

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Medical Technologies Evaluation Programme

Digital technologies to support the delivery of pulmonary rehabilitation for adults with chronic obstructive pulmonary disease: early value assessment

Scope

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1 Introduction

The topic has been identified by NICE for early value assessment (EVA). The objective of EVA is to identify promising technologies in health and social care where there is greatest need and enable earlier conditional access while informing further evidence generation. The evidence developed will demonstrate if the expected benefits of the technologies are realised and inform a final NICE evaluation and decision on the routine use of the technology in the NHS.

2 Description of the technologies

This section describes the properties of digital technologies to support pulmonary rehabilitation based on information provided to NICE by companies and experts, and information available in the public domain. NICE has not carried out an independent evaluation of this description.

2.1 Purpose of the medical technology

In the UK, an estimated 1.2 million people are living with chronic obstructive pulmonary disease (COPD). COPD exacerbations are the second most common cause of emergency hospital admissions, accounting for 1 in 8 of all UK hospital admissions. Exacerbations requiring hospital treatment are associated with poorer prognosis and an increased risk of death ([NICE Clinical Knowledge Summaries](#), 2023). [CORE20PLUS5](#) lists the prevention of exacerbations and hospital admission in people with COPD a key priority.

Pulmonary rehabilitation is an exercise and education programme for people with lung disease, including COPD, who experience breathlessness. Evidence

suggests that 90% of patients who complete a pulmonary rehabilitation programme experience increased exercise capacity and improved quality of life. However, it is currently only offered to 13% of eligible COPD patients, with a focus on those with more severe COPD. Clinical experts state that limitations in workforce and service funding restrict the ability of the NHS to provide pulmonary rehabilitation to all patients who may benefit.

The [NHS Long-Term Plan](#) includes commitments related to respiratory disease, including the need to increase access to pulmonary rehabilitation. It also highlights that new models of providing rehabilitation to people with mild COPD, including digital tools, should be offered to provide support to a wider group of patients with rehabilitation and self-management support.

Digital technologies to support pulmonary rehabilitation are a possible treatment option for adults with COPD. Delivering digitally supported pulmonary rehabilitation could improve access, engagement and adherence to pulmonary rehabilitation programmes. These technologies could also reduce unplanned hospital admissions, reduce exacerbations, prevent deterioration of a person's condition and reduce health inequalities by reducing variations in access to and outcomes of care. But some people with COPD may need support in accessing and using digital technologies.

2.2 Product properties

This scope focuses on digital technologies to support pulmonary rehabilitation for adults with COPD. Following referral and an initial in-person assessment, digital technologies can be used to deliver aspects of pulmonary rehabilitation programmes remotely, allowing people with COPD to self-manage their care at home at a time that is convenient to their lifestyle. Digital technologies to support pulmonary rehabilitation can be accessed online or via an app. [NICE's guideline for the diagnosis and management of COPD in over 16s](#) recommends that pulmonary rehabilitation programmes should include multicomponent, multidisciplinary interventions that are tailored to the individual person's needs. Pulmonary rehabilitation programmes should last a minimum of 6 weeks ([British Thoracic Society Quality Standards for Pulmonary Rehabilitation in Adults](#)) and include an in-person assessment before starting and after completion, physical training, disease education, and nutritional, psychological and behavioural interventions.

For this EVA, NICE will consider digital pulmonary rehabilitation technologies that:

- are intended for use by adults with COPD

- include at least one digital component of pulmonary rehabilitation: physical training; disease education; nutritional, psychological or behavioural intervention
- have a minimum duration of at least 6 weeks
- meet the standards within the digital technology assessment criteria (DTAC), and have a CE or UKCA mark where required. Products may also be considered if they are actively working towards required CE or UKCA mark and meet all other standards within the DTAC
- are available for use in the NHS.

