Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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REVIEW

Teleconsultation in respiratory medicine – A position paper of the Portuguese Pulmonology Society

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Abstract The COVID-19 pandemic crisis, among so many social, economic and health problems, also brought new opportunities. The potential of telemedicine to improve health outcomes had already been recognised in the last decades, but the pandemic crisis has accelerated the digital revolution. In 2020, a rapid increase in the use of remote consultations occurred due to the need to reduce attendance and overcrowding in outpatient clinics. However, the benefit of their use extends beyond the pandemic crisis, as an important tool to improve both the efficiency and capacity of future healthcare systems. This article reviews the literature regarding telemedicine and teleconsultation standards and recommendations, collects opinions of Portuguese experts in respiratory medicine and provides guidance in teleconsultation practices for Pulmonologists.

Abbreviations: Teleconsultation, A Portuguese Pulmonology Society postion paper.

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Introduction

Since its definition and first implementation initiatives at the end of the last century, the practice of telemedicine has

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had the potential to have a positive impact on healthcare services and health outcomes in many ways. COVID-19 and the need to reduce attendance and overcrowding in outpatient clinics led to several changes in the care and organisation of Pulmonology services. Portugal has seen a rapid increase in the use of remote consultations.

Remote consultations have proved important in reducing pressure on health services and improving access to non-COVID patients — and this is an important lesson. Although teleconsultations cannot fully replace face-to-face consultations, evidence shows that they can achieve equivalent patient outcomes while improving patient satisfaction.[1,2] Looking to the future, in a pandemic-free scenario, teleconsultations appear as a cost-effective and efficient way to enable access to routine care for chronic respiratory patients and should be incorporated, as an additional tool, in the medical care of these patients.

Nevertheless, as telemedicine and teleconsultation programmes pose unquestionable advantages in improving healthcare's efficiency, their implementation is far from optimization. Significant limitations in terms of overall guidance, both scientific and organizational, threaten their appropriate delivery. This is especially relevant in chronic respiratory diseases, as the heterogeneity of clinical conditions and patient journeys' steps demand specific guidelines.

This article reviews the literature regarding telemedicine and teleconsultation standards and recommendations, collects opinions of Portuguese experts in respiratory medicine and provides guidance in teleconsultation practices for Pulmonologists.

Methodology

A narrative non-systematic literature search of MEDLINE/Pubmed database was conducted in December 2020 using the keywords "telemedicine", "telehealth", "telemonitoring", "teleconsultation" and "video consultation". Also, other international and national societies were searched on this topic as well as documents from Portuguese authorities regarding legal issues and implementation. Other references were proposed by the authors throughout the preparation of the document and added to the final references.

Three meetings with all authors took place between January and June 2021.

The methodology applied for the elaboration of this document is shown in Fig. 1.

Telemedicine's definition and framework

Definition

Telemedicine, according to its first nomenclature reconciliation by the World Health Organization, was defined as "the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities".[3]

More recently, from a more operational perspective, telemedicine has been seen as the "distribution of health services in conditions where distance is a critical factor, by health care providers that use information and communication technologies to exchange information useful for diagnosis where a doctor is able to perform diagnosis at distance"[4], having the potential of mediating patients' contact with specialised care consultants.[5] Although a broader concept of telehealth has been argued,[4,6,7] for the purposes of this paper, 'telemedicine' and 'telehealth' are used interchangeably. There are core elements in telemedicine that must always be respected[7]:

- its purpose of providing clinical support;
- its intention to overcome geography issues, connecting patients to healthcare professionals in different locations;
- its practice including the use of information and communication technologies;
- its goal of improving health outcomes.

Framework

In Portugal, telehealth has been perceived as a core part of digital transformation strategies in health by addressing geographic inequalities and improving access to healthcare, thus improving the health system's effectiveness and efficiency.[6] Indeed, good outcomes and promising local and regional strategies have been reported in our country.[8,9]

Furthermore, general standards for the legal practice of teleconsultations in Portugal have been established,[10] including: respecting the doctor-patient relationship, ultimately not to be replaced by teleconsultations; ensuring the independence of physicians, who shall follow this practice when a good clinical overview of the patients' condition is deemed possible; and ensuring that the physician has quality, complete, and sufficient information through teleconsultation to make a medical decision. In addition, a governmental guidance was released in 2015, focusing on teleconsultations between different healthcare institutions, with the objective of improving access to a specialised healthcare team even across long distances. That guidance falls outside the scope of this document as it applies to forms of doctor-doctor interaction where clinical cases of patients are discussed.

Telemedicine in clinical practice: teleconsultations

Telemedicine enables doctors and other healthcare providers to assist their patients beyond physical limitations as it encompasses a spectrum of diverse technologies and applications.[11]

Recently, Artificial Intelligence (AI) has been applied to medical care, not only in improving remote healthcare, in developing algorithms to match the availability of healthcare providers to patients, but even going beyond the doctor-patient relationship.[12,13] Examples of this are AI-based machine learning methods, which may even eventually replace clinical judgment.[14] Several questions and concerns have been raised, namely ethical, legal, and privacy issues.[13] These new forms of digital healthcare are beyond the scope of this paper and will not be addressed here.

