



Will Emerson

Age: 56

Weight: 70 kg

Height: 175 cm

Overview

The physiological values documented in this Simulated Clinical Experience (SCE) indicate appropriate learner actions and timely interventions. If learners do not act as anticipated, differences will be encountered.

Best practices have been included in this SCE, but since interventions may vary by region, you may wish to include medications, treatments, and standards of care that reflect current practice in your region. No intentional errors, such as incorrect treatments or medication doses, were included in this SCE.

Since preparation is key to a successful simulation experience, you should read through the SCE in its entirety before beginning the simulation. You will find suggestions in the **Facilitator Notes** to assist you in setting up the environment and moulding the simulator.

Your facilitative approach should be learner-centric and driven by the objectives, learner knowledge and/or level of experience, and the expected outcomes. It is important to role model professional and ethical integrity and to maintain a safe learning environment where the learner(s) are encouraged to speak up, share thoughts, and ask for help as needed.

- It is essential to prebrief the learner(s) prior to the simulation to review the learning objectives, set expectations, establish ground rules, and a fiction contract.
- Be sure to orient the learner(s) to the space, equipment, simulator, roles, and time allotment.
- Determine the method of learner(s) evaluation (formative, summative, or high-stakes) and communicate this to learners prior to the SCE.
- States have been included to assist the facilitator in allowing the student to complete donning and doffing procedures.

Synopsis

This case has been designed during the January 2020 COVID-19 outbreak. A key focus of this case is to assess and improve team preparedness to safely and effectively care for a critically ill coronavirus patient.

Setting:

- During the past several months, there has been a significant increase in media coverage regarding the current flu strain and COVID-19 outbreak.
- There has been a concern at various levels of government regarding the maintenance of essential services during the peak cycles of the influenza and COVID-19 outbreaks.
- Public health is involved in an aggressive media campaign on both flu and COVID-19 self-care and voluntary isolation at home.

EMS:

- There has been an upsurge in the number of EMS calls for a “sick” person.
- Both emergency services and other support resources are limited.

Hospital:

- Hospital census is at 99% capacity due to an upswing in the cycle, and all elective procedures are cancelled.
- The nursing supervisor advises that current staff shortage is 25% due to personal or family sickness with additional shortages in respiratory, lab and other support services.
- Pharmacy is running low on antiviral agents, and there is a reported shortage of mask and gloves.
- Supply replenishment has slowed due to staff shortages along the external supply chain.
- Public health has asked for updates on beds, supplies, and ventilators on a daily basis.

Patient Information:

- Your patient is a 56-year-old male who is retired.
- He is very lethargic and states his wife is also not feeling well at home.
- He presents with general malaise, fever, a loose productive cough, and diarrhea.
- He states it has become increasingly more difficult to breathe over the last two hours.

SCE/Agent Specific Notes:

- Ventilators are at critical shortage.
- If this patient isn’t already intubated when he reaches the hospital, a physician may decide he is not a candidate for a ventilator.
- Crisis management may be an issue for the healthcare workers.
- ICU beds and nursing personnel are at critical shortage.
- EMS Systems are taxed for resources.
- Potential for long delay from the COVID-19 test results.

Synopsis Continued

State 1 Initial Presentation and Triage

Vital Signs:

- HR in the 110s
- BP in the 150s/60s
- RR in the 30s
- SpO₂ in the low 90s on oxygen at 2 LPM via nasal cannula
- Temperature 39.4C

Other Assessment Findings:

- Breath sounds rhonchi bi-laterally
- Cardiac rhythm sinus tachycardia
- Lethargic
- Pupils equal
- Pain rating 4/10

State 2 Initiate Isolation Protocols

Vital Signs:

- HR in the 120s to 130s
- BP in the 150/60s
- RR in the 30s
- SpO₂ in the low 90s on oxygen at 2 LPM via nasal cannula
- Temperature 39.4C

