

Guide to undertaking virtual respiratory assessment for adults

Basic and extended

Healthcare assessments have traditionally been undertaken during face-to-face clinical interactions. Social distancing requirements introduced to prevent community transmission of COVID-19 have resulted in much broader use of virtual care models. This document provides guidance about broader virtual basic respiratory assessment for patients with acute and chronic respiratory condition.

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NSW Health and the NSW Agency for Clinical Innovation provide support for clinicians to transition to telehealth models of care. Each local health district has a telehealth manager or lead who can be contacted for help or advice. Contact information is available [here](#).

Methodology

A rapid review of evidence on validated tools to assess respiratory illness via telehealth in published and grey literature was undertaken by the COVID-19 Critical Intelligence Unit on 15 April 2020. Google and PubMed were searched using the following terms:

- Validated virtual assessment tools
- Respiratory illness
- Virtual respiratory assessment
- Telemedicine assessment
- Measuring respiratory symptoms of Chronic Obstructive Pulmonary Disease (COPD)

Criteria for assessing evidence included: credibility of authors, inclusion of papers in high quality journals, availability of systematic reviews and evidence of validated tools.

Availability of evidence was limited; finding mainly prospective cohort and observational studies for telemedicine assessment, real time testing and accuracy of self-monitoring and clinical outcome patient surveys. No validated tools or studies were found for assessing dyspnoea by telephone or online video consultations, for remote monitoring of respiratory rate or for evidence of the accuracy of smartphone technology for measurement of oxygen saturation.

A further rapid evidence review was released on 2 June 2020 using Google and Twitter search terms:

- How to conduct respiratory assessment by telehealth
- Conducting remote respiratory assessments
- How to measure breathlessness telehealth
- Pulmonary Rehabilitation Remote Assessment
- Respiratory assessment by telehealth

The PubMed search cited evidence that whilst conducting physical examinations remotely by telehealth is recognised to be a challenge in clinical practice, there is evidence that telehealth assessments and monitoring can be carried out for a variety of respiratory illnesses. A systematic review found that forced expiratory volume, assessed daily by using a spirometer, was the most common modality of remote respiratory assessment in people with COPD.¹ Other measurements included resting respiratory rate, respiratory sounds and end-tidal carbon dioxide level.

There are no validated tests for assessing breathlessness in acute primary care settings and insufficient published literature was found which provided detailed clinical guidance and instructions (a 'how-to') for conducting virtual respiratory assessments via telehealth. This resource gap has been acknowledged in other research.^{2,3} Some experts advise that screening include a questionnaire as part of the care delivery system.⁴

NB: This guide to undertaking virtual respiratory assessment should be read in conjunction with the NSW Health guidance [Caring for adults with COVID-19 in the home](#), as the underlying principles for conducting a virtual respiratory assessment on a COVID-19 positive patient also apply to patients with chronic respiratory conditions.⁵

There is emerging evidence of increased usage of mobile technology to collect and send medical and healthcare data to an app, device or service including:

- wearable devices
- mobile equipment and devices that include peripherals
- smartphone apps to collect patient measures.

Australian and NSW Government sites were used to identify relevant policies that support the Guide.

A working group consisting of primary and acute care clinical and telehealth experts supported the development of the document. Consultation was sought from the Virtual Care, Primary Care, Community Health and Respiratory Communities of Practice prior to finalisation.

Purpose

The guide is for clinicians undertaking basic or extended adult virtual respiratory assessment including:

- Primary health care nurses and practice nurses
- General practitioners
- Junior medical officers
- Rural nurse generalists, GPs/VMOs and allied health clinicians
- Hospital in the home programs
- Residential aged care registered nurses

Refer to [inclusion criteria](#) for patients who can appropriately receive care according to this guidance.

This guide supports virtual assessment of respiratory function. However, many patients will have comorbidities which need to be considered in the context of the respiratory assessment. A concurrent general assessment is necessary to place components of the respiratory assessment into context e.g. a raised heart rate in the context of marked anxiety. A healthcare professional should assess whether

virtual respiratory assessment is appropriate on an individual case by case basis.

General assessment should begin with a rapid assessment: Is the patient very sick or not so sick? Does the patient seem distressed?

