

Evaluating Covid-19 Injury Claims With a Focus on Workers' Compensation

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COVID-19 illness can cause multiorgan illness. Some States have passed legislation granting a rebuttable presumption of causation by workplace exposure in certain occupations. This paper summarizes methodology for evaluating claimants utilizing known science and as well as information from the American Medical Association Guides resources.

Keywords: activities of daily living, ARDS, ACOEM, AMA Guides, Betacoronavirus, causation, coronavirus, COVID-19, disability, impairment, maximum medical improvement, metabolic stress echocardiography, occupational, oximetry, permanent and stationary, presumption, pulmonary function testing

COVID-19 illness is caused by the betacoronavirus SARS-CoV-2. Cases of SARS-CoV-2 infection can be classified into at least four distinct classes: asymptomatic, upper respiratory tract infection, lower respiratory tract infection (eg, pneumonia), and acute respiratory distress syndrome (ARDS). Additionally, the virus can affect the cardiovascular, liver, kidneys, skin, gastrointestinal, hematological, and central nervous systems.¹

Since the virus can be contracted from other people anywhere and a direct attribution is often difficult, classifying COVID-19 as an occupational illness can be controversial. Some US states (eg, AK, MN, UT, WI) have passed legislation granting the rebuttable presumption of causation by workplace exposure for select occupations. Many other states have taken executive or administrative actions to institute such presumptions (eg, AR, CA, FL, KY, ND, NH, NM, WA).²⁻⁴ See Table 1 for workers covered and definitions by each of these states. Who is covered differs considerably, with various combinations including first responders, corrections officers, military/national guard, nursing personnel, other healthcare personnel, grocers, and postal workers. In no case has the issue of a worker's prior comorbidities or apportionment been thus far directly incorporated into these new legislative and executive actions, although some states may have apportionment separately addressed in non-COVID regulations. This area of law is changing quite rapidly.

Qualifications for coverage also differ, such as whether a positive test is required for presumption. The degree and extent of

coverage differs somewhat among these states, with some limiting the extent and duration of coverage (eg, through the duration of an emergency declaration).

Cases which clearly meet the requirements of the presumptive rules may not require any further evaluation to determine work-relatedness. However, there are many situations which may require formal evaluations to determine work-relatedness. These include: (1) cases occurring in states without presumptive rules, (2) cases claimed outside of the presumptive rules (eg, workers not directly covered), (3) those occurring among individuals who claim to have had COVID-19, but who tested negative for the virus by polymerase chain reaction (PCR), and (4) those occurring in individuals who state they were ill and were not permitted to be tested, may likely have the causation question formally adjudicated.

Those cases either accepted by a workers' compensation insurer or administratively adjudicated as work compensable, may require an evaluation for issues such as ongoing treatment, Maximal Medical Improvement (MMI), Permanent and Stationary status (P and S), or Permanent Physical Impairment (PPI). The AMA Guides to the Evaluation of Permanent Impairment,⁵ which is used to guide ratings in the majority of States, does not address "COVID-19" or "SARS CoV-2."

CLINICAL SCENARIOS

Several scenarios may help illustrate issues to consider for workers with administratively accepted work-related cases for which a rating is requested. These scenarios are sequenced from mild to more severe presentations. Regardless of the scenario below, appropriate quarantining or self-isolation as per the local (or state) health department's directives should be observed if the individual is believed to be contagious to help limit the spread of the virus.

Scenario No. 1: There are asymptomatic individuals who are tested only because they have had contact(s) with a known, positive case. Examples include a paramedic responding to a call or a health care worker inside a nursing home with known cases. Such workers are often tested despite the absence of any symptoms. If this individual remains asymptomatic, but did test positive on PCR for having "live" virus, there are no known long-term complications in those with subclinical infection. These individuals are considered to be at MMI a few weeks after the positive test, and there is no permanent impairment.

Scenario No. 2: For those who are pre-symptomatic (had not yet become symptomatic at the time of testing, but later become symptomatic) the average onset of illness is about 5 days (range 2–14) after exposure.⁶⁻⁹ These people would be rated similar to the scenarios below.