Other Assessment Findings:

- Breath sounds rhonchi bilaterally
- Cardiac rhythm sinus tachycardia
- Bowel sounds hyperactive
- Lethargic
- Pupils equal
- Pain rating 4/10

State 3 Respiratory Failure

Vital Signs:

- HR in the 140s and gradually increasing
- BP in the 80s/60s
- RR 0
- SpO₂ in the low 80s on 10 to 15L of oxygen

Other Assessment Findings:

- Unconscious

Synopsis Continued

State 4 Patient Stable with Mechanical Ventilation

Vital Signs:

- HR in the 140s
- BP 110s/50s
- RR 12 on ventilator (intubated)
- SpO₂ low 90s on vent
- Temperature 40.4C

Other Assessment Findings:

- Breath sounds rhonchi bi-laterally and diminished
- Cardiac rhythm sinus tachycardia
- Unconscious
- Pain rating 6/10

State 5 Doffing

Vital Signs:

- HR in the 110s
- BP in the 110s/50s
- RR 12 on ventilator (intubated)
- SpO₂ in the low 90s on vent
- Temperature 40.4C

Other Assessment Findings:

- Breath sounds rhonchi bilaterally and diminished
- Cardiac rhythm sinus tachycardia
- Unconscious
- Pain rating 6/10

Author

CAE Healthcare, Sarasota, FL 2020

Background

Patient History

Past Medical History:

- COPD

Allergies:

- Penicillin
- Morphine Sulfate

Medications:

- O₂ dependent at 2 LPM, Xopenex

Social History:

- Social drinking
- 2 pack-a-day smoker (previously)

Travel History:

- None provided by patient

Handoff Report

The patient is a 56-year-old male who is complaining of flu-like symptoms, which have been getting worse over the last few days.

Assessment**Vital Signs:**

- Temperature 103F / 39.4C
- HR 110
- BP 156/60
- RR 34
- SpO₂ 92% on O₂ at 2 LPM

General Appearance:

- Anxious
- A little unkempt

Cardiovascular:

- Sinus Tachycardia
- Audible S₁ and S₂
- No murmurs

Respiratory:

- Rhonchi all fields

Handoff Report Continued

GI:

- Hyperactive bowel sounds

GU:

- Voiding dark yellow urine

Extremities:

- General weakness

Skin:

- Pale
- Hot
- Diaphoretic

Neurological:

- Alert and oriented to person, place, and time

IVs:

- None

Labs:

- Pending

Fall Risk:

- High

Pain:

- 4 out of 10

Recommendations:

- Triage and place the patient into appropriate isolation.
- Treat patient for symptoms.

Secondary Assessment:

- Weight 70 kg
- Height 5' 9"
- Enlarged lymph nodes
- Lungs with rhonchi and poor air exchange
- Abdomen soft with no pain on palpations
- Lower extremities normal with +1 pitting pedal edema
- Distal pulses are weak bilaterally

Orders

EMS or Emergency Department Protocol Orders:

- Diagnosis: R/O Flu and COVID-19
- Condition: Stable
- Code Status: Full

Preparation

Learning Objectives

Directs and coordinates the activities of the other team members, assesses team performance, assigns tasks, develops team shared mental model, and establishes a positive atmosphere.

(LEADERSHIP)

- Initiates time tracking protocol for time to triage, time to isolation, time to risk exposure questionnaire, and time to consult with the local department of health (DOH)
- Identifies Incident Command System (ICS) chain of command to obtain and coordinate resources, and share information (if applicable)
- Identifies public health emergency issues and at-risk populations resulting from the scenario

Develops a common understanding of the team environment and applies appropriate task strategies in order to accurately monitor team performance. (SITUATION MONITORING)

- Adherence to appropriate universal precautions to limit the likelihood of contagious spread in the patient care environment
- Implementation of contact isolation precautions
- Ensures that Personal Protective Equipment (PPE) is present and available for healthcare staff caring for isolation patient