The primary focus should be on any change in symptoms and placing the symptoms and clinical findings into the context of the patient's medical history with the overall assessment, using open ended questions.

Relevant policy/guidance about respiratory assessment and virtual care

Whilst the guide to undertaking virtual respiratory assessment has been developed to assist clinicians to undertake basic respiratory assessment, where possible it should be read in partnership with other policy documents addressing clinical care of people with COVID-19, virtual care and infection control (Appendix 1).

Adult patient inclusion and exclusion criteria for virtual respiratory assessment

The following criteria are adapted from the [Delivering pulmonary rehabilitation via telehealth during COVID-19](#) guidance developed by the ACI Respiratory Network.⁶

Inclusion criteria

The person:

- is accepting of a virtual respiratory assessment
- has access to an appropriate device (e.g. telephone, smartphone, tablet, or computer/laptop), a reliable internet connection and an adequate data plan to support videoconferencing
- has the ability to operate the device and software (e.g. videoconferencing platform) independently or with the assistance of a family member or a carer
- has access to basic medical equipment (e.g. thermometer and monitoring devices) required for a home assessment
- has adequate hearing and vision to participate in

phone or videoconferencing conversations. Virtual assessment is not suitable for cognitive or hearing-impaired patients unless they have support or other communication tools to assist

- has adequate English language proficiency to follow instructions, or ability to access interpreter services. The NSW Health clinician needs to arrange this through one of the five health care interpreter services.

Exclusion criteria

- Red flag symptoms which require urgent medical consultation.
- Cognitive impairment or no support person available (e.g. previous Mini Mental State Exam score <24).
- If the patient lives alone and is not confident to participate on his/her own or does not have the financial capacity or residential data plan to support videoconference participation
- Poor or unreliable internet, including power outage periods

Health related quality of life

A self-reported respiratory questionnaire suitable for assessing the patient's perception of health-related quality of life (HRQL) can be used to help determine inclusion and exclusion criteria, as well as acting as a component of the rapid assessment.

The COPD Assessment Test™ (CAT) is a patient-reported questionnaire that can quantify the impact of COPD on the patient's health.⁷ A recent systematic review confirmed that the CAT provides reliable measurement of health status for COPD and is responsive to change with treatment and exacerbations.⁸ Since 2013 the CAT has been incorporated as the preferred measure of symptomatic impact of COPD into clinical assessment schemes.

COPD Questionnaires are not validated for use in assessing acute viral respiratory illness, however the CAT does provide a helpful guide regarding HRQL when undertaken with COPD patients as part of the rapid virtual assessment (see Section 8 for rapid assessment process, and Appendices 3 and 4 for CAT questions and scoring).

Deterioration and escalation triggers for adults

Refer to the Recognition and management of patients who are deteriorating policy directive (PD2020_018) for further information.⁹

Red flag symptoms can indicate that the patient needs urgent medical assessment.⁹ It is important to consider within the context of the wider history, that many patients with chronic respiratory conditions, may have signs and symptoms which fall outside red flag parameters at rest, and therefore escalation pathways may not be appropriate.

Paediatric population groups are not within scope of this guide and palliative care and end of life care is not detailed in this document. Breathlessness at end of life is extremely common and assessment should be considered in association with end of life care planning.

Red flags

Red flags include:

- severe breathlessness or difficulty breathing
- sudden onset of severe breathlessness which doesn't go away with usual action plan
- pain or pressure in the chest (clinical discretion necessary)
- blue lips or face/cyanosis
- cold and clammy mottled skin
- respiratory rate >20 (in adults, if this is above the normal baseline for the patient with or without chronic respiratory disease)
- temperature >37.5C (as per the Communicable Disease Network Australia Guidelines)
- heart rate >100 in adults (compared to normal baseline)
- oxygen Saturation <92%, or <88% in patients known to be at risk of hypercapnic respiratory failure (compared to normal baseline)
- new confusion or delirium.

Referral pathway or presentation to ED is recommended in patients where red flags are identified.

Setting up a virtual clinical assessment

Refer to resource list for setting up telehealth in Appendix 2.