For this EVA, NICE will not consider digital pulmonary rehabilitation technologies that:

- replace the before and after in-person assessment
- are solely tele-rehab i.e. live pulmonary rehabilitation delivered remotely

Seven digital pulmonary rehabilitation technologies for adults with COPD are included in the scope.

Active+me REMOTE

Active+me REMOTE (Aseptika) is a cloud-based platform that supports the hybrid delivery of pulmonary rehabilitation and remote monitoring of adults with COPD at home. The Active+ REMOTE app includes an education programme delivered in small lessons and interactive exercise videos that increase in difficulty as a person's fitness and strength improves. The technology also collects patient generated data via an add-on pulse oximeter, spirometer and smart inhaler. The technology can be accessed via a mobile phone, tablet or desktop.

CliniTouch

CliniTouch (Spirit Health) is an online platform that supports the delivery of a 6-week digital pulmonary rehabilitation programme and facilitates remote monitoring of adults with COPD and other conditions. The digital pulmonary rehabilitation programme can be accessed via a mobile phone, tablet or desktop. The programme includes exercise sessions 3 times a week and users are asked to complete questionnaires before and after each session. Users are also contacted weekly by local healthcare professionals to monitor their progress and increase the complexity of exercises.

Kaia Health COPD

Kaia Health COPD (Kaia Health) facilitates the delivery of a personalised pulmonary rehabilitation programme. The technology includes educational modules, customisable daily training sessions and mindfulness exercises. It also facilitates communication with health coaches. The technology can be accessed via a mobile phone or tablet.

MyCOPD

myCOPD (my mhealth Ltd) is an online education, self-management, symptom reporting and pulmonary rehabilitation system. The myCOPD app includes a 6-week pulmonary rehabilitation course consisting of an incremental exercise programme with education sessions to help promote self-management of COPD. The app also has a dashboard of self-care tools and educational resources for people with all stages of COPD. The app can be accessed via a mobile phone or tablet.

Rehab Guru

Rehab Guru (Rehab Guru) is a digital exercise programme management software. Clinicians can use the technology to prescribe a personalised digital pulmonary rehabilitation programme. The technology includes exercise videos and users can share feedback with their clinician after each exercise and each session. Exercises are adjusted depending on a person's ability and goals. The technology can be accessed via a mobile phone, tablet or desktop.

Space for COPD

Space for COPD (University Hospitals of Leicester NHS Trust) is a digital self-management programme designed to help people with COPD manage their condition more effectively. The programme contains educational topics including information about medication, breathing control, exercise and nutritional advice. Users are encouraged to set goals, progress through a prescribed exercise programme and achieve weekly targets. The technology can be accessed via a mobile phone, tablet or desktop.

Wellinks

Wellinks (Wellinks) is an online platform that supports the delivery of a digital pulmonary rehabilitation programme and facilitates remote monitoring of adults with COPD. The programme includes tailored exercises, education, and motivational support. It also collects patient generated data via an add-on

pulse oximeter and spirometer. Wellinks can be accessed via a mobile phone or tablet.

3 Target condition

COPD is a long-term and progressive respiratory condition that causes breathlessness, a persistent chesty cough, persistent wheezing and frequent chest infections. The term 'COPD' includes chronic bronchitis and emphysema. COPD mainly affects older adults who smoke, and many people do not realise they have it. The breathing problems experienced with COPD tend to get worse over time and can limit a person's ability to undertake daily activities. Treatment can help keep the condition under control and includes stopping smoking, using inhalers and tablets, pulmonary rehabilitation, and surgery.

In 2020 to 2021, [NHS Digital](#) reported that approximately 1.17 million people (1.9% of the population) in England have been diagnosed with COPD and it is estimated that a further 2 million remain undiagnosed. Incidence of diagnosed COPD has risen from 1.7% to 1.9% of the population over the last 10 years. Chronic lower respiratory diseases were reported as the 3rd most common cause of mortality in England and Wales in 2023 ([Office for National Statistics, 2023](#)). COPD is much more common in areas of high deprivation. People living in these areas have a lower life expectancy than the general population, and COPD is responsible for 8% of this difference in men and 12% in women. Managing COPD in the UK costs the NHS over £800 million a year.

