BTS Guidance for pulmonary rehabilitation – Reopening services for the 'business as usual' participants

Introduction

This document outlines British Thoracic Society (BTS) guidance on reopening pulmonary rehabilitation services for the patients with chronic lung disease. This document may require updating as more information becomes available. This version was published on 2 June 2021. Please check the BTS website for the most up to date version of this document.

This guidance focuses on the how pulmonary rehabilitation services may adapt their programme to accommodate the infection control requirements of the Covid-19 pandemic.

We also understand that a number of patients may not be willing to attend for an assessment for pulmonary rehabilitation, and we would therefore suggest that these patients be provided with a supported self-management package and re-offered pulmonary rehabilitation as a treatment option when attendance at a hospital or community facility is possible and acceptable. It should be emphasised that a self-management package is not equivalent to pulmonary rehabilitation.

This guidance can only be pragmatic, but aims to describe in sufficient detail likely adaptations to guide services to support re-opening of services for patients who would routinely access pulmonary rehabilitation.

Content

BACKGROUND

Pulmonary rehabilitation is acknowledged as a high value intervention for individuals with chronic respiratory disease. Furthermore, the NHSE Long Term Plan (1) identifies pulmonary rehabilitation as central to the management of patients with COPD and other chronic respiratory diseases. The British Thoracic Society (BTS) has been at the forefront of the development of pulmonary rehabilitation services with the evidence based guideline (2) and the quality standards (3). The BTS Quality Standards for Pulmonary Rehabilitation (3) form the framework for the delivery of a rehabilitation programme. These standards are reflected in both the National Asthma and COPD and Audit Programme (NACAP) pulmonary rehabilitation work streams and the Pulmonary Rehabilitation Services Accreditation Scheme. During the acute phase of the Covid-19 pandemic many services were closed and staff redeployed. However, the NHS is now reopening services, albeit in a modified format. In recognition of these challenges, this guidance supports the reopening of pulmonary rehabilitation services for individuals with chronic lung disease.

Safe resumption of pulmonary rehabilitation is important and it is vital that measures are implemented to minimise the risk of patient and staff exposure to Covid-19. Guidance about the safe resumption and continuation of any service is detailed in the BTS document 'Guidance for the Resumption and Continuation of Urgent and Elective Outpatient Respiratory Services: Part 1' which can be accessed at: https://www.brit-thoracic.org.uk/about-us/covid-19-resumption-and-continuation-of-respiratory-services/ Additional guidance relating to community services is outlined in "BTS Advice for Community Respiratory Services in relation to caring for patients with chronic respiratory disease during the COVID19 pandemic" (https://www.brit-thoracic.org.uk/covid-19/covid-19-information-for-the-respiratory-community/). There is further BTS guidance on delivering rehabilitation to patients surviving Covid-19 using an adapted pulmonary rehabilitation approach:
(https://www.brit-thoracic.org.uk/covid-19/covid-19-resumption-and-continuation-of-respiratory-services/#pulmonary-rehab/).

Many providers will have a significant backlog of cases requiring pulmonary rehabilitation (i.e. COPD, IPF, bronchiectasis) that will demand a high-quality service in line with the BTS Quality Standards. Yet, there are a number of challenges in delivering rehabilitation under the current climate. Despite this, there is no reason why individuals cannot receive high quality service offered by experts in the field of pulmonary rehabilitation.

PRACTICAL GUIDANCE

Pulmonary rehabilitation is an important treatment for people with chronic lung disease and any risks involved in delivery have to be balanced against the risk of harm from not providing an essential treatment.

The rehabilitation assessment is a crucial component of the programme and this is reflected in all national and international guidance (2, 4). The scope of the initial assessment is broad, well documented and captured in the NACAP audit. A defining aspect of rehabilitation is the

exercise training component and the demonstration of effectiveness of this is dependent on the conduct of a baseline exercise test such as the incremental shuttle walk test (ISWT) or six-minute walk test (6MWT) at the time of the initial assessment in order to prescribe aerobic exercise.

CENTRE BASED PULMONARY REHABILITATION

Where it is possible to restart face-to-face training this is preferable due to the extensive and robust evidence of efficacy plus added value from face-to-face contact.

The site

Each service will have different geography so it is impossible to provide site specific guidance. However, implementing appropriate infection prevention and control measures to ensure the safety of patients and clinicians is imperative.