The different modalities of telemedicine can be grouped in three categories (Fig. 2).[15]

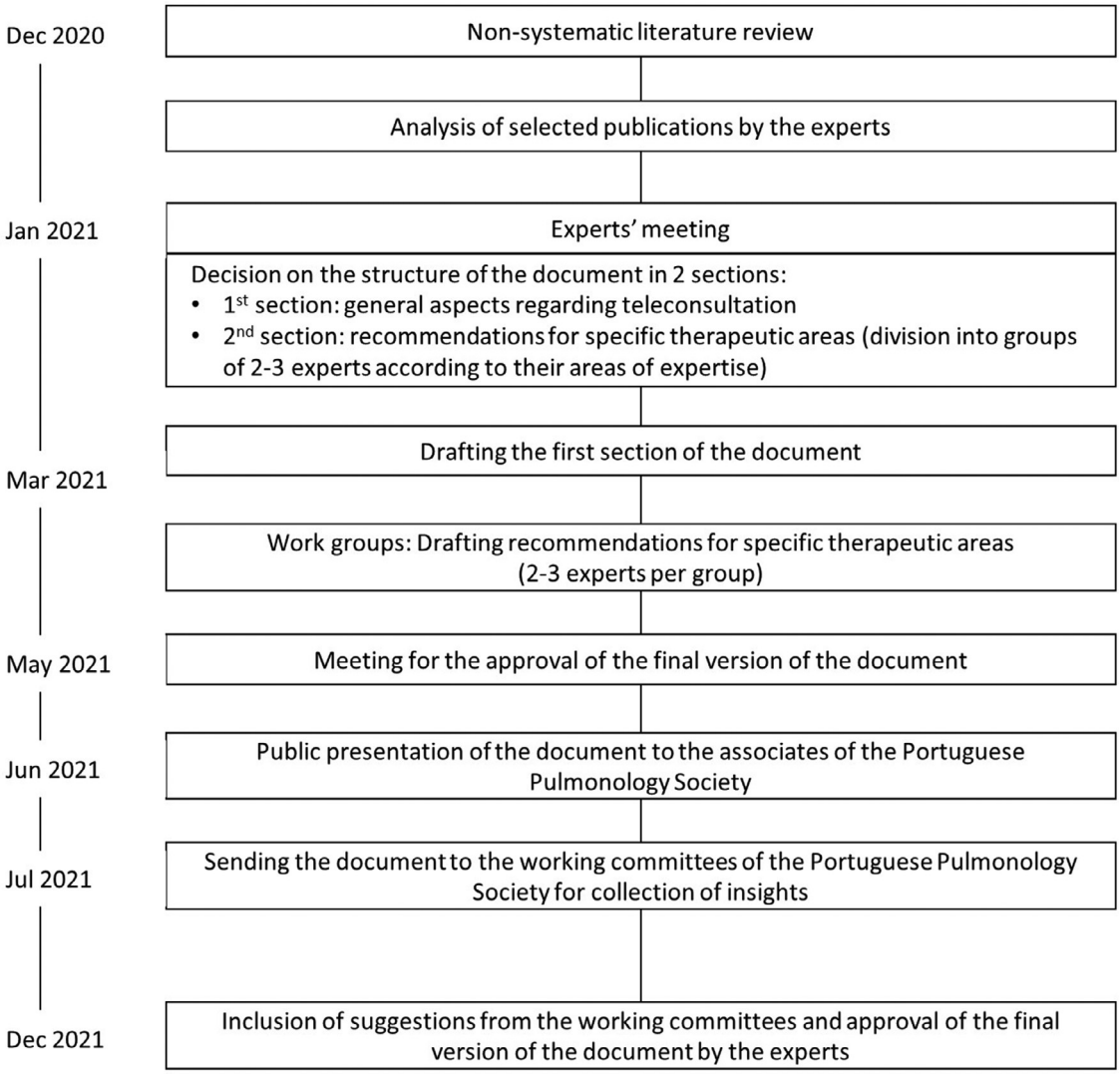

Fig. 1 Timeline and methodology used for the preparation of this document.

We will focus on teleconsultation,[16] defined as consultation in which information and communication technologies are implemented in order to overcome geographical and functional distances,[17] carried out through video and/or audio.

Teleconsultation is only a small part of telemedicine. However, teleconsultations imply that some of the other strategies are already in place. For example, in a patient with chronic respiratory failure under home non-invasive mechanical ventilation, a teleconsultation is only appropriate where telemonitoring is already happening - not only reporting adherence and ventilatory efficacy parameters, but also real-time monitoring, such as night-time oximetry and/or oxy-capnography. Home care providers have been playing a key role in this type of support, but wireless monitoring systems linked to hospital systems are now also available.

There is still a long way to go in the context of telemedicine. And this great boost that teleconsultation has had in the last year can definitely enhance the development of other potentialities of telemedicine.