Scenario No. 3: There are individuals who test positive and who have mild disease. They are typically not hospitalized, and they recover at home. Few will have become significantly dyspneic that requires hospitalization. Once recovered they are asymptomatic. There are currently rare case reports of individuals with mild disease, who recover at home, and yet who have persisting symptoms suggesting possible permanent consequences. Thus, when the majority back to normal activity without symptoms, they can be declared to be at MMI and without impairment (0%). If necessary,

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Clinical significance: Every citizen is aware of Covid-19 illness, caused by SARS-CoV-2. Classifying Covid-19 as an occupational illness is controversial; with several US states passing legislation granting causation to some occupations (eg, Health Care Workers and First Responders). However, evaluating physicians will need guidance on how to proceed with these claims.

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TABLE 1. States With Enabling COVID-19 Presumptive Statutes, Executive or Administrative Actions

State and Action	Workers Included	Requirements for Coverage
Statute enacted		
Alaska (SB 241)	First responders Firefighter Emergency medical technician Paramedic Peace officer Health care workers	Workers' Compensation Presumption Of Compensability. (a) Notwithstanding AS 23.30.121, 23.30.395(2), and 23.30.395(24), an employee who contracts the novel coronavirus disease (COVID-19) is conclusively presumed to have contracted an occupational disease arising out of and in the course of employment if, during the public health disaster emergency declared by the governor on March 11, 2020, as extended by sec. 2 of this Act, the employee (1) is employed as a firefighter, emergency medical technician, paramedic, peace officer, or health care provider; (2) is exposed to COVID-19 in the course of employment as a firefighter, emergency medical technician, paramedic, peace officer, or health care provider; and (3) receives a 3 (A) COVID-19 diagnosis by a physician; (B) presumptive positive COVID-19 test result; or (C) laboratory-confirmed COVID-19 diagnosis.
Minnesota (HF 4537)	First responders Peace officer Firefighter Paramedic Nurse Other Health care worker Correctional Officer Security counselor employed at corrections, detention, or secure treatment facility Emergency Medical Technician Healthcare provider nurse or assistive employee employed in a health care, or long-term care setting with direct COVID-19 patient care or ancillary work in COVID-19 patient units Workers required to provide child care to first responders	The employee's contraction of COVID-19 must be confirmed by a positive laboratory test or, if a laboratory test was not available for the employee, as diagnosed and documented by the employee's licensed physician, licensed physician's assistant, or licensed advanced practice registered nurse (APRN), based on the employee's symptoms. A copy of the positive laboratory test or the written documentation of the physician's, physician assistant's, or APRN's diagnosis shall be provided to the employer or insurer. Once the employee has satisfied the requirements of clauses (1) and (2), the presumption shall only be rebutted if the employer or insurer shows the employment was not a direct cause of the disease. A denial of liability under this paragraph must meet the requirements for a denial under section 176.221, subdivision 1.
Utah (HB 3007)	First responders Firefighters Peace officers Emergency medical technicians Health care workers	(1) A first responder who claims to have contracted COVID-19 during the performance of the first responder's duties as a first responder, is presumed to have contracted COVID-19 by accident during the course of performing the first responder's duties as a first responder if the first responder is diagnosed with COVID-19: (a) while employed or serving as a first responder; or (b) if the first responder's employment or service as a first responder terminates, within 2 weeks after the day on which the first responder's employment or service terminates. (2) A first responder who makes a claim under this part shall provide a copy of the positive laboratory test or the written documentation of a physician's diagnosis to the first responder's employer or insurer.
Wisconsin (SB 932)	First responders	This bill provides that, for the purposes of worker's compensation, an injury caused to a first responder, during any public health emergency declared by the governor on March 12, 2020, by executive order 72 and ending 30 days after the termination of the order, is presumed to be caused by the individual's employment. The presumption requires a diagnosis or positive test for COVID-19, and may be rebutted by specific evidence that the injury was caused outside of employment.
Executive and/or Administrative actions		
Arkansas – Executive Order (EO-20-19)	First responders Health care workers	(1) Suspend provisions. . .that currently require a contagious or infectious disease be contracted in or in immediate connection to a hospital or sanitorium to allow first responders and front-line healthcare workers to seek workers compensation for exposure to COVID-19 in the line of duty outside of those settings; and (2) Suspend provisions. . .that currently bars compensation for exposure to a disease to which the general public is exposure to allow first responders and front-line healthcare workers to seek workers compensation for exposure to COVID-19 fi contracted in the line of duty; and (3) Define exposure to COVID-19 as an "unusual and unpredicted incident". . .as it pertains to pulmonary and respiratory accidents that are the major cause of injury, illness, or death to first responders and front-line healthcare workers for the duration of this emergency; and (4) Pursuant to this Order, first responders and front-line health care workers who test positive for COVID-19 may be eligible for workers compensation if they can demonstrate a causal connection. . .between their diagnosis of COVID-19 and exposure to COVID-19 as a result of their employment or occupation; and (5) Claims for workers compensation due to exposure to COVID-19 must be actually incurred due to one's employment and not due to exposure outside the line of duty; and (6) Authority granted pursuant to this order is effective. . .and shall automatically expire when the state of emergency is terminated. . ."