Rehabilitation providers should risk-assess their current venue(s) to optimise safe distancing and adequate airflow in conjunction with local Infection Prevention and Control (IPC) leads. Where multiple venues are used, PR should be delivered at a site or sites where opportunities for social distancing are better (typically larger venues) and where greater airflow is possible (e.g. sufficient number of windows and doors, outdoor venues, filtration systems such as high-efficiency particulate filtration system)

Pre-appointment screening

The potential risks of the assessment visit should be discussed with patients and carers, who need to be involved in any decisions about assessment (exercise testing) and subsequent supervised centre-based training or home-based rehabilitation. Patients may prefer to attend sites away from 'acute'/'hot' healthcare sites.

One to two days before the assessment/rehabilitation session, the patient should be contacted to ensure they have no symptoms of Covid-19. If they have symptoms of Covid-19 they should be advised to self-isolate for in line with PHE guidance. If they have no symptoms, the patient should be advised to attend the appointment. If they subsequently develop symptoms of Covid-19 then they must contact the organiser and not attend subsequent appointments. When available, details from the contact tracing App (NHS Covid-19 App) should be discussed at the assessment.

If available, lateral flow or PCR testing as per local policy could complement these measures noting that there is a significant false negative rate. Currently, knowledge of antibody testing results or vaccination should not change this process but this advice may change over time.

The assessment

On arrival, acute symptoms and the patient's temperature should be checked. If their temperature is high, they should be sent home to self-isolate for in line with PHE guidance,

and clinical review sought if this is required. These patients should be followed up and reoffered an appointment after the period of isolation.

The BTS Quality Standards for Pulmonary Rehabilitation (3) state that programmes should include measures of exercise capacity, quality of life and dyspnoea as a minimum.
Much of the baseline assessment could and should be conducted by telephone or videoconference, but there is a requirement to conduct an exercise test to establish safety to exercise and effective prescription of exercise. Services may consider adding checking patients' Covid-19 vaccination status to the initial assessment, similar to the procedure for flu and pneumonia vaccine. If a patient has not been vaccinated, the assessor should query the reasons for this and explain the benefits of the vaccine and possible risks of attending face to face PR. If the patient would like to be vaccinated, the assessor should provide guidance on how to do this.

Ensure that waiting facilities allow for social distancing, or ask patients who have driven to wait in their car or designated waiting area until their appointment time. If the patient has a mobile phone they can be telephoned or alternatively they could be informed by a member of the team when the team is ready to complete their assessment.

Attempt to maintain a unidirectional flow of patients through the department to minimise face-to-face contact.

All equipment must be decontaminated after use by an individual.

The venue must be cleaned after each assessment as instructed by local IPC leads.

Exercise testing

Exercise testing (field-based exercise tests such as the ISWT, 6MWT or ESWT) and training are not classified as aerosol generating (AGP) but will produce droplets, which require a) social distancing during the assessment and any subsequent centre-based exercise training in line with the Government's guidance, b) changes in airflow in line with local policy, and c) subsequent cleaning of assessment equipment and environment. Staff will need to wear PPE consisting of a surgical mask, apron and gloves (plus a visor or goggles based on local risk assessment) as they may need to respond rapidly to any adverse event during exercise testing/training and this may not allow sufficient time to 'don' PPE.

The recommended exercise tests in the BTS Guidance and recorded in the NACAP PR audit are the 6MWT and ISWT (2). They are the most appropriate to assess desaturation and allow effective exercise prescription. Although there is some data to suggest that alternative field functional tests, such as 1 minute sit to stand (5) or a step test (6), may induce similar cardiorespiratory stress to maximal or submaximal exercise testing and therefore can assess safety to exercise, there is no evidence that they can be used for effective exercise prescription or evaluate oxygen desaturation. There is also no evidence reporting on the feasibility or safety of conducting these tests in the patient's home.

Two rapid reviews investigating exercise tests suitable for use in the home reported that sit-to-stand tests, step tests, the Timed Up and Go test or four metre gait speed test may be conducted in the home (7, 8). However, standardisation of testing poses a challenge, and these tests do not accurately measure exercise-induced oxygen desaturation or allow exercise prescription. Both reviews confirmed that face-to-face assessment remains the gold-standard. The reliability, validity and safety of performing these tests via video-conference was not reported. A risk assessment should be undertaken to evaluate whether it is safe to conduct these tests in home settings.