It is of utmost importance to stress that the use of information and communication technologies in health should always safeguard the security of information, ensuring data privacy and confidentiality. Thus, only platforms that respect these conditions should be used.

Advantages of teleconsultation

Teleconsultations make it possible to assess, diagnose, and treat patients remotely. These take place using one of two main approaches: remote patient−doctor contact while the patient remains at home; or the patient going to a local clinic or hospital, where other healthcare providers mediate the contact with a consultant physician. The latter is indicated in clinical conditions in which a clinical and/or biometric physical evaluation is required. Both approaches encompass several advantages,[6,18−21] such as:

- increasing access to specialists regardless of their national distribution;
- improving articulation between different physicians and levels of care of the health system, namely by facilitating the communication between hospital physicians and general practitioners;

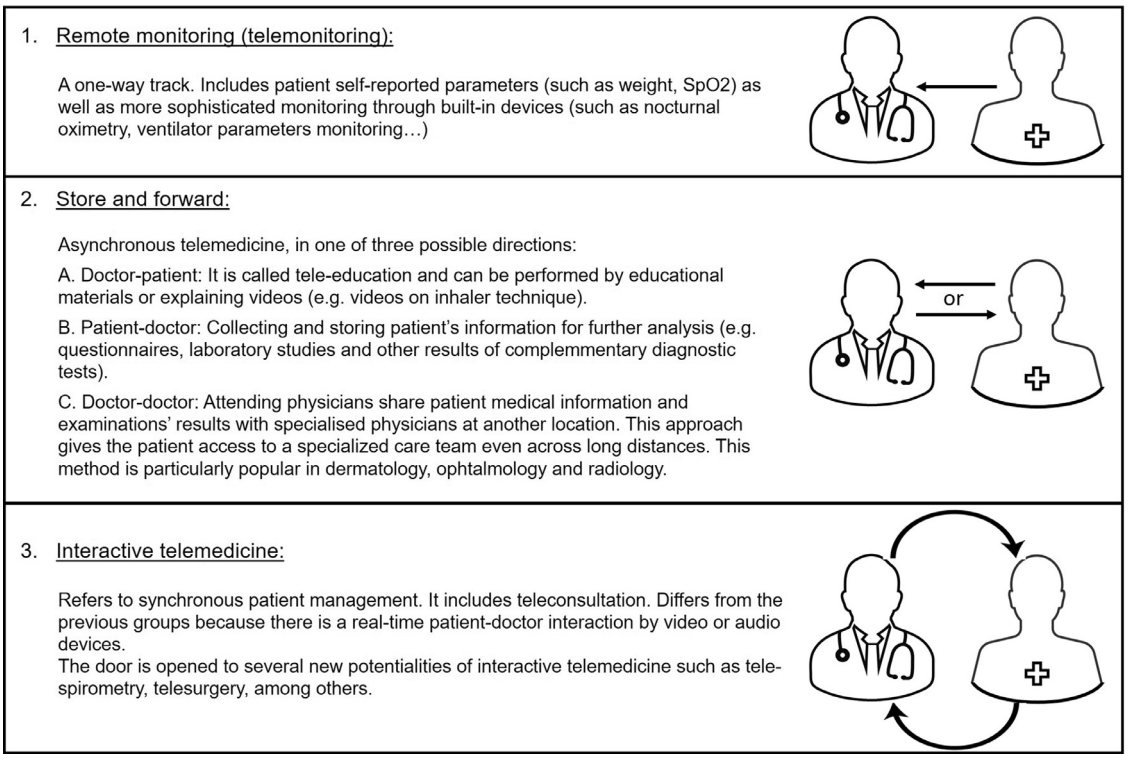

Fig. 2 Three categories of telemedicine.[15] This figure is an original image created by the authors for this publication.

- gains in care effectiveness, coupled with gains in comfort, time, and travel costs for patients;
- supporting long-term home management of specific chronic health conditions;
- reducing infections associated with healthcare services due to less crowded waiting rooms.

With regard to minimising infectious risks, critical during the pandemic of COVID-19, telehealth was established in a systematic review as very appropriate for reducing disease transmission and overall morbidity and mortality.[22] It has been argued that the pandemic led to the development of more "sophisticated" telemedicine, by simplifying processes and reducing unnecessary complexity,[23] although consensus practices remain to be established.[24]

Teleconsultation's limitations

Examples of good outcomes of telemedicine have been published, namely in Chronic Obstructive Pulmonary Disease – COPD.[25] However, teleconsultations are not suitable for all patients and for all clinical situations.[26] From a technological perspective, it is important to ensure adequate technical infrastructures (phone, computer, internet connection, as appropriate)[27] and carefully keep in mind that "technology should always be adapted to the patient and not the reverse".[25] The transition to teleconsultation, with its related bureaucratic processes, at least at the beginning, does not seem to minimize consultation time. From a clinical perspective, some conditions are not adequately managed by teleconsultation,[26–28] and some objectives of consultation may not be achieved with this modality.[27] Finally, only clinicians duly trained in teleconsultation should perform it,[29] and practices shall be standardised, compliant, and regulated.[28]