TABLE 1. (Continued)

State and Action	Workers Included	Requirements for Coverage
California— Executive Order (EO-N- 62–20)	All workers who test positive for COVID-19 and who are not exclusively working from home	Any COVID-19 related illness of an employee shall be presumed to arise out of and in the course of the employment for purposes of awarding workers' compensation benefits if all of the following requirements are satisfied: (a) employee tested positive for or was diagnosed with COVID-19 within 14 days after a day that the employee performed labor or services at the employee's place of employment at the employer's direction; the day in (a) on which the employee performed labor or services at the employee's place of employment . . . was on or after March 19, 2020; (c) the employee's place of employment in (a) and (b) was not the employee's home or residence; and (d) where (a) is satisfied through a diagnosis of COVID-19, the diagnosis was done by a physician who holds a physician and surgeon license issued by the California Medical Board and that diagnosis is confirmed by further testing within 30 days of date of the diagnosis.
Florida—Admin Policy Change (CFO Directive 2020–05) and (OIR-20–05M)	First responders Child safety investigators Corrections officers (and others whose official duties require physical presence in a state-operated detention facility) Law enforcement officer Firefighter Emergency medical technicians Paramedics National Guard service member responding to COVID-19 State-employed health care workers Reinforces the administrative policy change and informs insurance carriers that existing Florida law defines and covers occupational diseases.	The Division of Risk Management shall process Workers' Compensation claims submitted by Frontline State Employees who have tested positive for COVID-19, through a reliable method, as compensable claims for occupational disease pursuant to Section 112.1815, Florida Statutes, and Chapter 440, Florida Statutes, unless the State of Florida can show, by preponderance of the evidence, that a Frontline State Employee contracted COVID-19 outside his or her scope of employment as a state employee. Florida Statutes, requires an employer to provide workers' compensation coverage if the employee suffers a compensable injury arising out of work performed in the course and scope of employment. First responders, health care workers, and others that contract COVID-19 due to work-related exposure would be eligible for workers' compensation benefits under Florida law. See § 440.151, Fla Stat.
Kentucky— Executive Order (EO 2020–277)	First responders Law enforcement Emergency medical services Firefighters Corrections officers Health care workers Military and activated National Guard Domestic violence shelter workers Child advocacy workers Rape crisis center staff Grocery store workers Postal workers Child care workers	An employee removed from work by a physician due to occupational exposure to COVID-19 shall be entitled to temporary total disability payments pursuant to KRS 342.730(1)(a) during the period of removal even if the employer ultimately denies liability for the claim. In order for the exposure to be "occupational," there must be a causal connection between the conditions under which the work is performed and COVID-19, and which can be seen to have followed as a natural incident to the work as a result of the exposure occasioned by the nature of the employment
New Hampshire— Executive Order (E.O. No. 36)	First responder/public safety worker	1. For the purpose of this Order "First Responder" shall include any individual covered by the definition of "Emergency response/public safety worker" as set forth in RSA 281-A:2 V-c. 2. To be eligible for the provisions of this Order, a First Responder must have tested positive for COVID-19 and the case must have been reported to the Department of Health and Human Services pursuant to Section 12 of Executive Order 2020–04 as extended by Executive Order 2020-05. 3. Notwithstanding the provisions of RSA 281-A:2, XI and XIII, 16 and 27, in any proceeding before the New Hampshire Department of Labor or the administratively attached Compensation Appeals Board, there shall exist a prima facie presumption that the First Responder's COVID-19 exposure and infection were occupationally related. 4. This Order shall remain in effect for the duration of the State of Emergency declared in 2020- 04.
New Mexico— Executive Order (EO 2020-025)	Certain state workers and volunteers, for example: Emergency medical technicians Other first responders Volunteer and paid medical personnel Administrative and custodial staff at COVID-19 specific care centers Law enforcement officers.	1. In processing or responding to workers' compensation claims as an employer or an insurer, I direct all state executive agencies to employ a presumption that certain agency employees and eligible volunteers who contracted COVID-19 suffered a compensable occupational disease. . . 2. The presumption should be applied to all agency employees and eligible volunteers who contract COVID-19 within 2 weeks of providing direct assistance or care to COVID-19 patients, or within 2 weeks of working in any capacity inside a facility that provides direct assistance, care, or housing to COVID-19 patients.

