



# Pulmonologists' work and clinical life during the COVID-19 pandemic: a society-led survey

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**Pulmonologists and pulmonology residents are highly affected by the COVID-19 pandemic. More than a third have performed procedures they did not feel competent in. Investment in medical education research is necessary to counter future crises and pandemics.** <https://bit.ly/3tiOVh0>

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## Abstract

The continuous and ongoing coronavirus disease 2019 (COVID-19) pandemic has highly affected pulmonologists and pulmonology residents worldwide. To identify where additional work and resources must be focused, it is important to explore on what parameters the pulmonologists and residents are challenged. We present the results of a society-led survey on pulmonologists' and pulmonology residents' work and clinical life during the pandemic.

A total of 579 pulmonologists and pulmonology residents completed the survey (5.9% of the European Respiratory Society's physician members) and most respondents answered that they have had sufficient training on how to handle patients with COVID-19 (*e.g.* how to handle patients to prevent virus spread). However, more than a third of the respondents ( $n=210$ , 36.3%) had performed procedures they did not feel competent in due to the pandemic and, for example, relocation to COVID-19 units.

We must strive for investment in research on medical education and potentially simulation-based training in technical procedures to ensure competence and decrease the insecurity about new procedures, especially in the setting of worldwide pandemics or acute critical situations.

## Introduction

Since the World Health Organization declared coronavirus disease 2019 (COVID-19) a pandemic in March 2020 [1], healthcare systems have responded by modifying and restructuring resources to allocate the workload and control the infection. Pulmonologists play a major role in the diagnostic workup and care of patients hospitalised with or suspected of COVID-19, and therefore, they were, and still are, in the frontline to fight the pandemic. The need to restructure resources, for example relocating pulmonologists to COVID-19 units, could generate issues and challenges such as a lack of pulmonologists for outpatient clinics, delayed procedures for non-COVID-19 patients, and postponed research and educational activities.

The respiratory societies, international as well as national, have striven to support pulmonologists, pulmonology residents, and other healthcare professions working within pulmonology in handling their clinical life during a worldwide pandemic by endorsing online education, online meetings and activities [2]. They have quickly created guidelines, made research and evidence available, and encouraged sharing of data on the disease, actions to prevent spread of the disease, treatment and sequelae [3]. In the future,



societies and international institutions must be prepared and be able to support pulmonologists and pulmonology residents for potential pandemics or critical situations. To identify where additional work and resources must be focused, it is therefore important to explore on what parameters the pulmonologists and pulmonology residents are challenged.

We present the results of a medical society-led survey, which explores how the pandemic has affected and influenced pulmonologists' clinical life and education. The overarching aim was to report key elements that could inform future planning of structured efforts and educational aspects on an international level for yet another COVID-19 wave, other potential future pandemics, or critical situations affecting pulmonology patients. The objective was to assess the impact of the COVID-19 pandemic on pulmonologists' and pulmonology residents' clinical life.

## Methods

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### *Study design and setting*

A cross-sectional society-led study was carried out on the COVID-19 pandemic's impact on pulmonologists' and pulmonary residents' clinical life and education from February 2021 to April 2021. Data was obtained through an online survey using Research Electronic Data Capture (REDCap) provided by Open Patient data Explorative Network [4, 5].

All survey responses were anonymised, and the Regional Committee on Health Research Ethics for Southern Denmark was asked for review of the protocol and no further approval was needed. The study was conducted following the Declaration of Helsinki.

### *Study participants*

The online survey was distributed by e-mail and LinkedIn *via* a survey link to physician members of the European Respiratory Society (ERS). The ERS has ~30 000 members of which 9900 (33%) are pulmonologists or pulmonology residents.

### *Measures, outcomes and analysis*

The survey was designed to capture the impact of the COVID-19 pandemic on six variables on a scale from 1 to 10 (1 being no influence at all, 10 being heavy influence). The questions asked to assess these six variables were how much the pandemic situation has affected or influenced the following aspects of the respondents':

- Participation in mandatory educational courses
- Participation in regular educational meetings in your institution (*e.g.* board meetings)
- Access to supervision by more experienced colleagues
- Access to discussion with other trainees
- Workload
- Change in the shift schedule

Two dichotomic questions were to be answered:

- Have you received special training regarding the COVID-19 situation? (Yes/no)
- Have you experienced having to perform technical procedures that you did not feel competent in due to the pandemic situation? (Yes/no)

In addition to the questions mentioned above, the respondents' demographics covering age, gender, country of origin, place of employment, and years since graduation were also registered.

To ensure the robustness of the survey, it was pilot tested internally before distribution. The survey link was sent by e-mail to all members of the ERS in February 2021. Additionally, the link was distributed using online communication applications (*e.g.* LinkedIn).

The survey was open, and responses collected for a 2.5-month period until 20 April 2021.