An incremental cycle test may be considered if the appropriate equipment is available. Protocols for cycle testing have been described in the literature (9, 10) and usually rely on an increase of the load each minute to a symptom limited maximum performance. This may be particularly relevant for a cycle-based exercise programme (home- or centre-based).

THE PROGRAMME

The BTS Quality Standards indicate that the programme should be of at least six weeks duration and include a minimum of twice weekly supervised sessions (3).

Supervised pulmonary rehabilitation delivered in person is the gold-standard. If supervised sessions are delivered ensure that the local Trust's and Public Health England's guidance on infection control and the Government's guidance on social distancing are adhered to.
Each training venue will have different geography so it is impossible to provide site specific guidance, but a risk assessment will help ensure the programme is delivered in line with local and national guidance.

Ideally, arrival at the venue should be staggered and patients should only enter the venue when invited. Carers should only accompany patients into the venue where this is unavoidable and should not be present during the class unless this is essential to facilitate training.

There should be a unidirectional flow of patients through the venue to minimise face-to-face contact.

Social distancing in line with the Government's guidance should be maintained throughout and each participant should remain in one area of the training venue and have dedicated equipment for each session. The number of participants must be limited to allow social distancing, and will be dictated by the size of the facility.

Local infection control guidance should advise on the use of equipment by more than one person during an exercise session. All equipment must be adequately spaced to allow social distancing and cleaned as per local infection control guidance after use.

All patients should wear a face mask whenever possible. They can be removed during exercise and immediate recovery but should be replaced during rest periods.

Staff will need to wear PPE in line with local guidance. This will typically include a surgical mask, apron and gloves (plus a visor or goggles based on local risk assessment) as they may need to respond rapidly to any adverse event during exercise testing/training and this may not allow sufficient time to 'don' PPE.

Patients participating in face-to-face rehabilitation should also be reminded at every session to contact service providers and delay attendance if they notice new Covid-19 related symptoms in-between appointments.

Strongly advise the patient to bring their own water bottle, pen and possibly a larger bag to store their coats.

After completion of exercise training session

Service leads need to confirm airflow changes in all exercise training venues with local IPC leads to determine how long the rooms need to be left empty before cleaning. Re-use by another group (for any purpose) will be limited by this.

The venue must be cleaned after an exercise class as instructed by local IPC leads. Consideration should be given to the use of additional cleaning staff time to support this.

Safety precautions for supervised interventions

Patient safety during the delivery of supervised exercise should be informed by the BTS Guideline on Pulmonary Rehabilitation (2).

Safety considerations include;

- Infection control (as documented above to include environment and equipment etc).
- Exercise induced desaturation (and subsequent oxygen management).
- Medical emergencies (as would prevail in routine PR).
- Monitoring for pre-existing health issues (as would prevail in routine PR).

Cardiopulmonary resuscitation is an airway generating procedure and so high level PPE equipment in line with local IPC guidance is required and should be readily available in the unlikely event of a cardiopulmonary arrest.

Educational component

It may be desirable to deliver the educational component remotely using technology, DVD (11) or the telephone, and if pulmonary rehabilitation teams have the resource and expertise to do this, it may be preferable to face-to-face delivery. The optimal strategy to deliver education remotely is not known. However, individuals must not be denied this component because they are unable to access this effectively in a remote way. If the programme is delivered face-to-face, social distancing must be implemented and delivery prior to exercise training may be preferable.

The educational component of pulmonary rehabilitation is integral to the format and success of the programme (2). Although education comes into every aspect of pulmonary rehabilitation, this section relates to the discrete education sessions. The pulmonary rehabilitation education programme should include the standard education topics outlined in the BTS Guideline on Pulmonary Rehabilitation in Adults (2) with the addition of the following topics which are based on expert opinion:

- Covid-19: Infection control, including vaccination, to prevent the spread of disease in line with Public Health England guidance
- Exercise: How to exercise effectively in line with the Government's guidance on social distancing.
- Social issues: Management of social isolation and loneliness.