TABLE 1. (Continued)

State and Action	Workers Included	Requirements for Coverage
North Dakota— Executive Order (E.O. 2020-12)	First responders Firefighter Peace officer Correctional officer Court officer Law enforcement officer Emergency medical technician Healthcare providers trained or authorized to render emergency medical assistance or treatment	<ol style="list-style-type: none"> 1. First responders, health care workers and all occupations included under N.D.C.C. 65-01-02(11)(b)(1) who are exposed to COVID-19 in the course of employment may file a claim for worker’s compensation coverage and may be eligible for up to 14 days of wage replacement and medical coverage if quarantined. 2. Eligibility for workers’ compensation benefits requires the following: <ol style="list-style-type: none"> a. The worker must be subject to quarantine resulting from a work-related exposure, pursuant to an order of a treating health care provider, or public health officer. b. The worker has experienced lost wages during the period of quarantine and is not eligible for lost wage benefits from any other source. c. First responders, front line health care workers and all occupations identified in N.D.C.C. 65-01-02(11)(b)(1), who test positive for COVID-19 can demonstrate that the infection resulted from a work-related exposure, will be eligible for wage replacement and medical benefits as provided for in N.D.C.C. Title 65 for compensable injuries. 4. This order applies to individuals working in a paid or a voluntary capacity as a first responder, health care worker, and in all occupations identified in N.D.C.C. 65-01-02(11)(b)(1) during the pendency of the declared COVID-19 period.
Washington— Admin. Policy Change	First responders Health care workers	L&I will provide benefits to these workers during the time they’re quarantined after being exposed to COVID-19 on the job. . . Workers’ compensation coverage can include medical testing, cover treatment expenses if a worker becomes ill or injured and provide time-loss payments for those who cannot work if they are sick or quarantined.

this can be verified by Stress Echocardiography (Stress Echo) and full Pulmonary Function Testing (PFT)-especially DL_{CO}. Individuals with mild persistent symptoms may require a longer period up to 6 months before being declared permanent and stationary.

Scenario No. 4: There are individuals who have moderate disease (test positive, are hospitalized, and treated with supplemental oxygen, but are not put in the ICU or on a ventilator). They usually have abnormal chest CT scans, and generally have abnormal nonspecific findings on chest x-rays. In these cases, review of hospital records is required to objectively document the organ systems involved. The most common concern in these cases will be residual pulmonary or cardiac pathology either from the virus or from the ventilator. There may also be cases in which significant pulmonary involvement was documented by outpatient or emergency room imaging, and the person convalesced at home. Pulmonary Function Testing is generally required to evaluate these individuals. In some cases, Stress Echocardiography is also needed.

Scenario No. 5: There are individuals who have severe disease (test positive, are hospitalized, and are typically treated in an ICU with either non-invasive ventilation or mechanical ventilation). These individuals require careful review of the medical records to ascertain which organ systems were affected. Most of these cases require Pulmonary Function Testing to evaluate the person’s pulmonary status. In many cases, Stress Echocardiography is also needed. Depending on the extent of any identified impairment(s), subsequent evaluations may be required to ascertain maximum medical improvement and remaining permanent impairment.

Scenario No. 6: There are individuals who have severe disease such as that in scenario No. 5, but who also have one or more other end organ dysfunctions. These other disorders may include congestive heart failure, myocardial infarction, dysrhythmias, stroke, renal failure, psychological illness, myopathy, and coagulopathies. Thorough medical records evaluation is required. The evaluations of these individuals are typically quite complex and require testing of the relevant affected organs (eg, Stress Echocardiography, Pulmonary Function Testing, renal studies, functional capacity evaluation, and psychometric testing). Additionally, since the time to recover may be measured in many months to years, multiple assessments may be required to assess the attainment of maximum medical improvement and the permanent impairment.