Patient information/education for virtual appointments

Refer to the [ACI telehealth patient information sheet – Preparing for a virtual appointment](#)

- NSW Health approved video conferencing platforms for clinical care must be used.
- Approved platforms can be accessed from traditional video conferencing equipment, laptop or desktop (PC or Mac), mobile phones and tablets. A landline connection can be used if only audio is required.
- A laptop/desktop requires the following: webcam, microphone, and speakers-headset (preferably).
- Approved platforms are web based and can be used on both Apple and Android.
- Data required – a 15 minute virtual consultation uses approximately 80MB of data.
- Home environment – low noise, good lighting, privacy, good internet connection.

Browser requirements for external clients and patients		
Laptops/ desktop computers	Windows 7 & 10	Google Chrome v61 + Mozilla Firefox v60 + Microsoft Edge v41 +
	Apple MAC OS 11.1 +	Safari v11.1 +
Mobile phones	Android	Android v7.0 +
	Apple iPhone	iOS v7 + minimum version requirements
Tablets/ iPads	Android	Android v7.0 +
	iPad	iOS 11.x + minimum version requirements

Clinician information/resources for virtual appointments

- [ACI Telehealth Quick Start Summary Guide](#) – this includes Pexip Virtual Meeting Room number and managing appointment bookings
- Medical Records – recording the consultation in the patient record (electronic health record)
- Troubleshooting – Statewide service desk 1300 679 727
- Medicare rebates have been created for out of hospital patients as part of COVID-19 Response – See MBS Telehealth Fact Sheet, current to 31 March 2021
- Activity Based Management for inpatient services provides a guide for data recording and reporting – See NSW Telehealth Master Guide¹¹

Adult respiratory symptoms

The following assessment method is taken from the [Caring for adults with COVID-19 in the home](#) guidance.⁵

Key Clinical Questions

Patients should be asked specific questions regarding:

1. Presence of any of the symptoms below
2. Any changes in current symptoms
3. The development of new symptoms.

Symptoms include:

- **Fever/chills** – patient's temperature, clammy skin, flushed or cyanosed?
- **Cough** – dry or productive?
- **Sputum** – volume, colour and consistency, ease of expectoration?
- **Fatigue** – difficulty completing activities of daily living/change in sleep pattern?
- **Dyspnoea/Shortness of breath/difficulty talking** – able to finish sentences?
- **Wheeze** – audible, continuous or occasional, aggravating activities, relieved by bronchodilator?

Additional patient history and observation measures can be made including:

- Demeanour
 - Is the patient sitting, lying in bed, alert and oriented?
 - Level of activity/activities of daily living.
- Signs of respiratory distress - seating, effort, abdominal breathing, use of accessory muscles for respiration, inability to complete sentences and cyanosis.
 - Count respiratory rate (number of breaths per minute)
 - Depth of each breath, rhythm of breathing
 - Confusion/delirium, speech slurred
 - Ask, how is your breathing today?
 - If the patient has a known chronic respiratory condition, also ask do you have an Action Plan and have you commenced it?
- Signs of anxiety or mental distress – agitation, anxious, worried, fearful, sense of doom.

The rapid evidence review found that there is no evidence to suggest that measuring a patient's respiratory rate over the phone gives an accurate reading, and experts do not use such tests. The Roth Score is a tool in phone assessments for quantifying level of breathlessness, which is assumed to correlate to the level of hypoxia. It combines the maximal count reached and the time taken (starting from 1 to 30) during a single exhalation. However, predicting patient's hypoxia over the phone using the Roth Score does not provide an accurate assessment and may lead to false reassurance.¹²

It is possible to measure respiratory rate via a good video connection. Video also allows a more detailed assessment and may prevent the need for an in-person visit.³ There is no current evidence that smartphone technology is accurate for the clinical measurement of oxygen saturation,⁹ but evidence is still emerging. It is possible to purchase a home pulse oximeter for home use.