Video and audio-teleconsultations

Video consultations have shown some advantages over audio (telephone) consultations,[26] such as more personal contact between health professionals and patients,[26,30,31] although strong evidence of their effectiveness is still lacking.[24] These consultations are generally suitable for:

- younger patients (< 65 years), with good digital literacy in the technological solution used;
- follow-up consultations for clinically stable patients where a full physical exam is not expected to be necessary (as video consultations allow some parts of a physical examination to be performed). First consultations and consultations due to new symptoms should only be considered in very specific and well-defined clinical circumstances;
- situations where the video is the preferred method for both clinician and patient.

On the other hand, telephone (audio) consultations tend to be shorter and have a more restricted patient disclosure of health problems than face-to-face consultations.[30] These consultations may generally be appropriate for:

- older patients (≥ 65 years) and/or those with poor digital skills in complex technological solutions;
- settings where complex video call setup and/or technical infrastructures for video consultation are unattainable;
- consultations aimed at addressing simple health concerns by the patient or the physician;
- follow-up of clinically stable patients in which a physical examination is not necessary;

- situations in which a teleconsultation is deemed appropriate by both clinician and patient, and telephone is their preferred method.

Finally, there are specific situations that should exclude the possibility of a teleconsultation,[27,28] such as:

- presence of acute respiratory symptoms;
- new complications of underlying diseases;
- consultations where severe prognostic circumstances are expected to be addressed;
- or consultations where decompensation of underlying diseases cannot be correctly established.

Teleconsultations in Pulmonology's clinical practice

In the field of Pulmonology, the use of telemedicine has been proposed and reported in the management of chronic obstructive pulmonary disease (COPD), asthma, interstitial lung diseases (ILD), chronic respiratory failure (CRF), and home mechanical ventilation (HMV), among other clinical situations.[32] Even before the COVID-19 pandemic, there were some validated tools and scales for remote assessments in respiratory medicine.[33] More than 50% of pulmonologists rated the importance of telemedicine as "high" or "very high",[34,35] with potential for better care in chronic respiratory diseases such as asthma and COPD.[28]

After the COVID-19 pandemic, teleconsultation will still have a place in the future of respiratory medicine. Our view is mirrored by other publications, whose authors have recognised the incorporation of new technologies into new models of care as the key to the future success of Pulmonology.[23] Moreover, teleconsultation is seen as an important tool to improve both the efficiency and capacity of future healthcare systems,[35] and the potential for greater control and care in chronic respiratory diseases has been acknowledged.[28]

Considering teleconsultation in respiratory diseases, this document will address:

- general issues, including patient suitability and selection.
- specific issues, related to each respiratory disease.

General guidance

From a general perspective, we find that it is important to highlight some essential principles for the correct implementation of teleconsultation in respiratory diseases − Table 1.

Patient selection

Main eligibility criteria are common to the different respiratory diseases.[36] The particularities regarding specific diseases will be described below.

Inclusion Criteria

- Adults (≥ 18 years) with a diagnosis of respiratory disease, with a suspected or diagnosed sleep-disordered breathing, or referred for smoking cessation;
- Verbal or written consent to perform the teleconsultation;
- Availability and familiarity with a suitable device - phone, mobile phone, tablet or computer;
- Patients already followed by the department.

Exclusion Criteria

- Current exacerbation or clinical instability requiring urgent physical examination;
- Physical or cognitive impairment that makes the teleconsultation unfeasible.

Suitability[36]

- First consultations for smoking cessation and sleep-disordered breathing may be suitable, as described below.
- Follow-up consultations and hospital discharge follow-up consultations should be considered, respecting individual plans of care for each patient according to the disease and clinical condition. Renewal of therapy plans for medication and oxygen or ventilation therapies is a clear indication for teleconsultation.
- An unscheduled consultation shall be considered if there is a need by the patient to have an additional consultation related to his/her condition. In this case, there should be an assessment of the situation through teleconsultation, and, if it is not possible to adequately resolve the problems, a face-to-face consultation should be proposed and scheduled.
- Another potential use of teleconsultation is as initial screening of acute situations for chronic respiratory patients in home care, to better decide between a home visit or a face-to-face consultation in the hospital.

Table 1 General guidance steps in teleconsultations[21,35,36].

General Guidance Steps in Teleconsultations.
1. Use of a secure platform which complies with legal data protection requirements.
2. Ensure privacy and an adequate physical, acoustic, and visual environment.
3. Introduction of healthcare staff present and verification of patient's identity.
4. Obtain verbal or written consent for the virtual consultation.
5. Check technical problems and ensure suitable two-way communication.
6. Provide a short explanation of teleconsultation (definition and rationale).
7. Proceed with teleconsultation, keeping written records of all relevant information.
8. Agree upon the ending of the consultation and schedule a follow-up consultation, if applicable.