HISTORY

If these individuals have persisting complaints of dyspnea on exertion or fatigue (or other residual impairment of another organ system), the first assessment should be “face-to-face” in an office setting (ie, not telemedicine). Using release of information forms to obtain records from all recent clinical encounters before the onset of COVID-19 as well as the inpatient and outpatient medical records during treatment of COVID-19 is an essential first step. Obtaining these records from health care providers and hospitals will provide objective evidence of illness, potential organ system sequelae, and help with questions about pre-existing status. Records should include evidence of a positive PCR test for the presence of the virus. Chest x-ray or chest CT scan results would confirm pulmonary involvement occurred, as would measures of oxygen saturation level below 90% to 95% on room air in previously healthy individuals. A complete review of systems is needed. Suggested COVID-19 specific questions are provided in Table 2. Finally, a formal activities of daily living questionnaire should be used (see Table 3 for an example).

PHYSICAL EXAMINATION

The physical examination should address all affected organ systems. Typically, this would especially focus on the pulmonary and cardiovascular system examinations. Vital signs and pulse oximetry are helpful. Examination may also require attention to one of the less common complications described previously. A simple in-office screening test to potentially include is the 6-minute walk test while wearing a pulse oximeter. Norms for distance walked by age are available.¹⁰ Also, important information would include a change in pulse from sitting to walking, and whether desaturation (oxygen level on pulse oximeter) occurs during walking. Tachycardia (pulse more than 100) and less than normal distance walked with preserved oxygen saturation may suggest deconditioning, and not permanent impairment. However, the concern is that they have had a heart injury resulting in lowered ejection fraction.

GUIDELINES

The American College of Occupational and Environmental Medicine (ACOEM) Guidelines on COVID-19 (June 17, 2020

TABLE 2. Brief Questionnaire for Evaluating a Covid-19 Injury/Disease Claim

When did your COVID-19 symptoms begin? What were your symptoms?
 Did you have (%s provided from ACOEM COVID-19 Guideline) [16–18]:

- Fever (low or high grade) (80% to 88%)
- Dry cough [8, 19] (63% to 69%)
- Loss of appetite (39% to 84% [20])
- Fatigue (38% to 46%)
- Sputum production (33% to 42%)
- Chest pain or pressure (28% to 36%)
- Dyspnea (shortness of breath) (19% to 35%)
- Myalgia and/or arthralgia (muscle and joint pain) (15% to 33%)
- Sore throat (12% to 14%)
- Headache (11% to 15%)
- Chills (6% to 11%)
- Nausea or vomiting (5% to 10%)
- Diarrhea (4% to 29% [20])
- Nasal congestion (4% to 5%)
- Abdominal pain (4%)
- Conjunctivitis (pink eye) [21] (1%)
- Hemoptysis (1%)
- Rhinorrhea (runny nose)

Anosmia and dysgeusia (loss of smell and taste) (85% moderate/severe or anosmic) [22]

Have you had a positive test for the COVID-19 virus? When?

Was the test a nasal swab, a blood test or both?

If you have tested negative or have not been tested, but believe you still have had COVID-19, please explain what symptoms you experienced?

Have you had a specific exposure incident at work, where you were within 6 ft. for 10 minutes or longer of a person (eg, coworker, patient, or other workplace exposure) who tested positive for COVID-19? When?

Has a person you live with tested positive for COVID-19? Have your family members?

Has the Department of Health told you that you must (or were required to) quarantine at home due to you having a positive test for COVID-19? When?

Did a doctor tell you to “Self-isolate” at home due to a definite specific exposure to a person with a positive test for COVID-19? When?

Did you have any of the following conditions before you contracted the COVID-19 virus:

- Hypertension
- Heart disease (eg, heart attack, heart failure)
- Diabetes
- Kidney disease
- COPD or other lung disease
- Cancer
- Immune state compromised

Were you using cigarettes, cigars, marijuana, or vaping?

What is your job title*?

What is your work schedule or work shift? How many hours/week?

Do you have a second job? What is that job? How many hours/week?

What is your work schedule or work shift on your second job?

Do you think there is any requirement of your job that you can no longer do?

- Physical
- Mental stamina
- Safety-critical
- Current medication impacts
- Potential risk to fellow employees
- Potential need for personal protective equipment

These questions may be used in a patient evaluation to evaluate a potential work-related claim. These lines of query may also be useful for the evaluation of a posthumous case. These questions are in addition to a standard thorough inquiry of Review of Systems and job requirements.