REMOTE DELIVERY OF PULMONARY REHABILITATION

Remote delivery of pulmonary rehabilitation can be considered in those who have declined the gold standard (face-to-face supervised). However there is a smaller body of evidence for remote delivery of pulmonary rehabilitation. These remote options include platforms that do and do not require Internet access, which is important to consider as a significant proportion of people referred to pulmonary rehabilitation do not have Internet access (12). Furthermore, all studies published to date are characterised by a comprehensive assessment pre- and post-intervention. A recent Cochrane review reported that pulmonary rehabilitation delivered via telerehabilitation for people with chronic respiratory disease achieves outcomes similar to those of traditional centre-based pulmonary rehabilitation, with no safety issues identified (13). However, the certainty of the evidence provided is limited by the small number of studies, of varying telerehabilitation models, with relatively few participants and compromised by the sub-optimal benefit achieved in some traditional pulmonary rehabilitation programmes. A selection of the largest studies is outlined in the following paragraphs. The ACPRC have published a statement on considerations for the remote delivery of pulmonary rehabilitation services during the COVID-19 pandemic which services may find useful (14).

Programmes that do not require Internet access:

- A Canadian study that was preceded by a four week educational programme, and a stationary exercise bike was provided for each patient (15). The study identified important improvements in the home-based group comparable to the centre based group with respect to cycle endurance time and health-related quality of life.
- An Australian study offered an initial home visit to establish the exercise programme followed by weekly phone calls to support exercise behaviours and offer education advice and support (16). The results identified that the home-based group achieved improvements in the six minute walk test that matched the centre-based group.
- A UK-based study offered patients a supported self-management manual with telephone support scheduled twice during a seven-week period (17). Improvements

in dyspnoea, health-related quality of life and exercise capacity were observed in the home-based group.

- There is uncertainty about the effectiveness of home-based PR when compared to centre-based PR. The results of a systematic review of home-based pulmonary rehabilitation demonstrated that there is weak evidence that home-based pulmonary rehabilitation produces similar short-term moderate effects on exercise capacity, quality of life and breathlessness to standard pulmonary rehabilitation in patients with COPD (18). Due to the heterogeneity of non-digital programmes, the optimal model is not known. However regular contact with a therapist experienced in exercise prescription is critical to ensure a sufficient exercise dose is prescribed to obtain benefit. It is not known whether in person or telephone contact is more effective.

Programmes that require Internet access:

- Three studies have compared pulmonary rehabilitation delivered using a web-based platform to standard pulmonary rehabilitation in patients with COPD (19-21).
- Two UK-based studies compared pulmonary rehabilitation delivered using a web-based platform to standard pulmonary rehabilitation in patients with COPD (19, 20). Both studies reported the web-based groups achieved clinically and statistically significant improvements in exercise capacity and breathlessness, and there were no differences between the web-based and standard PR outcomes. It should be noted that the population selected for both studies were those that were able to use the Internet and / or an Internet-enabled device and therefore the generalisability of these interventions may be limited.
- A Danish study investigated pulmonary rehabilitation delivered via a telerehabilitation platform to standard pulmonary rehabilitation in patients with severe COPD (21). Although more participants completed the programme delivered using telerehabilitation than standard pulmonary rehabilitation, the telerehabilitation programme was not superior to the standard programme and there were no between-group differences.
- Examples of web-based platforms can be found in the BTS Pulmonary Rehabilitation resource pack https://www.brit-thoracic.org.uk/about-us/covid-19-information-for-the-respiratory-community/
- The World Health Organisation recommends that telerehabilitation should be used to deliver rehabilitation services wherever acceptable and feasible during the Covid-19 pandemic (22). Although a large number of studies have investigated the role of telerehabilitation in COPD management, few have compared a pulmonary rehabilitation programme delivered by telerehabilitation to standard pulmonary rehabilitation. One recent study demonstrated that a 10-week pulmonary rehabilitation programme achieved improvements in exercise capacity, breathlessness and health-related quality of life but the results were not clinically significant, nor was the telerehabilitation programme superior to standard pulmonary rehabilitation as had been anticipated by the authors (21). Another study demonstrated that pulmonary rehabilitation delivered using telerehabilitation provided similar improvements in peak work rate and functional exercise capacity to those seen in standard pulmonary rehabilitation (23).

- No trials have compared remote pulmonary rehabilitation to standard care in chronic respiratory diseases other than COPD. Therefore it is not possible to provide specific guidance for these groups. However, as pulmonary rehabilitation produces similar effects in COPD and other chronic respiratory diseases, it may be possible to extrapolate evidence from COPD to other chronic respiratory disease groups.