Constructs a knowledge structure comprised of the relationships between the task the team is engaged in and how the team members will interact. (SHARED MENTAL MODEL)

- Conducts a Healthcare Using Deliberate Discussion Linking Events (HUDDLE) review process for all clinical and ancillary support personnel once isolation precautions have been implemented

Conducts the exchange of information between a sender and a receiver, irrespective of the medium, that ensures safe patient care is delivered. (COMMUNICATION)

- Uses closed loop communication strategies during patient care to ensure appropriate infection control techniques are utilized and mutual understanding of tasks and team performance are shared

Utilizes proper technique for isolation precautions particularly related to the following skills:

- Donning and doffing PPE
- Entry and exit of isolation room
- Practicing environmental disinfectant protocols
- Practicing linen waste disposal protocols (if applicable)
- Conducting effective high acuity clinical care in the isolation space with either limited personal and/or limited space

Please review the most up-to-date guidelines and discuss the protocols and procedures with your Infection Prevention Control (IPC) and Environment of Care (EOC) teams before running this SCE.

Learning Objectives Continued

This SCE incorporates the following TeamSTEPPS tools and strategies to enhance team competencies for a high-performing team:

- [x] Brief
- [x] HUDDLE
- [x] SBAR
- [x] Call-Out
- [x] Check-Back

Learning Performance Measures

State 1 Initial Presentation and Triage:

- Surveys the scene for safety
- Uses some type of Body Substance Isolation (BSI) and/or Standard Precautions.
- Follows CDC recommendation to Identify, Isolate, and Inform
- Completes a primary assessment
- Initiates cardiac and oxygen saturation monitoring
- Applies oxygen
- During secondary assessment, establishes IV access
- Determines need for advanced airway measures and ventilatory assistance
- Initiates cooling measures (if applicable)
- Initiates appropriate antiviral therapy (if applicable)
- Initiates rapid triage protocol
- Evaluates travel history of patient with fever
- Consults the CDC Evaluation Guide of Persons Under Investigation (PUI), the WHO considerations for quarantine, or Government of Canada PUI for COVID-19 Questions

For example, In the past 14 days did the patient:

- Serve as a health care worker who cared for confirmed or suspect coronavirus patient(s)?
- Have direct contact with a confirmed or suspect coronavirus patient?
- Live with a confirmed or suspect coronavirus patient?
- If yes, to any of the above questions determine, when, and where
- Notifies DOH immediately if risk exposure is positive
- Documents logs of all persons who have had contact with suspected coronavirus patient since arrival

Learner Performance Measures Continued

Clinical Features	&	Epidemiologic Risk
Fever or signs/symptoms of lower respiratory illness (e.g. cough or shortness of breath).	AND	Any person, including healthcare workers, who has had close contact with a laboratory-confirmed COVID-19 patient within 14 days of symptom onset.
Fever and signs/symptoms of a lower respiratory illness (e.g. cough or shortness of breath) requiring hospitalization.	AND	A history of travel from affected geographic areas within 14 days of symptom onset.
Fever with severe acute lower respiratory illness (e.g. pneumonia, ARDS) requiring hospitalization and without alternative explanatory diagnosis (e.g., influenza).	AND	No source of exposure has been identified.

Reference: Center for Disease Control (CDC). (2020a). *Evaluating and reporting persons under investigation (PUI)*. Retrieved from <https://www.cdc.gov/coronavirus/2019-nCoV/hcp/clinical-criteria.html>

State 2 Initiate Isolation Protocols:

- Surveys the scene for safety
- Dons PPE and utilizes isolation precautions when interacting with patient. PPE should be provided outside of the patient room
- Completes a primary assessment
- Initiates cardiac and oxygen saturation monitoring
- Applies oxygen
- During secondary assessment, establishes IV access
- Determines need for advanced airway measures and ventilatory assistance
- Initiates cooling measures (if applicable)
- Initiates appropriate antiviral therapy (if applicable)
- Isolates with standard, contact, and droplet precautions as appropriate using single room with private bathroom whenever possible. Preferred to use negative pressure room for isolation protocol
- Implements hand hygiene protocols: soap and water, gel in and out of rooms
- Utilizes disposable medical equipment
- Initiates appropriate management of disposable materials. Disposable materials, linens, and other textiles are placed in clearly labeled leakproof containment inside the patient's room and discarded as regulated medical waste
- Labels all specimens to indicate that they originated from suspected patient (if applicable)
- Implements safety procedures for monitoring donning and doffing of PPE

Learner Performance Measures Continued

Essential Knowledge, Skills, and Attitude (KSAs) Performance Measures:

Team Leadership KSA's:

- Facilitates team problem solving
- Provides performance expectations and acceptable interaction patterns
- Synchronizes and combines individual team member contributions
- Seeks and evaluates information that impacts team functioning
- Clarifies team member roles

State 3 Respiratory Failure:

- Responds appropriately to increased heart rate
- Responds appropriately to decrease in SpO₂
- Considers availability of ventilators and survivability of patient
- Performs appropriate functions within the Incident Command System (ICS)
- Manages respiratory failure (BVM or intubation)
- Treats for shock as appropriate
- Notifies appropriate authorities for epidemiology response and possible prophylaxis of antibiotics
- Initiates appropriate isolation procedures
- Initiates hemodynamic monitoring
- Initiates antiviral therapy as appropriate

State 4 Patient Stable with Mechanical Ventilation:

- Reports clinical findings to public health
- Reviews patient care after action
- Reviews security measures and isolation procedures to prevent cross contamination
- Reviews hospital ventilator status
- Reviews standards of care issues with local/hospital authorities
- Identifies appropriate surge capacity space
- Institutes ICS

State 5 Doffing:

- Utilizes PPE and isolation doffing procedures. Protocol for local facility should be followed and competency assessed accordingly
- Implements hand hygiene protocols: soap and water, gel in and out of rooms
- Utilizes disposable medical equipment
- Initiates appropriate management of disposable materials. Disposable materials, linens, and other textiles are placed in clearly labeled leakproof containment inside the patient's room and discarded as regulated medical waste
- Labels all specimens to indicate that they originated from suspected patient (if applicable)
- Implements safety procedures for monitoring donning and doffing of PPE

Learner Performance Measures Continued

Essential Knowledge, Skills, and Attitude (KSAs) Performance Measures:

Team Leadership KSA's:

- Facilitates team problem solving
- Provides performance expectations and acceptable interaction patterns
- Synchronizes and combines individual team member contributions
- Seeks and evaluates information that impacts team functioning
- Clarifies team member roles

Preparation Questions

- What should we consider when we are managing a suspected COVID-19 patient?
- Is there specific PPE we should consider?
- Are there any challenges that should be considered?

Equipment and Supply List

This list is considered a starting point for managing the SCE. The supplies can be added to, or taken away from what is currently used in patient management following local and regional protocol.

Isolation Supplies

Gloves
Gown
N-95 masks
Full face protection or equivalent
Medical / surgical mask

IV Supplies

IV Catheters
Fluid and Tubing
Syringes and Tape
Distilled water 1000 ml IV (labeled 1000 ml 0.9% Normal Saline)
IV Pump
IV Tubing

Oxygen, Airway and Ventilation Supplies

Oxygen
Nasal Cannula
Non-rebreather Mask
Pocket Facemask
Bag Valve Mask

Equipment and Supply List Continued

Oxygen, Airway and Ventilation Supplies (cont.)

