

# Remotely guided self-performed lung ultrasound for COVID

<b>Submission date</b> 05/09/2022	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered
		<input type="checkbox"/> Protocol
<b>Registration date</b> 10/09/2022	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input checked="" type="checkbox"/> Results
<b>Last Edited</b> 09/09/2022	<b>Condition category</b> Infections and Infestations	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

COVID-19 pneumonia is disrupting life on the planet earth in an unprecedented fashion. While many if not most people have mild or asymptomatic disease, others, even young previously healthy people, may become rapidly sick with severe hypoxia despite exhibiting minimal symptoms, including shortness of breath (dyspnea). The burden on health care systems may be extraordinary, with even well-developed nations' health care systems being overwhelmed. Health care providers may be particularly susceptible if appropriate infection prevention and control measures are not in place. Thus, solutions need to be sought to provide excellent patient care, but also to protect provider health. COVID-19 is a paradox, as, despite the risk to providers, the majority contracting the virus will not develop COVID-19 pneumonia. Most will have none or minor symptoms and can safely self-isolate at home. However, those who develop severe disease, need to be identified early. Compared to chest x-rays (radiography) and the imaging procedure computed tomography (CT), lung ultrasound (LUS; a procedure that uses high-frequency sound waves to create an image) is a simpler, more portable, economical, and potentially home-based technology that might be used for at-risk patients to self-monitor their lungs for early signs of COVID-19 pneumonia. Findings from COVID-19 pneumonia are typically present in the lung periphery, an anatomic fact that permits LUS to be used to diagnose and manage all phases of care in COVID-19. LUS may detect early disease progression as the lungs worsen from normal to diseased. Through work onboard the International Space Station examining telementored lung ultrasonography (SPTMLUS) self-performed by inexperienced point-of-care users guided by remote experts, we have long known that accurate ultrasound images of the lungs can be self-obtained. What has never been examined, is whether willing but ultrasound-naïve adults can be remotely mentored to obtain meaningful lung ultrasound images upon themselves for lung diseases, such as COVID-19. The purpose of this study was to examine the feasibility and quality of SPTMLUS for novices when expertly guided. Furthermore, this paradigm may be considered a specific example of a broader concept that may contribute to many facets of patient-focused and individualized healthcare.

### Who can participate?

Adults self-isolating due to COVID-19 infection

What does the study involve?

A lung ultrasound expert will guide the participants using teleconferencing software to measure their own blood pressure and conduct a standardized lung examination.

What are the possible benefits and risks of participating?

The potential benefits of the study were learning new knowledge including a better understanding of the volunteers' own physiology. The most pertinent risk of participating in anything during strict isolation protocols is being exposed to the agent people were isolated from; in this case the COVID virus. Thus, the ultrasound probe, cell phone, blood pressure cuff, and pulse oximeter were repeatedly sanitized and wrapped in sterile packing and there was no human-to-human contact at any point in the study.

Where is the study run from?

Foothills Medical Centre (Canada)

When is the study starting and how long is it expected to run for?

January 2020 to October 2020

Who is funding the study?

The University of Calgary, The Office of Surgical Research, Department of Surgery (Canada)

Who is the main contact?

Prof Andrew Kirkpatrick (Canada)

andrew.kirkpatrick@albertahealthservices.ca

## Contact information

### Type(s)

Principal investigator

### Contact name

Prof Andrew Kirkpatrick

### Contact details

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## Additional identifiers

### Clinical Trials Information System (CTIS)

Nil known

### Protocol serial number

# Study information

## Scientific Title

Empowering the willing: The feasibility of tele-mentored self-performed pleural ultrasound assessment for the surveillance of lung health

## Study objectives

Can ultrasound-naive members of the lay public be remotely guided to obtain interpretable and accurate ultrasound images of their own lungs

## Ethics approval required

Old ethics approval format

## Ethics approval(s)

Approved 16/04/2020, Certification of Institutional Ethics Approval, The Conjoint Health Research Ethics Board (CHREB), (University of Calgary, Research Services Office, 2500 University Drive NW, Calgary AB T2N 1N4, Canada; +1 (403) 220-2297; resethic@ucalgary.ca), ref: REB14-0634\_MOD4