Guidance regarding respiratory tele-rehabilitation, given its own specificities, falls outside the scope of this document and will be described elsewhere.

In this document, we discriminate the disease-specific criteria for each of the follow-up consultations in the different respiratory diseases.

However, the preparatory steps apply to all of them, and are described below.

Pre-consultation

1. Register collection of verbal or written consent in patient's medical records.
2. Schedule the appointment for a time when the patient is rested and comfortable, set a duration per call and provide any applicable questionnaires/scales, if possible
3. Define a backup plan in case the teleconsultation needs to be canceled on a short notice.

Telemedicine in Pulmonology's specific indications

Asthma[36–42]

These recommendations only apply to follow-up consultations.

1. Guidance steps

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Assess asthma control by clinical assessment and through validated questionnaires (ACT - Asthma Control Test / CARAT – Control of Allergic Rhinitis and Asthma Test).
3. Assess exacerbation events since the previous consultation, including admissions and emergency visits. Detail date of occurrence, type and duration of drugs administered (specifically systemic corticosteroids).
4. Assess frequency of reliever medication use.
5. Assess environmental exposures (smoking, indoor and outdoor pollution, allergens), work-related exposures and other potential triggers.
6. Check medication withdrawal.
7. Check adherence to treatment.
8. Review inhaler technique (ideally by video call). If incorrect, reinforce education on correct inhaler technique – through detailed explanation, demonstration (if video-consultation) or through pre-recorded videos available (e.g. by sharing screen). If necessary, schedule a face-to-face visit to reinforce education on inhaler technique.
9. Assess the occurrence of adverse events to medication.
10. Measure oxygen saturation by pulse oximeter, if available.
11. Review peak expiratory flow measurements, if applicable.
12. Review the results of tests performed (laboratory studies, imaging, spirometry and others, as appropriate).
13. Assess coexistence of comorbidities that may interfere with disease control and request tests or refer to other specialities if necessary.
14. Request the appropriate tests (laboratory studies, lung function tests, imaging, as adequate).
15. Review the action plan: recognition and appropriate reaction to acute exacerbations (how and when to take medication, when to call the physician, and when to get emergency care).
16. Review the prescribed treatment and reinforce the importance of adherence to treatment.
17. Treatment adjustment, if necessary.
18. Provide instructions on the new treatment prescribed, if applicable. In case a new inhaler is prescribed, provide explanation of inhaler technique – ideally through demonstration (if video-consultation) or through pre-recorded videos available (e.g. by sharing screen). If necessary, schedule a face-to-face visit to reinforce education on inhaler technique.
19. Review non-pharmacological strategies: patient avoidance behaviours (identify triggers and remind how to avoid them) and modifiable risk factors.
20. Schedule the following consultation (teleconsultation or face-to-face appointment).

Specific tools and recommendations

- Asthma Control Test (ACT) / Control of Allergic Rhinitis and Asthma Test (CARAT)
- Peak expiratory flow meter, if applicable
- Pulse oximeter, if available
- Inhalers to explain inhaler technique (if video consultations) or pre-recorded videos on specific inhalers
- Electronic prescription system

COPD/ non-cystic fibrosis bronchiectasis[35–37,43–46]

These recommendations only apply to follow-up consultations.

1. Guidance steps

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Assess symptom control by clinical assessment or through validated questionnaires as applicable:
   - Dyspnea and other symptoms through validated questionnaires (modified Medical Research Council - mMRC and/or COPD Assessment Test – CAT).
   - Cough and its characteristics
   - Sputum production, its volume and consistency / colour changes.
   - Nocturnal symptoms.
3. Assess occurrence of acute exacerbations and their severity since the previous consultation, including admissions and emergency visits. Detail date of occurrence, type and duration of drugs administered (specifically antibiotics and systemic corticosteroids).
4. Check medication withdrawal.
5. Check adherence to treatment.
6. Review inhaler technique (ideally by video call). If incorrect, reinforce education on correct inhaler technique – through detailed explanation, demonstration (if video-consultation) or through pre-recorded videos available (e.g. by sharing screen). If necessary, schedule a face-to-face visit to reinforce education on inhaler technique.
7. Assess the occurrence of adverse events to medication.
8. Measure oxygen saturation by pulse oximeter, if available.
9. Review the results of the tests performed (laboratory studies, sputum microbiological tests, imaging, spirometry and others, as appropriate).

10. Assess coexistence of comorbidities that may interfere with disease control and request tests or refer to other specialties if necessary.
11. Request the appropriate tests (laboratory studies, lung function tests, imaging, as adequate).
12. Review the action plan: recognition and appropriate reaction to acute exacerbations (how and when to take medication, when to call the physician, and when to get emergency care).
13. Check compliance (% days; hours per day) with long term oxygen therapy or non-invasive ventilation, as appropriate. In patients with non-invasive ventilation, check ventilation parameters and adjust as necessary.
14. Review the prescribed treatment and reinforce the importance of adherence to treatment.
15. Treatment adjustment, if necessary.
16. Provide instructions on the new treatment prescribed, if applicable. In case a new inhaler is prescribed, provide explanation of inhaler technique — ideally through demonstration (if video-consultation) or through pre-recorded videos available (e.g. by sharing screen). If necessary, schedule a face-to-face visit to reinforce education on inhaler technique.
17. Review modifiable risk factors and behaviours, with a special focus on smoking habits. In case of active smoking, review motivation to quit smoking.
18. Review non-pharmacological strategies and reinforce their importance. Assess present or previous enrolment in respiratory rehabilitation programs.
19. Assess family / social support.
20. Schedule the following consultation (teleconsultation or face-to-face appointment).