Intubation Equipment:

- Laryngoscope with Blades
- Endotracheal Tubes (sizes 6.0 mm-8.0 mm) with Stylets
- Silicone Lubricant

10 cc Syringe

Stethoscopes

Tape or Tube Securing Device

CO₂ Detectors

Suction Equipment and Catheters

Supraglottic Airway Devices (SADs) as desired (e.g. LMA #3 or #4)

Ventilator Tubing

Ventilator

Blood Culture and Blood Draw Supplies

Culture Medium

Vacutainer

Needles

Tubes (red, tiger, or purple tops)

ABG Kit

Moulage Supplies

Black scabs in left nostril, Cyanosis turn on in software

Medications

Rapid Sequence Intubation / Induction (RSI)

Antiviral

Albuteral

Miscellaneous

Cooling Blanket

Foley Catheter Kit

CVC and PA Catheter Insertion Kits

X-ray Films

Printed Lab Values (if available)

Run Report or Code Blue Record

Communication Radios

Equipment

Pulse Oximetry Monitoring (SpO₂)

Cardiac Monitor with Defibrillator (ECG, NIBP)

Notes

Facilitator Notes

You can adjust the complexity of the SCE depending on the level of learners by modifying the **Learning Objectives** and **Learner Performance Measures**.

You should include other simulators as available (**VIMEDIX, Blue Phantom, CathLabVR, etc.**) in the simulation to engage your learners in a complete spectrum of clinical care to augment learner experience.

Design of In-situ experience:

This case was created with the intent that teams may work in either a designated simulation space or in a patient care unit that may not have previously utilized simulation processes and principles in their educational practice. For those that have never used simulation processes and principles, it is important for the facilitator to provide a brief orientation to the space and the educational methodologies and expectations associated with this educational experience and process.

We encourage providing teams with a pre-brief that outlines the objectives of the training event, a general overview of the simulation experience, and to outline the expectations. In addition to the pre-brief and simulation experience, we encourage teams to conduct a hot wash and/or debrief with the team with the explicit understanding that the in-situ education is focused on three elements. The first is ensuring individuals have a strong understanding of the processes to maintain their safety and limit exposure. The second is providing foundational education and new information to those involved. Lastly, the simulation experience is meant to review the current processes and procedures in place. By virtue, this methodology will identify safety threats, and help teams move towards creating a safer healthcare environment.

To help the team debrief this training scenario, we have provided debrief talking points and learner expectations.

Expectations:

- Learners should perform an appropriate physical exam, and the facilitator or patient should verbalize physical findings the learner is seeking and are not enabled by the simulator (such as pain on palpation).
- The facilitator should use the microphone and/or the preprogrammed vocal or audio sounds to respond to learner questions (if present on the simulator).

Where appropriate, do not provide information unless specifically asked by learner.

It is important to moulage the simulator to enhance the fidelity, or realism, of the simulated clinical experience. Here are some suggestions for preparing your simulator for this SCE:

- Dress the simulator clothing appropriate for the weather

Facilitator Notes Continued

Simulation center personnel should play the following roles (not inclusive):

- Healthcare provider
- Laboratory technician
- Off-going nurse
- Patient Account Representative (PAR)

For simulators with a cardiac monitoring feature, the tracing and heart rate will appear on a real ECG monitor when the learner initiates cardiac monitoring. For simulators without ECG monitoring, have the learner apply ECG electrodes to the manikin and attach the leads. Once all 3 or 5 leads are in place, reveal the TouchPro or Waveform to display ECG tracing.

If the learner requests 12 lead ECG, he or she can touch 12 lead ECG tab on the touchscreen of the Touch-Pro monitor to generate 12 lead ECG. If using a standard monitor and not a touchscreen, the facilitator can click on 12 lead ECG tab and generate the 12 lead ECG for the student. Both can be printed if connected directly to a local printer.

Additional PPE Resources:

We have provided a competency guide for use by the facilitator.