4 Care pathway

[NICE's guideline for the diagnosis and management of COPD in over 16s](#) (2019) states that COPD care should be delivered by a multidisciplinary team that includes respiratory nurse specialists. Pulmonary rehabilitation is defined as a multidisciplinary programme of care for people with chronic respiratory impairment. It should be individually tailored and designed to optimise each person's physical and social performance and autonomy.

[The NHS service guidance for pulmonary rehabilitation](#) (2020) says that services should be offered to all patients with a confirmed diagnosis of COPD or other chronic respiratory diseases. [NICE's guideline for the diagnosis and management of COPD in over 16s](#) (2019) recommends pulmonary rehabilitation to help better manage symptoms and improve exercise capacity and quality of life for people with COPD who are functionally breathless or those who have had a recent hospitalisation because of an acute exacerbation. NICE's guideline also says that pulmonary rehabilitation should

be offered to all people who view themselves as functionally disabled by COPD (usually Medical Research Council [MRC] dyspnoea scale grade 3 and above). However, the current [NHS Long-Term Plan](#) (2023) recommends that pulmonary rehabilitation should be offered to people with mild COPD and above (MRC dyspnoea scale 2 and above).

Pulmonary rehabilitation programmes should last at least 6 weeks and include a minimum of 2 sessions per week. Programmes should include individually tailored and prescribed progressive exercise training, including both aerobic and resistance training, as well as a structured education programme. The [British Thoracic Society Quality Standard for Pulmonary Rehabilitation in Adults](#) (2014) recommends that pulmonary rehabilitation is delivered in face-to-face appointments. But clinical experts note that these standards are due to be reviewed and updated, and the [Cochrane review of pulmonary rehabilitation](#) (2015) that underpins the intervention includes a mixture of home-based methods.

Potential place of digital technologies to support pulmonary rehabilitation in the care pathway

Digital technologies to support pulmonary rehabilitation programmes would be offered as an option to adults with COPD that are referred for a pulmonary rehabilitation course. This could be at the time of diagnosis or following hospitalisation for an acute exacerbation, for example.

Pulmonary rehabilitation courses are typically delivered in groups of 8 to 16 people. They may be held in local hospitals or a range of accessible venues such as community halls, health centres and leisure centres. Pulmonary rehabilitation teams typically include trained healthcare professionals such as physiotherapists, nurses and occupational therapists.

Digital technologies to support pulmonary rehabilitation could be offered to facilitate the delivery of pulmonary rehabilitation in a person's home environment. People using digital technologies that support their pulmonary rehabilitation would still need to attend in-person appointments for their initial and end assessments. Digitally supported pulmonary rehabilitation would be delivered as part of a wider respiratory pathway where people can access several parts of the pathway at the same time. Referrals may come from a broad range of sources where an accurate diagnosis of COPD has been made. This may include, but is not limited to, primary care, intermediate care, secondary care, tertiary care, occupational health, private health or self-referrals for people who have an accurate diagnosis. Patient preference and engagement should be considered when helping people make decisions about the care that they want to receive.

5 Patient issues and preferences

[The NHS service guidance for pulmonary rehabilitation](#) lists a number of ways to improve accessibility to pulmonary rehabilitation services. This includes finding a suitable venue with adequate parking and transport links, delivering programmes at a suitable time, and making accommodations for those who are working where possible. Digital technologies to support pulmonary rehabilitation can be used via mobile phones, tablets or computers and can be accessed remotely in a person's home environment. For people struggling to access face-to-face pulmonary rehabilitation courses due to lack of available services, long waiting lists or inability to attend regular in person sessions (which could be due to travel or mobility restrictions, and other time commitments), digital technologies could improve access and engagement. Digitally supported pulmonary rehabilitation could also appeal to regular users of digital technologies, people who prefer to access healthcare remotely or people who are housebound due to illness.