Specific tools and recommendations

- mMRC Questionnaire
- COPD Assessment Test (CAT) Questionnaire
- Pulse oximeter, if available
- Inhalers to explain inhaler technique (if video consultations) or pre-recorded videos on specific inhalers
- In patients with non-invasive ventilation, access to ventilator reports (adherence and ventilation parameters); to nocturnal oximetry and/or nocturnal oxi-capnography and diurnal recording of end-tidal or transcutaneous CO2
- Electronic prescription system

Lung cancer[36,47,48]

These recommendations apply to follow-up teleconsultations in patients diagnosed with lung cancer who have undergone previous curative surgery and do not require additional treatment beyond adjuvant therapy.

There are, however, some anecdotal lung cancer cases that can be considered after a long course of stability without treatment requirement, although that orientation should be validated by an accurate evaluation and decision from the multidisciplinary team meeting.

Apart from lung cancer, incidental pulmonary nodules follow-up requires serial chest CT evaluation and is guided by algorithms, posing a particular indication for teleconsultations.

1. Guidance steps

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Assess symptom control by clinical assessment.
3. Assess acute events since the previous consultation, including admissions and emergency visits.
4. Characterise patient performance status through validated scales (ECOG Performance Status Scale/ Karnofsky Performance Status Scale).
5. Check medication adherence and withdrawal, if applicable.
6. Assess the occurrence of adverse events to treatment prescribed.
7. Assess compliance with the respiratory rehabilitation program defined for the patient, if applicable.
8. Measure of oxygen saturation by pulse oximetry, if available.
9. Review the results of tests performed (laboratory features, tumour markers, imaging, lung function tests, and others, as appropriate).
10. Assess coexistence of comorbidities and request tests or refer to other specialties, if necessary.
11. Request the appropriate tests (laboratory studies, tumour markers, lung function tests, imaging, as adequate).
12. Review the prescribed treatment and reinforce the importance of adherence to treatment.
13. Treatment adjustment, if necessary.
14. Review non-pharmacological strategies and modifiable risk factors, such as smoking. Promote or reinforce smoking cessation.
15. Schedule the following consultation (teleconsultation or face-to-face appointment).

Specific tools and recommendations

- ECOG Performance Status Scale/ Karnofsky Performance Status Scale
- Pulse oximeter, if available
- Electronic prescription system

Smoking cessation[36,49—53]

These recommendations apply to smokers who want to make a serious attempt to quit smoking and who have been referred to a Pulmonology clinic for assessment. First-time and follow-up consultations, unscheduled consultations, and end of follow-up consultations should be considered. We reinforce that first-time teleconsultations should be video consultations.

1. Guidance steps

First consultation

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Self-declaration of tobacco consumption.

3. Assess and characterise smoking history and smoker's profile, including triggers for smoking and barriers for cessation.
4. Determine weight and height.
5. Assess motivation to quit smoking through the Visual Analogue Scale and through a validated questionnaire: Richmond test.
6. Review patient medical history (comorbidities and concomitant medication).
7. Assess nicotine dependence through a validated questionnaire: Fagerström test.
8. Assess anxiety and depression symptoms through HADS (Hospital Anxiety and Depression Scale).
9. Characterise the smoker behaviour profile.
10. Set a personalised program, discuss possible therapeutic interventions, and define the D-day to quit smoking.
11. Request appropriate tests, if necessary.
12. Provide pharmacological treatment, if necessary, and a written behavioural plan.
13. Schedule a follow-up consultation (preferably 8-15 days after D-day) and request complementary exams, if necessary.

Follow-up consultation

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Self-declaration of tobacco consumption.
3. When applicable, determine if D-day was accomplished and congratulate the patient. If there is still tobacco consumption, reassess, discuss relapsing issues, encourage to set a new D-day and reinforce commitment to smoking cessation.
4. Determine weight variation.
5. Assess compliance with treatment plan. Reinforce information on how drugs work and the need to comply with the full treatment.
6. Rule out the occurrence of adverse events to medication.
7. Give advice on how to manage withdrawal symptoms: irritability, difficulty in concentrating, pain, fatigue, headache, increased appetite, insomnia, and constipation. Reinforce behavioural strategies.
8. In case of persistent high levels of anxiety or depression, consider referring for psychologic or psychiatric evaluation. If increasing appetite and weight, consider referring for nutritional support.
9. Work on relapse prevention strategies.
10. Schedule the following consultation according to the progression on the cessation process.