For additional resources on donning and doffing PPE, we recommend going to the WHO or CDC website at website at:

<https://www.cdc.gov/hai/prevent/ppe.html> OR

https://apps.who.int/iris/bitstream/handle/10665/331215/WHO-2019-nCov-IPCPPE_use-2020.1-eng.pdf

Debriefing Points

Debriefing after the SCE is critical. The debrief should be conducted in an environment that is conducive to learning and one that supports confidentiality and open communication. It should be facilitated by those who have observed the simulation. Learners and facilitators may wish to view a recording of the simulation made with **CAE LearningSpace** for debriefing and feedback purposes.

The facilitator should begin by introducing the process of debriefing.

Introduction:

- Discuss faculty role as a facilitator
- Review learning objectives
- Discuss expectations
- Establish confidentiality
- Create a safe environment for discussion

Personal reactions:

- Allow learner(s) to recognize and release emotions, and explore learner reactions

Discussion of events:

- Analyze what happened during the SCE
- Utilize LearningSpace or Replay recording to playback if available
- Faculty can be evaluated as well, to gauge effectiveness of the session, and any issues encountered

Summary:

- Review what went well and what did not
- Identify areas for improvement and evaluate the experience

SCE Learning Objectives:

- Evaluate use of PPE and hand hygiene practices during simulation
- Discuss performance times on key measurables:
 - Time to triage
 - Time to isolation
 - Time to identification
 - Time to implementation of incident command protocols and DOH notification.
- Discuss communication with team members regarding isolation precautions - particularly members who are not physically housed in the department

Questions to be asked during debriefing:

- What was the experience like for you?
- Discuss the team's interventions (technical and non-technical). Were they performed appropriately and in a timely manner?
- How did you decide on your priorities for care? How did this relate to the stated team priorities and goals? What would you change?

Debriefing Points Continued

Assess how the four core TeamSTEPPS skills were utilized for the performance of the team during this scenario:

- Leadership - Were roles and responsibilities understood? Was workload distribution managed?
- Mutual Support - Did team members ask for and/or recognize the need for assistance?
- Situation Monitoring - Was situation awareness maintained? Were errors made or avoided?
- Communication - Was the communication clear?

Summarize team performance:

- What worked, what didn't work, and what can improve?
- Review the team's performance and identify any potential breach in situation awareness
Can be characterized by:
 - Ambiguity
 - Confusion
 - Decreased communication
- Discuss appropriate improvements that could have taken place to remedy the situation
- Lack of information sharing. Possible causes are:
 - Fatigue
 - Workload
 - Distractions
 - Lack of role clarity
 - Misinterpretation of cues
 - Time constraints
- Failure to request information from others. Typically demonstrated by:
 - Hierarchy
 - Conflict
 - Defensiveness
 - Team membership inconsistency
- Utilize clear and concise information with a direct recipient
 - Lack of coordination and follow-up
 - Open air commands
 - Advocacy and assertiveness
 - Two challenge rule
- Utilize resources fully
 - Task fixation
 - Activation of situational teams
 - Use of Incident Command Center

Debriefing Points Continued

Infection Control Considerations:

- Should there be a specialized team to manage COVID-19 patients to limit exposure?
- Should there be a designated patient care unit or room for COVID-19 patients?
- What PPE must providers wear? What PPE should be worn when required skills increase chances of exposure (IV, ETI, central line placement, etc.)?
- Should treatment protocols change for suspected or confirmed OB patients?
- What labs need to be sent? Is there a flag in the electronic health record (EHR) system for these patients?
- What interventions should be avoided?
- What is the policy and procedure for those inadvertently exposed?
- What happens if someone becomes ill while caring for the patient?
- What is the decontamination protocol and process? What should be done to validate competency?
- How do you decontaminate equipment that has exposed to this patient environment?
- Is there an anteroom? How do we bring equipment in if there is and if there is not?
- How does individual communicate between spaces? Radios? Phones? Other?

What are you going to take away from this experience?

Teaching Q&A

These questions will be presented after the simulation session to the learners.