Spirometry is the most commonly performed test for assessing respiratory function and is recognized as a valuable tool for identifying and managing chronic obstructive pulmonary disease (COPD), asthma and other disorders affecting the respiratory system.¹³ Spirometry use is dependent on the accuracy of the spirometer and the competence and knowledge of the

operator in performing the test and interpreting the results. However, multiple studies of spirometry in primary care settings¹⁴ have shown poor achievement of adherence to quality criteria, including a lack of knowledge and skill in spirometry performance, access to spirometry training and ongoing support, inability to maintain competency due to infrequent testing and insufficient maintenance and quality control (QC) of spirometers.

In the context of asthma, patient peak flow monitoring could also be undertaken via telehealth.

Infection control

Collecting sputum specimens

Adapted from [COVID-19 - Guidance for community based health services including home visits](#)

- Pathology request form is obtained via GP request.
- Patient collects specimen – provide instruction on the correct technique for collecting sputum.
- External container is wiped with detergent/antiseptic.
- Container is placed in a ziplock plastic bag.
- Specimen is collected from letterbox or delivery arranged to pathology, if not self-isolating or COVID-19 positive.

Cleaning loan equipment

There are many pieces of equipment that are shared and allocated to patients (via community equipment Loan Pools). Provided equipment can be appropriately cleaned and disinfected between use, items can be reused.

If loan equipment is being used, it is the responsibility of the Local Health District equipment pool manager to ensure that any equipment provided for loan is clean and includes cleaning instructions as per the manufacturer guidelines. If in doubt, check with the individual organisation's Infection Control team.

Mobile devices

The device, casing and accessories must be cleaned appropriately before being given to the patient or family member, and after they have been returned.

Hand hygiene must be performed prior to and after touching or handling the device by the patient, health worker and any family member of the patient. When not in use, loan equipment must be stored securely and appropriately.

To clean mobile phones and tablets, unplug all cables and turn off. Using a 70% isopropyl alcohol wipe or Clorox disinfecting wipes, gently wipe the hard, nonporous surfaces of the tablet, such as the display, keyboard, or other exterior surfaces. Don't use bleach (or cleaners containing hydrogen peroxide), window cleaners, household cleaners, compressed air, aerosol sprays, solvents, ammonia, or abrasives to clean.

Avoid getting moisture in any opening and don't submerge the tablet in any cleaning agents.

Headsets

Headsets need to be either cleaned or the shared components must be changed. Items such as these should be cleaned in between use with a detergent/disinfectant - if this is not possible then they should be dedicated to a single person for use.

Virtual adult respiratory assessment – Process flowchart

Adapted from Covid-19: Remote assessment in the Primary Care¹⁰

1. SET UP



- Does the patient have basic medical and monitoring equipment required?
- What device will the patient use to connect?
- What videoconferencing platform will be used?
- Has the patient received information to support a successful assessment and connection e.g. suitable location, equipment, environmental factors and a back-up strategy if the technology fails
- Do the patient and the clinician have headphones (hands free – for accessing health record or monitoring equipment; reduces background noise)
- Open electronic medical record

2. CONNECT



- Check the quality of the video/audio connection: **Can you see/hear me?**
- Confirm the patient's identity – **name/date of birth**
- Check where the patient is joining from and who is present (home, elsewhere)
- Have the patient's phone number in case internet connection fails
- Ensure the patient is in a suitable environment with good lighting and privacy

3. RAPID ASSESSMENT



- Quick assessment to see how sick the patient is
- Too breathless to speak? Ask key clinical questions:
 1. Presence of any of the symptoms below
 2. Any changes in current symptoms
 3. The development of new symptoms.
 - Symptoms include:
 - **Fever/chills** – patient's temperature, clammy skin, flushed or cyanosed?
 - **Cough** – dry or productive?
 - **Sputum** – volume, colour and consistency, ease of expectoration?
 - **Fatigue** – difficulty completing activities of daily living/change in sleep pattern?
 - **Dyspnoea/Shortness of breath/difficulty talking** – able to finish sentences?
 - **Wheeze** – audible, continuous or occasional, aggravating activities, relieved by bronchodilator?
- What does the patient want from the consultation? (clinical assessment, referral, reassurance)
- COPD Assessment Test™ (CAT)
- Borg 0–10 dyspnoea scale

4. HISTORY



- Respiratory history/ diagnosis of chronic respiratory condition/current status?
- Most common symptoms?
- Medications and delivery devices? e.g. check inhalers and delivery techniques
- Previous or current tobacco use and/or Nicotine Replacement Therapy (NRT)
- Home O₂ therapy?
- General medical history
- Vaccinations?
- Who is next of kin/GP?
- Social history?