Data was extracted from REDCap and analysed in Stata 16.0 (StataCorp LLC, College Station, TX, USA).

## Results

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A total of 579 pulmonologists or pulmonology residents completed the survey, amounting to 2.0% of all ERS members in the year 2021, and 5.9% of the physicians intended to answer the survey. The responses came from pulmonologists or physicians in training to become pulmonologists from 67 different countries.

**TABLE 1** Respondents' demographics

Age (years), mean±sd	45.3±11.2
Gender, n (%)	
Female	265 (45.8)
Male	314 (54.2)
Employment, n (%)	
Public university hospital	306 (52.9)
Major public hospital	135 (23.3)
Minor public hospital	55 (9.5)
Private hospital	48 (8.3)
Other	35 (6.0)
Years since graduation, n (%)	
0–5	69 (11.9)
6–10	93 (16.1)
11–15	83 (14.3)
16–20	88 (15.2)
>20	246 (42.5)

Of the 579 responses, 514 (88.8%) were from pulmonologists in Europe, representing 39 European countries. The countries with the most respondents were Spain (n=71 responses, 12.3%), Italy (n=46 responses, 7.9%) and Greece (n=35 responses, 6.0%). The mean±sd age was 45.3±11.2 years, and gender was almost equally distributed (female n=265, 45.8%).

Most responses were provided by pulmonologists employed at public, university hospitals (n=306, 52.9%) or major public hospitals (n=135, 23.3%). Respondents' demographics are presented in table 1.

Figure 1 presents the distribution of answers on the 10-point scale for the six questions, covering to what extent the COVID-19 pandemic has influenced different aspects of clinical daily life and training.

Four variables had a median score of eight: participation in mandatory educational courses (median 8, quartiles 6–9), participation in regular educational meetings in your institution (median 8, quartiles 5–9), workload (median 8, quartiles 6–9), and change in work schedule (median 8, quartiles 6–9).

To the question if the respondents had received sufficient training in regard to the COVID-19 pandemic situation (e.g. how to handle test-kits or how to handle patients to prevent virus spread) 72.8% (n=421) answered yes. Whereas 36.3% (n=210) answered that they have had to perform technical procedures that they did not feel competent in due to the pandemic situation (e.g. due to limited access to supervision or transfer to another department/unit that they do not usually work in, where other procedures are done).