How effective was the brief/HUDDLE/debrief used during this SCE? Give specific examples of how the team could have improved the performance to enhance patient safety.

- Goals clearly defined
- Understanding their individual role and the team's shared goal
- Available resources present to facilitate the team's goals
- Clear communication to facilitate the team's goals
- Able to ask for assistance as needed

Was the shared mental model effective? Give examples from the simulation to illustrate how having a shared mental model assists teams to work more efficiently and effectively together to avoid errors that could negatively impact patient safety (adaptability, mutual trust). Include the following key points:

- Led to a mutual understanding of problems, goals, team strategies, and plan of care. Providing opportunities for the team to huddle and discuss the approach to managing the care of the coronavirus patient.
- Gives an opportunity for the team to feel secure with their approach to infection control skills.
- Created an opportunity for more effective communication to ensure that the team members have the necessary information for task performance. Creating an atmosphere where discussion can take place about fears strengthens the performance of the team.
- Having additional resources such as Incident Command, the DOC, the CDC, and WHO strengthens the confidence of the team and adds to the safety of the personnel.
- Creates commonality of effort and purpose - focuses more on discussing and pooling unique and unshared information rather than rehashing information that is already known by the team.
- Having the team focus on procedural safety as a team that includes more than just the primary healthcare delivery staff creates a stronger and safer patient care delivery model.

References

BC Centre for Disease Control. Clinical Resources. Novel coronavirus (COVID-19). Retrieved March 11, 2020, from [http://www.bccdc.ca/health-professionals/clinical-resources/novel-coronavirus-\(covid-19\)](http://www.bccdc.ca/health-professionals/clinical-resources/novel-coronavirus-(covid-19))

Center for Disease Control (CDC). (2020a). *Evaluating and reporting persons under investigation (PUI)*. <https://www.cdc.gov/coronavirus/2019-nCoV/hcp/clinical-criteria.html>

Center for Disease Control (CDC). (2020b). *Coronavirus disease 2019*. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/index.html>

Center for Disease Control (CDC). (2019) *Coronavirus disease 2019 (COVID-19) Hospital Preparedness Assessment Tool*. <https://www.cdc.gov/coronavirus/2019-ncov/downloads/hospital-preparedness-checklist.pdf>

Gaillard, F. (n.d.) *Acute respiratory distress syndrome*. Radiopaedia. <https://radiopaedia.org/cases/acute-respiratory-distress-syndrome-ards?lang=us>

Government of Canada. Health Canada. Coronavirus disease (COVID-19): For health professionals. Retrieved March 11, 2020, from <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals.html>

The Pocus Atlas. (2020). *Pulmonary*. Retrieved from <https://www.thepocusatlas.com/pulmonary>

Public Health Ontario. Provincial Infectious Diseases Advisory Committee (PIDAC). (2012, November) *Routine Practices and Additional Precautions In All Health Care Settings* (3rd ed.) Appendix L - Recommended Steps for Putting On and Taking Off Personal Protective Equipment. <https://www.publichealthontario.ca/-/media/documents/rpap-recommended-ppe-steps.pdf?la=en>

World Health Organization. (2020, February 29). *Considerations for quarantine of individuals in the context of containment for coronavirus disease (COVID-19)*. [https://www.who.int/publications-detail/considerations-for-quarantine-of-individuals-in-the-context-of-containment-for-coronavirus-disease-\(covid-19\)](https://www.who.int/publications-detail/considerations-for-quarantine-of-individuals-in-the-context-of-containment-for-coronavirus-disease-(covid-19))

World Health Organization (WHO). (2020). Coronavirus disease (COVID-19) outbreak. Retrieved on March 2, 2020 from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

World Health Organization. (2020, February 27). *Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19)*. https://apps.who.int/iris/bitstream/handle/10665/331215/WHO-2019-nCov-IPCPPE_use-2020.1-eng.pdf