way to assess which model would best suit which patient (Holland et al., 2021). Although there is an emerging role for Home Based PR as another form of service delivery, with small numbers of studies showing improvement in COPD disease specific symptoms and quality of life (Pradella et al., 2015, Horton et al., 2018) and some improvements in exercise capacity (Nolan et al., 2019).
There is a wide variety of Home Based PR approaches detailed in the literature (Stafinski et al., 2022) however overall the volume and quality of research in this area remains low. Therefore at this time it is not possible to recommend a specific model of Home Based PR for the purpose of this guideline as further research is required.

13.3. Web-based PR

A web-based PR programme has the potential to be a novel approach to increasing patient choice in the mode of delivery and setting of PR and maintenance PR. It is important to note that for a web-based programme to be used as VPR it must align with the NCP 2020 guidelines on PR and strive to meet the essential criteria for a PR programme (Holland et al., 2021). It is not possible to recommend a specific model of web-based PR for the purpose of this guideline as further research is required (Holland et al., 2021).

14.0 Monitoring and Evaluation of the VPR Service

Health Care Professionals have a clear responsibility to the patients in their care and should ensure that the standards and delivery of that care is adequately meeting the needs of their patients. Health Care Professionals have responsibilities not only in planning care but also in re- evaluating patient outcomes, and demonstrating the ability to change current practices and interventions to effectively respond to the identified need of the individual patient.

Houchen-Wolloff and Steiner (2020) commented on a Randomised Control Trial carried out by Hansen et al., (2020) comparing home-based tele-rehabilitation with conventional centre-based PR in a population with severe COPD. They stated that the most important consideration in evaluating such innovations in PR delivery is ensuring that improvements in uptake and adherence to PR are achieved without sacrificing the efficacy of the intervention.

This service will be monitored and audited at a local level through reports to the physiotherapy manager, operational team lead (if applicable) and respiratory consultant lead, illustrating the performance of the programme.

The following is a list of data that can be collected and audited. It is not an exhaustive list:

- Pre and post VPR outcome measures.
- Exacerbation rate and hospital admission pre and post VPR.
- Drop – out rates during VPR course and the reason for same.
- Information on patients who are unable to enrol and why (i.e. not interested no device, no broadband, lives alone and at risk of falls).
- A Patient Experience Survey is recommended to assess feasibility outcomes.

15.0 References

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16.0 Appendices

Name:
Date of birth:
Address:
Contact number:

Appendix 1 Sample VPR Referral form

Virtual Pulmonary Rehabilitation Referral Form

Date of Referral: Diagnosis:

PFTs: (if available) Date: FEV1/FVC _____% FEV1 ____% FVC _____% DLCO_____ %

mMRC Score:

Inclusion Criteria (Please tick):	Yes	No
Confirmed diagnosis of chronic lung disease		
Functionally limited by dyspnoea despite optimal management (mMRC ≥2)		
Motivated to participate and change lifestyle		
Ability to exercise independently and safely i.e. balance ABC score >67% or other validated Balance assessment tool		
Email/IT access and phone access		
Agreeable to download the relevant application for accessing the IT platform		
Agreeable to signing a disclaimer in which they agree that they are voluntarily taking part in the exercise class at their own risk and assume all risk of injury themselves		
No uncontrolled cardiovascular conditions limiting participation in an exercise programme		
No significant orthopaedic, psychological or neurological conditions that reduce mobility or cooperation with physical training		
No suspected underlying malignancy		
No new COVID-19 symptoms		

Optimisation of Respiratory Medications	Yes	No
Optimisation of Respiratory Medications		
Please List Medications:		

Smoking status		
Current smoker ◯	Ex-smoker ◯	Never smoker ◯
If Smoker, has patient been referred to Smoking Cessation Officer	Yes ◯	No ◯

	Yes	No
LTOT	L/min device	
Portable oxygen	L/min device	

	Yes	No
Has the patient consented to the referral		

Signature:

Name of referrer:

Contact phone number:

Send Completed forms to:

mMRC Score

Grade	Degree of Breathlessness Related to Activities
0	Not troubled by breathlessness except on strenuous activity
1	Short of Breath when hurrying on level ground or walking up a slight hill.
2	Walks slower than most people on the level, stops after a mile or so, or stops after 15 minutes walking at own pace.
3	Stops for breath after walking about 100 yards or after a few minutes on level ground.
4	Too breathless to leave the house, or breathless when undressing

Appendix 2: Activities-specific Balance Confidence (ABC) Scale

The Actvities-Specific Balance Confidence (ABC) Scale

Patient Name:_____ **DOB:**_____ **Date:** _____

For each of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following rating scale:

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

No Confidence _____ **Completely confident**

How confident are you that you will not lose your balance or become unsteady when you.

1. Walk around the house?_____%
2. Walk up or down stairs?_____%
3. Bend over and pick up a slipper (or item) from the front of a closet floor?_____%
4. Reach for a small can off a shelf at eye level?_____%
5. Stand on your tiptoes and reach for something above your head?_____%
6. Stand on a chair and reach for something?_____%
7. Sweep the floor?_____%
8. Walk outside the house to a car parked in the driveway?_____%
9. Get into or out of a car?_____%
10. Walk across a parking lot to the mall (store)?_____%
11. Walk up or down a ramp?_____%
12. Walk in a crowded mall where people rapidly walk past you?_____%
13. Are bumped into by people as you walk through the mall?_____%
14. Step onto or off an escalator while you are holding onto a railing?_____%
15. Step onto or off an escalator while holding onto parcels such that you cannot hold onto the railing?_____%
16. Walk outside on icy sidewalks?_____%

Instructions for Scoring:

The ABC is an 11-point scale and ratings should consist of whole numbers (0-100) for each item. Total the ratings (possible range = 0 - 1600) and divide by 16 to get each subject's ABC score.

Total Score:

Appendix 3: Disclaimer

Disclaimer **I agree and consent to the following:**
• I am voluntarily participating in a week Virtual Home-Based Pulmonary Rehabilitation programme
• I understand that this is a new initiative and the background and benefits of the programme have been explained to me. I understand that when participating in any exercise there is a risk of injury
• I am taking part at my own risk and assume all risk of injury to myself. The HSE and physiotherapists on this programme accept no liability
• I have read and will adhere to the Safe Home Exercise Checklist
• My data may be used anonymously in any post project reporting
Print Name
Signature
Date

Appendix 4: Safe Home Checklist

Safe Home Exercise Checklist

- A stable surface to put your computer device on
- Ample safe space to do the demonstrated exercises
- A family member, friend or carer if advised
- A supportive chair for doing exercises from and resting on
- Avoid any rugs or mats that may be a trip risk
- A glass of water or water bottle
- No pets present that may cause you to trip or fall
- Stop exercising immediately if you experience any of the following: chest pain, dizziness or feeling faint, extreme shortness of breath, excessive wheezing or coughing up blood

Appendix 5: Sample Virtual Pulmonary Rehabilitation Assessment

Name:	**Date of Assessment:**
DOB:	**MRN:**
Address: **EIRCODE:** **Email address:**	**Medical card no.:** **Phone no.:** **Emergency Contact no.:** **Consultant:** **GP:**
Respiratory diagnosis:	
Other past medical Hx:	**Social Hx:** Lives alone / with _____ Two-Storey or Bungalow Mobility: Transportation: Occupation:
Medications: Inhaler Technique Checked: Yes ☐ No ☐	**Baseline Respiratory function:** Mobility distance: Cough: Sputum: Wheeze: Other:
Home Nebs: Yes ☐ No ☐	Stress incontinence:_____Referral to WH: _____ **Vaccines**: Flu ☐ Pneumonia ☐
Home O2: No ☐ Yes ☐ _____L/min_____hrs/day	**Portable O2:** No ☐ Yes ☐ Device_____Setting _____
BiPAP: Yes ☐ No ☐ Settings: IPAP:_____EPAP: _____	**Smoking Hx**: Never/Ex/Current Pack year Hx: _____