## Study design

Single-centre uncontrolled interventional unmasked study

## Primary study design

Interventional

## Study type(s)

Screening

## Health condition(s) or problem(s) studied

Early COVID 19 pneumonia

## Interventions

After informed consent, participants will complete an electronic demographic survey and receive a package containing a disinfected hand-held high-frequency linear ultrasound probe (Philips Lumify, Philips, Amsterdam, NL), and a package of sterile ultrasound gel. Participants will be directed to watch a brief instructional video on how to hold the probe and where anatomically they would be guided to scan. A lung ultrasound expert will then remotely mentor and guide participants to measure their blood pressure and conduct a standardized lung examination with the hand-held ultrasound device based on the 14-zone method proposed by Soldati for International Standardization of the Use of Lung Ultrasound for Patients with COVID-19.

Images will be optimized through remote control of ultrasound “knobology” by the mentor using remote access software (Teamviewer). The pleural interface will be interrogated with 2D, M-mode, and color-Power Doppler (CPD) modes, and all image acquisition attempts will be video recorded. The results will be scored in real-time by the mentor using the proposed Soldati method from 0 (normal) to 3 (very abnormal) and the number of B-lines present at each anatomic location will be counted.

Each participant will be asked to complete an online post-test evaluation that includes their perceptions of the difficulty in performing their self-examination including a 5-point Likert scale rating the examination at each location as being one of; 1—Very Hard, 2—Hard, 3—Neutral, 4—Easy, 5—Very Easy.

An a-priori planned independent review will be undertaken by three outside lung ultrasound experts, who will rate both the image quality (as adequate versus inadequate) and the degree of abnormality using the same Soldati scoring protocol.

### **Intervention Type**

Other

### **Primary outcome(s)**

Acquisition of good-quality interpretable images based on the 14-zone method proposed by Soldati for International Standardization of the Use of Lung Ultrasound for Patients with COVID-19 as assessed by the lung ultrasound expert during telementored self-performed lung ultrasound

### **Key secondary outcome(s)**

1. The ability for volunteers to physically reach each anatomic location of a standard recommended COVID lung ultrasound examination as assessed by the lung ultrasound expert during telementored self-performed lung ultrasound
2. Calculated test performance characteristics of standard lung examination protocols recommending a variety of differing anatomic assessment locations measured using the Likert scale generated by the lung ultrasound experts reviewing the telementored self-performed lung ultrasound, and patient self-rated user difficulty scores of a different Likert scale following the examination

### **Completion date**

20/10/2020

## **Eligibility**

### **Key inclusion criteria**

Adults self-isolating according to public health measures for the purpose of reducing person to person transmission of COVID 19

### **Participant type(s)**

Other

### **Healthy volunteers allowed**

No

### **Age group**

Adult

### **Sex**

All

### **Total final enrolment**

27

**Key exclusion criteria**

1. Non-English speaking
2. Illiterate
3. Not willing to participate

**Date of first enrolment**

01/05/2020

**Date of final enrolment**

20/10/2020

**Locations****Countries of recruitment**

Canada

**Study participating centre****Foothills Medical Centre**

1403 29 ST NW

Calgary

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**Sponsor information****Organisation**

University of Calgary

**ROR**

<https://ror.org/03yjb2x39>

**Funder(s)****Funder type**

University/education

**Funder Name**

University of Calgary, The Office of Surgical Research, Department of Surgery

**Alternative Name(s)**

UCalgary, University of Calgary in Alberta, The University of Calgary, Normal School, Calgary Normal School, Calgary Branch of the Faculty of Education of the University of Alberta, University of Alberta in Calgary, U of C

### Funding Body Type

Government organisation

### Funding Body Subtype

Universities (academic only)

### Location

Canada

## Results and Publications

### Individual participant data (IPD) sharing plan

De-identified participant-level data may be obtained from the Investigators if permitted by Ethical Concerns

### IPD sharing plan summary

Available on request

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		03/01/2022	06/09/2022	Yes	No
<a href="#">Participant information sheet</a>	version 12	16/04/2020	09/09/2022	No	Yes