Some people may not choose to use a digital technology to support their pulmonary rehabilitation and may prefer in-person clinician led treatment if this is available.

People may have some of the following concerns when considering whether they want to use a digital technology as part of their pulmonary rehabilitation:

- ability to use the technology
- fear of breathlessness from exercise (not knowing that some types of breathlessness are acceptable during the exercise)
- unpredictable nature of their co-morbidities
- possible costs incurred from using digital technologies, for example mobile data charges
- level of human support provided during digitally supported pulmonary rehab
- data security and quality control

People should be supported by healthcare professionals to make informed decisions about their care, including the use of digital technologies. Shared decision making should be supported so that people are fully involved throughout their care (see the [NICE guideline for shared decision making](#)).

6 Comparator

The comparator for this assessment is standard care for adults with COPD. Standard care consists of face-to-face pulmonary rehabilitation programmes. Access to pulmonary rehabilitation courses varies depending on location, and

some people are on waiting lists to access services. So, no or delayed treatment is also a relevant comparator.

During the COVID-19 pandemic, many areas provided pulmonary rehabilitation via paper ‘manuals’ of exercises for people with COPD to follow from home, as face to face classes were unavailable in many areas, and this may still be an option in some services (but with face to face assessment before and after the programme). Some areas provide hybrid programmes comprising face-to-face and live sessions delivered remotely (as opposed to a purpose-designed digital technology for pulmonary rehabilitation).

7 Scope of the assessment

Table 1 Scope of the assessment

Populations	<p>Adults with a confirmed diagnosis of COPD who:</p> <ul style="list-style-type: none"> • Have had a recent hospitalisation because of an acute exacerbation, or whose functional baseline has greatly changed and is not following the expected recovery path <p>or</p> <ul style="list-style-type: none"> • Have a MRC dyspnoea score of 2 or above <p>or</p> <ul style="list-style-type: none"> • Have decreased exercise capacity as measured by a validated outcome measure such as the 6-minute walk test
Subgroups	<p>If the evidence allows the following subgroups will be considered:</p> <ul style="list-style-type: none"> • Level of breathlessness (MRC dyspnoea score) • Having or not having comorbidities (including frailty) • Living in a rural or urban setting • Having had an exacerbation which required hospitalisation in the previous 12 months
Interventions (proposed technologies)	<p>Digital pulmonary rehabilitation technologies for adults with COPD. This includes:</p> <ul style="list-style-type: none"> • Active+me REMOTE • CliniTouch • Kaia Health COPD • myCOPD • Rehab Guru • SPACE for COPD • Wellinks

Comparators	<ul style="list-style-type: none"> • Standard care face-to-face pulmonary rehabilitation, either in a clinical or home-based setting • No treatment, or waiting list <p>If data is available:</p> <ul style="list-style-type: none"> • Hybrid of face-to-face and remote live pulmonary rehabilitation • Non-digital non-face-to-face options for components of pulmonary rehabilitation, for example printed exercise sheets
Healthcare setting	Secondary or community care
Outcomes	<p>Outcomes for consideration may include:</p> <p><u>High priority</u></p> <ul style="list-style-type: none"> • Exercise capacity measured by a validated outcome measure • Health-related quality of life • Other measures of respiratory function (including but not limited to the COPD assessment test [CAT] score, the MRC and the modified MRC dyspnoea score) • Intervention completion (receiving a final assessment), adherence, rates of attrition (dropouts) • Intervention-related adverse events • Acute exacerbations, hospital admissions, readmissions or emergency admissions <p><u>Other (if data available)</u></p> <ul style="list-style-type: none"> • Intervention uptake from those offered the technologies • Daily activity • Patient experience, technology usability and acceptability • Healthcare professional experience
Costs	<p>Costs will be considered from an NHS and Person Social Services perspective. Costs for consideration may include:</p> <p><u>High priority</u></p> <ul style="list-style-type: none"> • Costs of healthcare professional time (various grades) to deliver digitally supported pulmonary rehabilitation • Costs of healthcare professional time (various grades) to deliver standard care • Cost of the digital technologies including license fees and staff training <p><u>Other (if data are available)</u></p> <ul style="list-style-type: none"> • Cost to healthcare system of device acquisition, if relevant