Spirometry	**Date:**	**Exacerbation Rate in Past 12 months**
FEV1		
FVC		
Ratio		
% predicted		
DLCO		
TLC		
Reversibility		
1-min STS	**Pre-rehab Ax Date:**	**Post-rehab Ax Date:**
Pre-test Borg		
No. Reps Completed		
Post-test Borg		
CAT (for COPD pts only)		
mMRC		
GAD-7		
PHQ-9		
Falls History		
ABC Questionnaire		
Safe to exercise Alone	Yes ☐ No ☐	

Appendix 6: Digital Inclusion

The key dimensions of digital inclusion are connectivity, access to devices, skills, and the confidence to engage with ICT (Digital Inclusion in Ireland Council Report 2021). Digital skill levels in Ireland are below the EU average with older Irish people having lower levels of digital skills than people of the same age in the EU. There are other socio-economic and demographic divides in Ireland, for example people who are unemployed and those with lower education are less likely to own ICT devices, use computer software or download apps. Those in rural areas also tend to have weaker online engagement, linked to poorer connectivity in these areas (Digital Inclusion in Ireland Council Report 2021)

Resources for increasing access to VPR by addressing the key dimensions of digital exclusion:

- County Councils: County Councils have digital strategies which commit to improving digital inclusion and digital engagement among minority groups. This includes digital education and training to increase digital literacy. Age Friendly Ireland and Local Sports Partnerships are also available in local County Councils and often can provide digital training and access to devices.
- Public Libraries: some Public Libraries in Ireland provide digital skills courses.
- Age Action: Age Action's Getting Started Computer Training programme delivers free training on computers, tablets and smartphones to people over the age of 55. There is also a Getting Started kit available here: https://www.ageaction.ie/how-we-can-help/getting-started-kit.
- ALONE: ALONE and Active Retirement Ireland have partnered with Vodafone Ireland Foundation to deliver a new nationwide digital skill training program for older people called Hi Digital https://activeirl.ie/hidigital/. At hidigital.ie people can access on-line classes. In addition Active Retirement Ireland run in-person group classes across the country for older people alongside mentoring and training in digital skills https://activeirl.ie/hi-digital-skills-classes-schedule/. ALONE's Assistive Technologies mission is to create an infrastructure to empower older people to use technology, enabling the user to manage their social connection, health, safety and security. ALONE also often provide devices, training and Wi-Fi access to patients.
- Fastrack into Information Technology (FIT): FIT have online training videos available that teach basic computer skills: https://fit.ie/myit/HTML/exercises.html
- Irish Rural Link: Irish Rural Link run nationwide 'Getting Citizens Online' classes: https://www.irishrurallink.ie/getting-citi- zens-online/
- Generation Tech: Generation Tech provides technical support to people aged 65 and over, there is more information available at https://www.generationtech.ie/about.html.
- HSE Self-Management Support Coordinators: Some CHOs provide Acorn Age Friendly Smart Tablets to patients on loan through the Living Well programme.
- Education and Training Boards (ETBs) run a wide range of programmes within Further Education and Training (FET) for all persons, who wish to upskill and to develop their digital literacy. Examples of FET basic digital skills courses include: internet skills; basic computers; self-directed digital learning; computer literacy and preparation for ECDL. There are also number of related courses, such as 'Get Connected', 'Silver Surfers' for older learners and 'How to use a tablet' which are designed to specifically assist persons to feel more comfortable about using digital technologies in their everyday lives. Contact your local ETB for further information.

Appendix 7: Maintenance of VPR Using Digital Resources

See below a list of online exercise classes for maintenance of PR, this is not an exhaustive list.

- COPD Support Ireland: Online Classes at various times and days during the week.
- Irish Lung Fibrosis Association: Online Classes at various times and days during the week.
- HSE Exercise Videos for people with chronic conditions: https://www2.hse.ie/wellbeing/being-active-with-a-health-condition/being-active-with-a-health-condition.html

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