5. FULL RESPIRATORY ASSESSMENT



In good lighting:

- Ask the patient to describe their state of breathing and colour of face and lips
- Look for general demeanour (sitting up/lying down/anxious/skin colour)
- Check respiratory function – ability to talk in full sentences?
- Ask the following questions (as relevant):
 - How is your breathing?
 - Is it worse today than yesterday?
 - What does your breathlessness prevent you from doing?
 - How independent are you with activities of daily living?
 - If the patient has a diagnosed chronic respiratory condition, ask **when was your last exacerbation or hospital admission?**
- Patient reported: Basic Virtual Assessment
 - Breathing/cough/wheeze or difficulty
 - Temperature
 - Pulse
 - Activities of daily living, exercise tolerance, appetite and sleep
- If equipment is available, in addition to the assessment steps above, also complete a Patient Reported: Extended Virtual Assessment
 - Oxygen saturation/pulse oximeter
 - Blood pressure
 - Peak flow meter in context of asthma
 - Action Plan review in context of chronic respiratory disorders
 - O₂ flow rates if on home oxygen
 - Usage of short acting bronchodilators

Interpret self-monitored results with caution and in the context of your wider assessment.

6. DECISION AND ACTION



- Summarise discussion and actions
- Confirm self-management support (i.e. action plan and referral pathways)
- If COPD, has the patient completed or do they want to participate in a pulmonary rehabilitation program?
- Schedule the next appointment
- If red flags (adult respiratory rate >20, temperature >37.5C, Heart rate > 100, Oxygen Saturation <92%) follow escalation pathway
- Document in the patient record (eMR)

Appendices

Appendix 1 – Relevant policy and guidance about respiratory assessment and virtual care

- The Australian Department of Health has implemented a [COVID-19 National Health Plan – Primary Care Package](#). This includes MBS telehealth services and increased practice incentive payments, aiming to expand access to telehealth to protect vulnerable people and optimise workforce
- Agency for Clinical Innovation Respiratory Network, [Delivering pulmonary rehabilitation via telehealth during COVID-19](#), published April 2020
- NSW Health Virtual Care Community of Practice, [Caring for adults with COVID-19 in the home](#), published August 2021
- Communicable Disease Network of Australia (CDNA). [Coronavirus Disease 2019 \(COVID-19\) National Guidelines for Public Health Units](#), updated 24 August 2020
- Clinical Excellence Commission, [Infection Prevention and Control Novel Coronavirus 2019 \(2019-nCoV\) – Primary and Community Care](#), published February 2020
- Agency for Clinical Innovation, [Telehealth resources](#) (information for [NSW Health clinicians](#), and [patients, carers and other providers](#))
- [NSW Health, Virtual Care, Published March 2019 Virtual Care COP resources](#)
- NSW Health, [COVID-19 \(Coronavirus\) - Guidance for community-based health services including home visiting](#), updated 24 July 2020

Appendix 2 – Resources: Setting up telehealth assessment and virtual care

[ACI Telehealth website](#)

[ACI Telehealth in practice guide](#)

[ACI Telehealth: Getting Started Guide](#)

[ACI Telehealth: Quick start guide summary](#)

[ACI Telehealth: Readiness assessment](#)

[ACI Email Template – Telehealth clinic appointment](#)

[ACI Attending a consultation with your patient using telehealth](#)

[ACI Clinician script to introduce patients to a telehealth appointment](#)

[ACI Patient Information - Attending your appointment using telehealth](#)

[ACI Patient Information Guide - Preparing for a virtual appointment](#)

Appendix 3 – COPD Assessment Test™ (CAT)

The COPD Assessment Test™ (CAT) is a patient-reported questionnaire that can quantify the impact of COPD on the patient's health and quality of life.⁷

The CAT is not validated for use in assessing acute viral respiratory illness, however the following questions may provide a helpful guide when undertaken with COPD patients as part of the virtual rapid assessment (see Section 8).