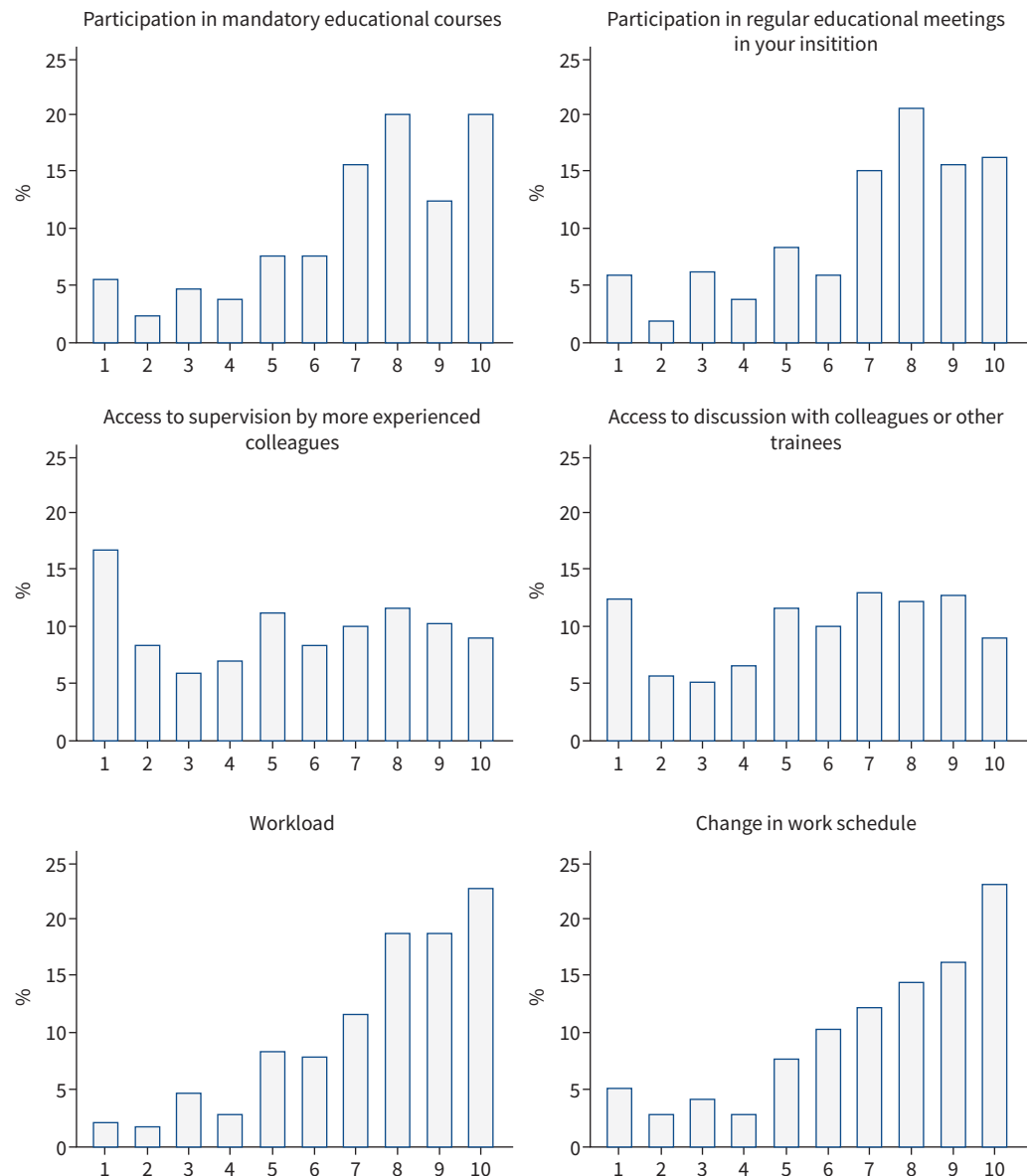
## Discussion

We aimed to conduct and complete the first survey on pulmonologists' and pulmonology residents' clinical life, education, and training during the COVID-19 pandemic. We found that the COVID-19 pandemic has had a significant and higher impact on the participation in educational courses and meetings and workload than on access to supervision and discussions with colleagues. Most of the pulmonologists and residents in pulmonology responded that they received sufficient education for handling the pandemic situation, however, due to the pandemic situation more than one-third had performed technical procedures they did not feel competent in.

*“Lesser opportunity to train hands-on procedures locally and internationally, however, many opportunities for webinar and online learning”*

Respondent's comment

Pulmonologists and pulmonology residents are required to perform a variety of technical, hands-on procedures in a competent way. Several respondents, most often residents, described less opportunity to develop, train and maintain competences in technical hands-on procedures. On an international level, the ERS has presented structured, evidence-based educational programmes including simulation-based training and assessment in, for example, bronchoscopy, endobronchial ultrasound and thoracic ultrasound [3–5].



**FIGURE 1** The questions included in the survey were on a scale from 1 to 10 (1 being no impact, 10 being heavy impact) as to how much the pandemic situation has affected or influenced the following aspects of the respondents' work: participation in mandatory educational courses, participation in regular educational meetings in your institution (e.g. board meetings), access to supervision by more experienced colleagues, access to discussion with other trainees, workload and change in the work schedule.

Thereby, there is an opportunity to train technical procedures, for example, *via* simulation without exposure to virus and regardless of the number of patients.

The COVID-19 pandemic has increased the need for the pulmonologists and residents to perform additional procedures like tracheal intubation, airway suction, mechanical ventilation, placement of central venous catheter and performing throat swabs [6]. Procedures which most likely are to be performed on COVID-19 units by physicians independent of original specialty. As mentioned in the respondent's comment above, the pandemic has made it more challenging to learn these practical procedures for several reasons. For example, the increased risk of infection during aerosol-generating procedures like bronchoscopy. The airborne spread of the disease has been debated years before the COVID-19 pandemic in relation to other respiratory diseases, like the Middle East respiratory syndrome and conventional flu, but is today more relevant than ever [7].

*“Performance of airborne related procedures are highly affected”*, wrote a pulmonology resident as a comment for the survey. There is abundant evidence that proximity is the key to risk of transmission and performing aerosol-generating procedures on COVID-19 positive patients is classified as high risk [8]. As a result, especially at the beginning of the pandemic when the disease was not yet fully explored, much clinical training was reduced. Many elective routine procedures, which are often used in clinical training and education because of the calm environment and possibility for supervision, were postponed and practical courses cancelled. It is estimated that the ERS has cancelled approximately 20 hands-on courses in technical procedures like endobronchial ultrasound and bronchoscopy, and the annual Congress that usual includes approximately 30 hands-on training sessions, ranging from spirometry to cardiopulmonary exercise testing, was held online.

The reduced clinical training and decreased access to supervised technical procedures could, along with the abovementioned issues, be a key factor in the worrying main finding; that more than one-third of the respondents have performed technical procedures that they did not feel competent in due to the pandemic.

*“In my opinion during the pandemic the training programme should be postponed and not continuing with evaluations and examinations while working much more hours and not attending the compulsory internships”*.