- Unscheduled consultation
  If there is a need to review treatments, their duration and adverse events, if there is a relapse, or in case of vital situations that require close monitoring.
- End of follow-up consultation
  At 12 months after starting treatment, if there has been abstinence for more than 6 months, no craving, and absence of significant weight gain (< 3-4 Kg) or psychological diseases or distress.

Specific tools and recommendations

- Visual Analogue Scale on motivation to quit smoking
- Richmond test
- Fagerström test
- Hospital Anxiety and Depression Scale
- Smoker behavioural profile evaluation
- Electronic prescription system

Sleep-disordered breathing[36,54–58]

First consultations and follow-up consultations should be considered for patients with sleep disorders.

Follow-up teleconsultations in sleep medicine are highly dependent on telemonitoring, not only in terms of adherence, but mainly for checking efficacy parameters. No follow-up teleconsultation should occur without the PAP device report. Other telemonitoring options may be suitable, such as nocturnal oximetry under PAP treatment.

1. Guidance steps

First consultation

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Assess occupation. Seek professions with high-risk consequences in the case of sleep disorders, such as truck drivers and others.
3. Review patient medical history (medical and psychiatric comorbidities, comorbid sleep disorders, and concomitant medication).
4. Assess and characterise smoking habits and alcohol intake.
5. Detail sleep history – including sleep habits (sleep hygiene), sleep environment, timing, duration and quality of sleep, daytime naps, activities performed before initiation of sleep.
6. Assess daytime sleepiness through Epworth Sleepiness Scale.
7. Check for other symptoms associated with sleep-disordered breathing – such as snoring, witnessed apneas, gasping, non-refreshing sleep, frequent awakenings, morning headache, morning fatigue, irritability and cognitive impairment.
8. Assess body mass index (BMI).
9. Assess craniofacial patient morphology (by video call).
10. Request appropriate diagnostic tests and explain the procedure, as well the preparatory recommendations.
11. Review non-pharmacological strategies, with special focus on sleep hygiene, and reinforce their importance.
12. Treatment prescription, if applicable. Detailed explanation of treatment – its purpose, explanation of device's performance and interface selection.

Follow-up consultation / Checking the results of diagnostic tests

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Check sleep diary, if applicable.
3. Review results from the sleep study performed, if applicable.

4. Treatment prescription, if applicable. Detailed explanation of treatment — its purpose, explanation of device's performance and interface selection.
5. Assess clinical response to treatment.
6. Assess daytime sleepiness through Epworth Sleepiness Scale.
7. Assess other symptoms that may be to poor efficacy of treatment, such as snoring, witnessed apneas, gasping, non-refreshing sleep, frequent awakenings, morning headache, morning fatigue, irritability and cognitive impairment.
8. In patients under PAP treatment, check adherence (through PAP devices with built-in wireless connectivity or through PAP reports prepared by the home care provider).
9. Check PAP parameters of efficacy, such as residual apnea-hypopnea index (AHI).
10. Assess the occurrence of adverse events to treatment — nasal symptoms, aerophagia, interface-related side effects, among others.
11. Review changes in sleep habits and recommendations on sleep hygiene.
12. Review PAP prescription if necessary and consider need for additional treatment.
13. Schedule nocturnal oximetry or other tests, if necessary.
14. Schedule the following consultation (teleconsultation or face-to-face appointment).

Specific tools and recommendations

- Epworth sleepiness scale
- Sleep diary
- PAP report prepared by the provider company or obtained through built-in wireless connectivity
- Electronic prescription system of home respiratory care

Home mechanical ventilation[4,36,59,60]

Follow-up teleconsultations may be considered for patients with suspected or diagnosed Nocturnal Hypoventilation Syndrome. This also applies to neuromuscular patients, depending on the speed of disease progression and clinical judgement.

Patients who require previous evaluation to start non-invasive ventilatory support are not suitable for teleconsultation. Also, patients of high complexity (e.g. Amyotrophic Lateral Sclerosis) or highly ventilator-dependent may require a face-to-face assessment, a home visit, or a scheduled hospital admission.

Considering the potential role of the caregiver, physical or cognitive impairment should not be regarded as exclusion criteria for teleconsultation.