*It is critical for the examiner to know the state/jurisdiction’s requirements for presumptive rules, if any. The worker’s job title and job tasks must be compared with the state’s jurisdictional requirements, especially during the incubation period.

update)¹¹ contains a section on Disability and Return to Work. It states that based on prior experience with other similar viral illnesses, patients who recovered without hospitalization will generally be adequately recovered from post-infection fatigue, and be ready to return to work after 2 to 3 weeks. This is about the time when some patients may be retested to see if they are still shedding the virus if required by their employer. The clinical significance of a recovered patient still having viral shedding is unclear and may not be a barrier to work especially if the work can be performed without close contact with others (eg, telework). For patients with documented pneumonia or who required supplemental oxygen

therapy, recovery would be estimated to be 4 to 8 weeks after hospitalization or clinical recovery based on analogies to other viral pneumonias.

For patients who required mechanical ventilation for an Acute Respiratory Distress Syndrome (ARDS) illness, past experience has been that 50% of survivors may not have returned to work by 1 year from hospital discharge.^{12–16} Lung volumes often show about a 20% reduction that frequently resolves in 6 months. Thus, it would be logical to wait until hospitalized survivors are 6 months from discharge before attempting to perform an initial evaluation for MMI and PPI. The ACOEM guideline points out that lung diffusion

TABLE 3. Activities of Daily Living Questionnaire

	Without Difficulty	With Some Difficulty	With Much Difficulty	Unable to Do
Self care-are you able to:				
Dress yourself including shoes				
Comb your hair				
Wash and dry yourself				
Take a bath				
Get on and off the toilet				
Brush your teeth				
Cut your food				
Lift a full cup/glass to your mouth				
Open a new milk carton				
Make a meal				
Communication-are you able to:				
Write a note				
Type a message on the computer				
See a television screen				
Use a telephone				
Speak clearly				
Physical activity-are you able to:				
Walk outdoors on flat ground				
Climb up 1 flight of 10 steps				
Stand				
Sit				
Recline				
Rise from a chair				
Run errands				
Light housework				
Sensory-are you able to:				
Feel what you touch				
Smell the food you eat				
Taste the food you eat				
Hand activities-are you able to:				
Open car doors				
Open previously opened jars				
Turn faucets on and off				
Travel-are you able to:				
Shop				
Get in and out of a car				
Sleep/personal-are you able to:				
Sleep				
Engage in sexual activity				

An "X" is placed in the box for symptoms over the past week. Scored 0 to 3 by taking the worst score in each category and dividing by 7.

abnormalities, if present, may take 5 years to resolve after ARDS. The diffusion capacity for carbon monoxide (DLco) is the test that best reflects diffusion abnormalities. There are no published studies yet of spirometry results in COVID-19 survivors, but the pathophysiology so far appears to be predominantly Diffuse Alveolar Damage, Hyaline Membranes, and microangiopathic processes.¹⁷ Thus, the DLco, which can be difficult to obtain, may be anticipated to be the most sensitive test to assess impaired pulmonary function.

LABORATORY TESTING

Blood testing for Complete Blood Count, Comprehensive Metabolic Panel should be obtained unless recent results from prior convalescent testing are available and normal. This testing should include renal function, albumin, and at least one or more hepatic enzymes. Testing should also include any abnormal findings during prior treatment to document return to normalcy (eg, coagulation studies).

If residual pulmonary impairment is plausible, then full spirometry (including measurement of the DLco, full lung volumes,

impedence testing, or nitrogen washout) should be obtained. The test results should be evaluated to verify that they meet ATS criteria for full effort and reliability.^{18–20}

Pulmonary impairment is rated from Tables 5–4 (6th ed., p88). In jurisdictions using the AMA Guides 5th edition, ratings come from Table 5–12 (5th ed., p. 107). Cardiovascular injuries that may come to attention as well as the relevant sections of the AMA Guides are included in Table 4. Desaturation during exercise with normal spirometry could suggest impaired cardiac output (decreased left ventricle ejection fraction by Echocardiogram) or interstitial lung disease. If the echo is normal, then other systemic illness such as anemia or lung abnormalities are most likely.

For most cases the spirometry, echocardiogram, and possibly routine Bruce-protocol treadmill testing will be sufficient for rating the pulmonary and/or cardiac consequences of moderate to severe COVID-19. For less common cases in which the reported fatigue and or dyspnea appear out of proportion to the spirometry and echocardiogram results, metabolic cardiopulmonary exercise stress testing²¹ is the gold standard for evaluation.