Pulmonologist’s comment

As mentioned above, pulmonologists have seen residents struggle to meet the criteria of the training programmes. Much has changed and much has been learned since the beginning of the pandemic in Spring 2020. Hopefully, we are now facing a post-pandemic era where training programmes again are running with high quality, but residents could potentially lack competences that have not been learned in the past 2 years because their focus has been on the COVID-19 pandemic and COVID-19 patients.

Even though online, virtual, and augmented reality to some extents have replaced some parts of the medical training programmes, it is not possible to train practical skills *via* e-learning, virtual reality or webinars alone [9]. A solution to this can be increased use of simulation-based training that allows practical training of technical procedures [10]. Simulation-based training has several well-known advantages including gaining competences in a structured and calm environment, the possibility to train in high-risk procedures without exposing the patient to risk and an increased level of competency when performing the first patient procedure [11, 12]. The COVID-19 pandemic has introduced another significant important argument; that simulation-based training does not include the risk of disease transmission for healthcare professions.

Thereby, simulation-based education and training can replace some part of the practical training at the beginning of the learning curve, however, apprenticeship, clinical training and supervision are of great importance and unreplaceable.

*“We now have easier/wider access to online education forms like webinars”*

Respondent’s comment

Societies and databases made articles and evidence on COVID-19 open access to share information across institutions and borders regardless of economic status. Additionally, free online meetings, educational sessions and presentations covering different aspects of the COVID-19 pandemic have been arranged. This was commented on several times in the survey, especially by respondents from low-income countries. GORDON *et al.* [13] and NAYAHANGAN *et al.* [14] describe unanimously in their systematic reviews of education during the pandemic that the evidence of medical education and educational effects during a pandemic is sparse. It is necessary to discuss if the rapidly increased demand for knowledge-sharing and proposed educational approaches could have entailed a compromised workflow. Medical education and information sharing are not regulated with peer-review like research data and manuscripts. The fast shift towards digital educational material was in the reviews seen as a response because it did not require face-to-face meetings and the asynchronous material made learning accessible in time and place. Independent of platforms, we must continue to strive for structured and evidence-based education on technical procedures [15].

On a positive note, as congresses and international meetings during the pandemic have been primarily online, physicians have been able to join without taking more days off work to travel to the events. A qualitative assessment of the voluntary comments connected to each survey response revealed that there are positive things to highlight and that solutions have been made and evolved during the outbreak. However, concerns are that we have not yet seen the consequences of cancelled congresses and educational activities.

*“We have got sufficient training now; this was not the case in the spring 2020”*

Pulmonology resident’s comment

Overall, our findings indicate that pulmonologists at an international level have been heavily affected by the pandemic. Interpretation of our results also reveal that the highest impact is seen as change in work schedule and workload. COVID-19 departments and units have been organised and structured in almost every country during the first and second lockdown [16], however, there is a continued need for handling non-COVID-19 patients, for example, for cancer screening and investigation. Thereby, the increased workload and work schedule is not surprising.

A general needs assessment on educational needs of doctors and nurses working with COVID-19 patients performed in the early phases of the pandemic in Wuhan, China, found that focus on coping strategies for mental strain was necessary [6]. Several studies have been published with the aim of exploring psychological impact, mental health and burnout following the pandemic [17]. A systematic review of psychological impact of COVID-19 in Western frontline healthcare professionals reports and concludes that pulmonologists among intensive care unit personnel, emergency department personnel and geriatrics are the most affected [18]. Especially during the first months after the outbreak when the disease was not fully elucidated, the anxiety and stress was high and studies highlight that long working hours and the long-term, permanent vigilance required when working in intensive care units, emergency departments and pulmonology departments during a respiratory pandemic worsened the psychological state of the healthcare professionals [19]. Furthermore, the risk of disease transmission to family and relatives kept physicians at a distance to their beloved ones.

Our study was an international, cross-sectional survey on the well-being of pulmonologists and pulmonology residents during the COVID-19 pandemic. Surveys always reflect a snapshot of reality that potentially quickly change in both worse or better directions.

During the pandemic, we have seen varying degrees of impact from country to country but also from region to region and city to city [20]. Changes in restrictions and requirements happen quickly which could affect the responses over time. We are also aware that some areas and countries have been and are more affected than others, and our survey did not differ between high-income countries and developing countries, or between countries that were highly affected by the COVID-19 pandemic and those that were less affected.

In conclusion, we must strive for investment in research on medical education and potentially simulation-based training of technical procedures to ensure competence and decrease the insecurity about new procedures, especially in the setting of worldwide pandemics or acute critical situations.

Conflict of interest: P.I. Pietersen has nothing to disclose. L. Konge has nothing to disclose. R. Jørgensen has nothing to disclose. D. Stolz has nothing to disclose. A. Farr is an employee of the European Respiratory Society. C.B. Laursen has nothing to disclose.

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