An electronic version of the CAT can be found [here](#) and includes automatic calculation.

12/23/2020 Patient Site Test Page English Universal

How is your COPD? Take the COPD Assessment Test™ (CAT)

This questionnaire will help you and your healthcare professional to measure the impact that COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your answers and test score can be used by you and your healthcare professional to help improve the management of your COPD and gain the greatest benefit from the treatment.

If you wish to complete the questionnaire by hand on paper, please [click here](#) and then print the questionnaire.

For each item below, place a mark (X) in the box that best describes your current situation. Please ensure that you only select one response for each question.

Example: I am very happy 0 1 2 3 4 5 I am very sad

SCORE

I never cough 0 1 2 3 4 5 I cough all the time

I have no phlegm (mucus) on my chest at all 0 1 2 3 4 5 My chest is full of phlegm (mucus)

My chest does not feel tight at all 0 1 2 3 4 5 My chest feels very tight

When I walk up a hill or a flight of stairs I am not out of breath 0 1 2 3 4 5 When I walk up a hill or a flight of stairs I am completely out of breath

I am not limited to doing any activities at home 0 1 2 3 4 5 I am completely limited to doing all activities at home

I am confident leaving my home despite my lung condition 0 1 2 3 4 5 I am not confident leaving my home at all because of my lung condition

I sleep soundly 0 1 2 3 4 5 I do not sleep soundly because of my lung condition

I have lots of energy 0 1 2 3 4 5 I have no energy at all

TOTAL SCORE

Make sure you print your CAT before visiting your healthcare professional!

A COPD assessment test was developed by an interdisciplinary group of international COPD experts with support from GSK. GSK's activities in connection with the COPD assessment test are monitored by a supervisory council that includes external, independent experts, one of which is chair of the council.

Appendix 4 – COPD Assessment Test™ (CAT) Scores⁷

Quantifies impact of COPD symptoms on patients' overall health and quality of life.

CAT Score	Impact on Daily Life	Action	Patient Score
0–10	Low Impact	Recommend smoking cessation, preventative care and reduced exposure to exacerbation risk factors; consider Long Acting Muscarinic Antagonist (LAMA) and rescue inhalers.	
11–20	Medium Impact	Recommend smoking cessation, preventative care and reduced exposure to exacerbation risk factors, LAMA and rescue inhalers. Consider inhaled corticosteroids (ICS) and long acting Beta Antagonist (LABA) plus referral for pulmonary rehabilitation.	
21–30	High Impact	Recommend smoking cessation, preventative care and reduced exposure to exacerbation risk factors, triple therapy (ICS, LAMA, LABA); consider oxygen supplementation and possible lung transplant evaluation.	
31–40	Very High Impact	Recommend smoking cessation, preventative care and reduced exposure to exacerbation risk factors, triple therapy (ICS, LAMA, LABA), oxygen supplementation and possible lung transplant evaluation. Medical Review required.	

The CAT is one component in clinical decision making, along with other considerations such as history of previous exacerbations and airflow limitation.

For all people with chronic respiratory conditions, smoking cessation, preventative care (e.g. annual flu/pneumococcal vaccinations) and reduced exposure to exacerbating risk factors are mainstays of management.

CAT scores may also worsen where a patient has stopped or is not taking their treatment effectively. Check inhaler technique as well as adherence to treatment. Where rapid disease progression is suspected, referral for specialist opinion may be required.

CAT Scores are calculated according to severity scale from <https://www.mdcalc.com/copd-assessment-test-cat#next-steps>

APPENDIX 5 – Modified Borg Dyspnoea Scale¹⁵

0	Nothing at all
0.5	Very, very slight (just noticeable)
1	Very slight
2	Slight
3	Moderate
4	Somewhat severe
5	Severe
6	
7	Very severe
8	
9	Very, very severe (almost maximal)
10	Maximal

Patient Instructions for Borg Dyspnoea Scale

This is a scale that asks you to rate the difficulty of your breathing. It starts at number 0 where your breathing is causing you no difficulty at all and progresses through to number 10 where your breathing difficulty is maximal. How much difficulty is your breathing causing you right now?

Freecall 1800 654 301

www.lungfoundation.com.au

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