TABLE 4. Cardiovascular Injuries that are Seen in ARDS and Suggested Rating Locations in the AMA Guides

Condition	AMA 5th Edition Rating	AMA 6th Edition Rating
Cardiomyopathy	Table 3–9 Page 47	Table 4–7 Page 59
Arrhythmia	Table 3–11 Page 56	Table 4–9 Page 64
Cardiac muscle injury	Table 3–6a Page 36	Table 4–6 Page 55
Pulmonary emboli	Table 4–6 Page 79	Table 4–14 Page 72
Carotid occlusion	Chapter 13 or possibly by analogy Table 4–2 Page 70	Chapter 13
Deep vein thrombosis	Table 4–5 Page 76	Table 4–12 Page 69

COVID-19 patients can have cardiac complications. Some COVID-19 patients have ST segment elevation on EKG with corresponding clots in major epicardial coronary arteries attributed to a hypercoagulable state seen in these patients.²² Some COVID-19 patients have viral myocarditis/cardiomyopathy without large artery induced infarcts.²³ These patients can be rated as for any other cardiomyopathy patient. Left ventricle ejection fraction (EF by Echo or cardiac catheterization), Brain Natriuretic Peptide level (BNP), and/or METs of exertion achieved on a Stress Echo, are the test results that guide this evaluation.

Pulmonary emboli may occur due to either a hypercoagulable state that may be related to the viral infection and/or prolonged inactivity.²⁴ Impairment would be evaluated by spirometry (infarction reduced forced vital capacity—FVC) and by echocardiogram or Stress Echocardiogram showing pulmonary hypertension.

There are patients having large vessel strokes, presumably due to the hypercoagulable state known to occur in some patients with COVID-19.²⁵ These would be rated like any other large vessel stroke, and if cranial nerve or visual impairment is present, they would be rated from Chapters 11 and 12 in either Guides edition.

Guillain-Barré syndrome and its variants have been reported during and just after COVID-19 illness,^{26,27} and these are ratable from the Guides 5th and 6th edition The Central and Peripheral Nervous System chapter. This diagnosis should not be used for subjective complaints of weakness and fatigue with no objective documentation of Guillain-Barré actually having been present, by accepted criteria.²⁸

An unusual symptom in COVID-19 is anosmia, ie, loss of sense of smell. Early reports do not clarify if this is only loss of smell, or whether there is also loss of taste. Most of the sense of the taste of food is determined by the sense of smell. Subjective loss of sense of smell is not always validated on testing. Recovery of sense of smell lost from viral disease is known to recover in 32% to 66% of cases,²⁹ but it may take up to a month to recover. If persistent, olfaction should be tested with the UPSIT or Sniffin Sticks. This is given a rating of 1% to 5% based on the Guides 5th ed. Page 262 or 6th ed. Page 270.

Note that the central and peripheral nervous system chapter also has a rating methodology for myopathy³⁰ or for generalized peripheral neuropathy (Sections 13–9 in either edition). However, myopathy is usually reversible with a physical therapy and home exercise treatment course that focuses on active progressive exercises.

While COVID-19 patients may have a hypercoagulable state (elevated D-dimer, etc) there are no current reports of a hypercoagulable state persisting after recovery.

Providing care to COVID-19 patients can be stressful.^{31,32} There are individuals who present with Post Traumatic Stress Disorder symptoms. Some had actual COVID-19, some were first responders or health care workers,^{33–35} and some had both of these experiences. Some states have created a legal presumption that PTSD in these situations is presumed to have been caused by

COVID-19. Modern systematic reviews indicate cognitive behavioral therapy (CBT) has better outcomes compared with medications^{36–38} and therefore 12 to 18 sessions of CBT should have been provided before MMI is established. A further consideration is the stability of employment. If the individual is still in a “temporary” off work status, the outcome of PTSD with a change in employment is not known. Thus, if a health care worker is still unwilling to return to work after CBT, an alternate career choice may need to be made, and PPI should logically be assessed after re-employment in a different career (removal from exposure) results in improvement.

CONCLUSION

In summary, there is preliminary evidence and advice for the scientific approach to workers who need to have evaluations for the permanent consequences of COVID-19 illness in those with either administratively accepted or adjudicated cases. With further clinical experiences with this unique viral infection, the approach to rating may need to be modified slightly. However, the suggestions and general approach outlined here should remain applicable for the foreseeable future.

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