	<ul style="list-style-type: none"> • Cost of other resource use (e.g. associated with managing COPD, adverse events, or complications): <ul style="list-style-type: none"> ○ Healthcare appointments in primary, secondary and community care ○ Cost of emergency department attendance, and length of stay if admitted to hospital ○ Medication use and adverse events
Time horizon	The time horizon for estimating the clinical and cost effectiveness should be at least a year. This is to reflect any differences in costs or outcomes between the technologies such as the impact on hospital admissions. One year is also the typical length of time before someone is eligible to repeat a course of pulmonary rehabilitation.

8 Other issues for consideration

Characteristics of digitally enabled programmes

The digital technologies to support pulmonary rehabilitation included in the scope may have differences in terms of mode of delivery (computer, app), length of programme, and the frequency and intensity of support from a range of healthcare professionals. Some technologies solely provide aspects of pulmonary rehabilitation, and some technologies have additional functions, including symptom tracking and medication monitoring.

9 Potential equality issues

NICE is committed to promoting equality of opportunity, eliminating unlawful discrimination and fostering good relations between people with particular protected characteristics and others.

COPD is most common in people over 50. Men tend to be at higher risk of developing COPD than women. There is a higher prevalence of respiratory diseases in people from a lower socioeconomic background due to poorer living conditions and higher rates of smoking. People living in more disadvantaged areas also have a lower life expectancy than the general population. COPD is responsible for 8% of this difference in men and for 12% of this difference in women.

Digital technologies to support pulmonary rehabilitation are accessed via a mobile phone, tablet, or computer. People will need regular access to a device with internet access to use the technologies. Additional support and resources may therefore be needed for people who are unfamiliar with digital technologies or people who do not have access to smart devices or the

internet. People with a visual, hearing, or cognitive impairment, problems with manual dexterity, a learning disability, or who are unable to read or understand health-related information (including people who cannot read English) or neurodivergent people may need additional support to use digital technologies. Some people would benefit to receive their digitally supported pulmonary rehabilitation in a language other than English. People's ethnic, religious, and cultural background may affect their views of digital pulmonary rehabilitation interventions. For example, some people may not want to attend a mixed gender exercise class. Healthcare professionals should discuss the language and cultural content of digitally enabled programmes with patients before use.

In addition, there are groups of people who may struggle to access digitally supported pulmonary rehabilitation, these include people who are homeless, people living in homes of multiple occupancy, people living in residential care and people with mental health conditions.

Age, sex, disability, race, and religion or belief are protected characteristics under the Equality Act 2010.

10 Potential implementation issues

Equity of access

Digital technologies to support pulmonary rehabilitation may not be suitable for some people. COPD is most common in people over 50 and there is a higher prevalence of respiratory diseases in people from a lower socioeconomic background. Some people may be less comfortable or skilled at using digital technologies or may not have access to appropriate equipment, the internet, and may prefer another treatment option.

Capacity limitations

Implementation of digital technologies to support pulmonary rehabilitation may initially increase staff workload to set up new pathways and become familiar with new systems. Staff may need to spend additional time attending training courses or watching training videos. Additional time may also be needed for staff to train patients to use the digital technologies. Some companies may offer patient training, and some may expect local clinicians to provide this to patients.

Costs

Costs of technologies may differ. Implementation of digital pulmonary rehabilitation technologies may initially increase costs to set up new pathways

and change service delivery. These could include training, hardware and internet access costs. Smaller service areas may have higher costs per user due to not needing as many licences for the technology. Digital technologies may be chosen based on the balance between costs and expected outcomes.

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