Safety precautions for remotely supervised interventions

- Undertake a risk assessment and develop a standard operating procedure to mitigate any risks.
- Obtain written or verbal consent to supervised remote pulmonary rehabilitation explicitly indicating that the risks and benefits of remote pulmonary rehabilitation have been explained and that the patient is aware of adverse signs and symptoms associated with exercising at home and has a safe environment to exercise in. (see appendix -check list).
- Keep regular contact (at least twice per week as per BTS Quality Standards for Pulmonary Rehabilitation) with clinicians to review progress and any relapse.
- Use validated measures of breathlessness and exertion/fatigue to monitor response to exercise prescription (e.g. BORG CR 10 Dysponea Scale, Borg Rate of Perceived Exertion Scale (24)).
- The individual will need access to any equipment required to complete the interventions effectively and safely.
- Use of an exercise diary to monitor exercise progression.
- Deliver appropriate advice for any outside walking prescription in line with government policy for Covid-19 shielding and/or social distancing.
- Safety to exercise and the exercise prescription must be assessed at the time of an initial assessment.
- Oxygen requirements should be established at the time of the initial assessment (therefore an oximeter is not mandated).

Safety precautions for patients following admission for an acute exacerbation of COPD

The BTS Guideline on Pulmonary Rehabilitation (1) recommends that post-exacerbation programmes should deliver this service as a supervised intervention, there is insufficient evidence for remote post-exacerbation pulmonary rehabilitation.

If a patient with COPD has an acute exacerbation with Covid-19, either requiring a hospital admission or managed in the community, commencement of pulmonary rehabilitation should be delayed until the isolation period has elapsed to reduce the infection risk and administered in line with the BTS guidance on Delivering rehabilitation to patients surviving Covid-19 using an adapted pulmonary rehabilitation approach (https://www.brit-thoracic.org.uk/covid-19/covid-19-information-for-the-respiratory-community/).

SUPPORTED SELF-MANAGEMENT

It is likely that a proportion of patients will not be able or willing to attend a face-to-face assessment to assess their exercise tolerance.

Exercise testing in the home - tests that can potentially be conducted in the home are sit to stand tests or a step test (5,6). These could be conducted under the direct supervision of a member of the rehabilitation team, but this is unlikely under the current circumstances. An alternative approach is to conduct these tests via a video consultation but there are significant safety concerns with respect to conducting a maximal test and avoiding trips and falls.

In this instance it is sensible to offer a supported self-management programme. These programmes are commonly activity-based and do not require the conduct of an exercise test to assess safety or provide guidance on a physical activity programme. It is important to note that this type of programme does not meet the definition of a pulmonary rehabilitation programme .

The NICE Guidance for COPD (25) recommends an individualised self-management plan covering the following:

- an explanation of COPD and its symptoms
- advice on quitting smoking (if relevant) and how this will help with the person's COPD
- advice on avoiding passive smoke exposure
- managing breathlessness
- physical activity and pulmonary rehabilitation *(PR should be reoffered when appropriate)*
- medicines, including inhaler technique and the importance of adherence
- vaccinations
- identifying and managing exacerbations
- details of local and national organisations and online resources that can provide more information and support
- how COPD will affect other long-term conditions that are common in people with COPD (for example hypertension, heart disease, anxiety, depression and musculoskeletal problems)

The Cochrane review of self-management in COPD identified that these interventions improved health-related quality of life (St Georges Respiratory Questionnaire) and dyspnoea (Medical Research Council Dyspnoea score), and a reduction in respiratory-related and all cause hospital admissions was observed (26). The components included in this review comprised educational sessions (smoking cessation, inhaler technique, disease management and activity/ exercise advice). Many of the studies included in this review were group-based which makes it difficult to extrapolate to the current situation where it is likely to be delivered individually in the patients' home.

A recent review of technology-based self-management interventions concluded that self-management for people with COPD delivered via smart technology significantly improved health-related quality of life and levels of activity up to six months compared with

interventions given through face-to-face/digital and/or written support, however the authors indicated that no firm conclusions could be drawn. The data is based on three studies with a high risk of bias and further research is required (27).

NOTE: Data for patients undergoing any of the programmes, including self-management, described in this document can be uploaded onto the NACAP pulmonary rehabilitation work stream audit platform. There is an additional menu option with respect to exercise testing 'not completed because of Covid-19' and the intervention followed can be recorded for each individual.

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