1. Guidance steps

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Review results from the diagnostic tests performed - spirometry, peak cough flow, arterial blood gases, sleep study, nocturnal oximetry and/or oxi-capnography, as appropriate.
3. Treatment prescription, if applicable. Detailed explanation of treatment — its purpose, explanation of device's performance and interface selection.
4. Assess response to treatment by clinical assessment or through validated questionnaires — Severe Respiratory Insufficiency (SRI) Questionnaire / S3-NIV Questionnaire.
5. Assess symptoms of clinical deterioration (increased daytime sleepiness, orthopnea, morning headache, dysphagia, etc.) by clinical survey, as well as a disproportionate increase in hours of ventilation or respiratory rate recorded in built-in ventilator software.
6. Measure oxygen saturation by pulse oximetry.
7. Check adherence to treatment (through ventilators with built-in wireless connectivity or through reports elaborated by the provider company).
8. Check ventilator parameters of efficacy.
9. Check nocturnal oximetry and/or oxi-capnography results to assess correction of nocturnal hypoventilation.
10. Review the prescribed treatment.
11. Verification of correct placement of the interface (nasal, oronasal, etc.). Prevent and rule out the existence of interface-related side effects (pressure ulcers, dermatitis, etc) — ideally through a video call; alternatively, make use of videos or demonstrate application of interface placement.
12. Assess the occurrence of other adverse events to treatment, such as nasal symptoms, aerophagia, among others.
13. Schedule nocturnal oximetry and/or oxi-capnography or other tests, if necessary.
14. Update of the prescription in the digital platform available, to inform the company provider of therapies for the replacement or exchange of consumables, interface and equipment.
15. Schedule the following consultation (teleconsultation or face-to-face appointment).

Specific tools and recommendations

- Questionnaires (SRI / S3-NIV)
- Pulse oximeter
- Ventilator reports prepared by the home care provider or obtained through built-in wireless connectivity. Ventilatory parameters — minimum requirements: compliance (including graph with hours of use), programmed ventilatory parameters, trend graph and / or measurement of leakage, AHI, % triggered breaths pressure, flow and alarm management
- Access to monitoring tools of ventilation efficacy — nocturnal oximetry and/or oxi-capnography
- Electronic prescription system of home respiratory care

Interstitial lung disease[36,44,61—64]

Interstitial Lung Diseases (ILDs) encompass a range of distinct diseases with substantial differences in their underlying pathophysiological mechanisms, therapeutic approach, and prognosis.

Regardless of ILD, all consultations during the diagnostic approach should be done face-to-face until the diagnosis is fully established at the Multidisciplinary Team meeting. Thereafter, diseases such as sarcoidosis or some smoking-related disorders (e.g. respiratory bronchiolitis associated

with ILD), which often have a stable clinical course and do not need any significant therapeutic intervention, are much more suitable for teleconsultation. In contrast, in all other ILDs that require complex therapeutic interventions, such as immunosuppressants and antifibrotic agents, or have a more unstable clinical course with risk of progression, patients need to be assessed in person. Therefore, the modality of the consultation will depend on the nature of the disease and the particularities of the drugs prescribed.

1. Guidance steps

1. Introduction and confirmation of consent to perform the teleconsultation.
2. Assess dyspnea through validated questionnaires (mMRC).
3. Assess disease impact (e.g. through questionnaires such as King's Brief Interstitial Lung Disease – K-BILD – health status questionnaire).
4. Assess cough through validated questionnaires (visual analogue scale - VAS, Cough Quality of Life Questionnaire).
5. Assess occurrence of acute events and their severity since the previous appointment, including admissions and emergency visits.
6. Check adherence to treatment.
7. Assess the occurrence of adverse events to medication.
8. Measure oxygen saturation by pulse oximeter, if available.
9. Review lung function tests and assess FVC and diffusion capacity evolution.
10. Review the results of other tests performed (laboratory studies, imaging, arterial blood gases, 6-min walking distance and others, as appropriate).
11. Assess coexistence of comorbidities and medications that may interfere with disease control and request complementary diagnostic tests or refer to other specialties if necessary.
12. Request the appropriate tests (laboratory studies, lung function tests, imaging, as adequate).
13. Review the action plan: how and when to take medication, strategies to minimise adverse effects, when to call the physician, and when to get emergency care.
14. Review the prescribed treatment and reinforce the importance of adherence to treatment.
15. Treatment adjustment, if necessary.
16. Provide instructions on the new treatment prescribed, if applicable.
17. Review modifiable risk factors and behaviours, with a special focus on smoking habits. In case of active smoking, review motivation to quit smoking.
18. Review non-pharmacological strategies and reinforce their importance.
19. Assess family / social support, if applicable.
20. Schedule the following consultation (teleconsultation or face-to-face appointment).

Specific tools and recommendations

- mMRC Questionnaire
- Visual Analogue Scale
- Leicester Cough Questionnaire (Chronic Cough Quality of Life Questionnaire)
- Pulse oximeter
- Electronic prescription system

Conclusions

The pandemic crisis of COVID-19, amongst so many social, economic and healthcare problems, also brought new opportunities. It has allowed other forms of contact to be explored and has accelerated the digital revolution. And great steps have been taken towards a true implementation of telemedicine.

Teleconsultation, initially performed out of a great need to not loose contact with patients, but in a very empirical way, now appears as another tool at our disposal. This document seeks to establish recommendations to standardise the practice of this telemedicine modality.

Teleconsultation is just the beginning in the digital revolution in healthcare. In a near future, it is expected that other, more complex modalities of telemedicine will also become part of daily clinical practice.

It can never be emphasized too strongly that technology should always be at the service of the patient, and not the other way around. All these emerging tools only make sense if they prove to be an added value for the patient and for the improvement of healthcare provided to patients.

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