

## Appendix 2: Consolidated testing protocols for post-acute covid19 summary document

### Laboratory

	TEST	COMMENTS
General	CBC, CMP, Mg, CRP, TSH	<ul style="list-style-type: none"> <li>• Order if not done within past week</li> </ul>
	Quantitative IgG, IgM, IgA, SARS-CoV-2 Anti-nucleocapsid IgG (infection), SARS-CoV-2 Anti-spike protein IgG (infection or vaccination)	<ul style="list-style-type: none"> <li>• Consider in recurrent or “breakthrough” infection</li> </ul>
Conditional	D-Dimer	<ul style="list-style-type: none"> <li>• If low or intermediate risk for VTE. Especially if previously “normal” or demonstration of rising levels</li> </ul>
	BNP, Trop-I, CKMB	<ul style="list-style-type: none"> <li>• Dyspnea, chest pain, tachycardia, palpitations, concern for cardiac involvement</li> </ul>
	CPK, aldolase	<ul style="list-style-type: none"> <li>• Muscle pain, weakness, fatigue</li> </ul>
	Vit B12, Vit B1, Vit D	<ul style="list-style-type: none"> <li>• Neurologic symptoms (headache, brain fog, etc.)</li> </ul>
	Lymphocyte Enumeration (CD4 or CD8 T cells, CD19 B cells, natural killer cells)	<ul style="list-style-type: none"> <li>• Prolonged or recurrent infection, co-infections or superinfections</li> </ul>
	8–9 am Cortisol and ACTH best (Random Cortisol level >35ug/dL: low likelihood of adrenal insufficiency)	<ul style="list-style-type: none"> <li>• Many shared symptoms with adrenal insufficiency. Cortisol level &lt;3 µg/dL is indicative of adrenal insufficiency and a cortisol level &gt;15 µg/dL likely excludes an adrenal insufficiency diagnosis.</li> </ul>
	ACTH Stim test	<ul style="list-style-type: none"> <li>• ACTH stimulation test when morning cortisol values are between 3–15 µg/dL. Peak cortisol levels &lt;18.1 µg/dL at 30 or 60 minutes indicate adrenal insufficiency.</li> </ul>
	Sputum for microbiology (bacterial, and viral, consider PJP)	<ul style="list-style-type: none"> <li>• If productive cough or infiltrates.</li> <li>• Add PJP DFA if on steroids or other immunosuppressants</li> </ul>
Specialized Testing (Depending on Clinical Scenarios and prior findings)	Total T and B cell Subsets (Naïve T and B cells, Memory T and B cells) Cytokine assay (IL-6, IL-10, TNF-α, IL-12, IFN-γ)	<ul style="list-style-type: none"> <li>• If concern for immunodeficiency or abnormality in initial immunologic testing.</li> <li>• Referral to immunology</li> </ul>
	ANA, SSA, SSB, RF, CCP, dsDNA, Smith, RNP, C3, C4, cryoglobulins, ENA, RNP, antiphospholipid antibodies, ANCA, PR3/MPO, Ferritin, IL-6 Uric acid, urine analyses, Urine Protein/creatinine ratio	<ul style="list-style-type: none"> <li>• Autoimmune history or features. Referral to Rheumatology</li> </ul>

**Laboratory (Continued)**

	TEST	COMMENTS
	Renin, Aldosterone, 24 hr urine Na, 24 h fractionated metanephrines, VMA, 5-HIAA; plasma fractionated metanephrines, orthostatic intolerance, dysautonomia features. Renin, Aldosterone, 24 hr urine Na 24 h fractionated metanephrines, VMA, 5-HIAA; plasma fractionated metanephrines	<ul style="list-style-type: none"> <li>• Orthostatic intolerance, dysautonomia features.</li> <li>• Usually Referral to cardiology/neurology</li> </ul>

CBC = complete blood count, CMP = complete metabolic profile, Mg = magnesium, CRP = C-reactive protein, TSH = thyroid stimulating hormone, Ig = immunoglobulin, VTE = venous thromboembolism, BNP = beta natriuretic peptide, CKMB = creatine kinase-MB, CPK = creatinine phosphokinase, HA = headache, ACTH = adrenocorticotrophic hormone, µg = microgram, AI = adrenal insufficiency, PJP = Pneumocystis jirovecii, DFA = direct fluorescent antibody, TNF = tumor necrosis factor, IFN = interferon, ANA = anti-nuclear antibody, RF = rheumatoid factor, DNA = deoxyribonucleic acid, Na = sodium, DD = D-dimer.

**Imaging**

	TEST	COMMENTS
General	CXR ECG Signal averaged ECG (SAECG) HRCT	(1) can omit if normal CXR and no respiratory symptoms or signs
Conditional	Quantitative HRCT	History, exam or CXR suggestive of pulmonary fibrosis
	CTPA or VQ Scan	Concern for acute or chronic PVTED
	Sniff Test	Elevated diaphragm on imaging
	Transthoracic Echo	CP, palpitations, dyspnea, murmur, hypoxemia, abnormal Ao, PA, or cardiomegaly on chest imaging
	Nuclear cardiac stress Test	Symptoms consistent with angina
	24-hour Holter monitor	CP, palpitations, tachycardia, orthostatic intolerance, dyspnea
Specialized Testing (generally to be ordered by physician)	Cardiac MRI (PET)	Consider in following: <ul style="list-style-type: none"> <li>• Unexplained chest pain</li> <li>• Patient is “high performance” or “elite” athlete with documented COVID-19 infection</li> <li>• ECG shows significant T wave abnormalities or QTc prolongation</li> <li>• ECHO shows unexplained LV systolic dysfunction</li> <li>• Signal averaged ECG shows 2 of 3 abnormal domains</li> <li>• Elevated TropI or CK-MB</li> <li>• Consider cardiac PET if patient meets criteria for CMR but is unable to undergo MRI</li> </ul>
	Joint Xrays MSK ultrasound	
	Brain MRI	

CXR = chest radiograph, ECG = electrocardiogram, HRCT = high resolution computed tomography, CTPA = CT pulmonary angiogram, PVTED = pulmonary venous thromboembolic disease, CP = chest pain, Ao = aorta, PA = pulmonary artery, PET = positron emission tomography, MRI = magnetic resonance imaging, LV = left ventricle.

**Physiologic/Other**

	<b>TEST</b>	<b>COMMENTS</b>
General	6MWT PFT	
Conditional	Bronchoprovocation Challenge testing	<ul style="list-style-type: none"> <li>Prominent symptoms of wheezing, history of asthma, airflow limitation on spirometry</li> </ul>
	Laryngoscopy	<ul style="list-style-type: none"> <li>Suspicion of upper airway obstruction or Inducible Laryngeal Obstruction</li> </ul>
	Active Stand Test (supine 5min, stand 3min - Evaluate SBP, DBP and HR)	<ul style="list-style-type: none"> <li>Symptoms of orthostatic intolerance. Test is also considered positive if patient is unable to tolerate 3 minutes of standing.</li> </ul>
	Oxygen assessment with ABG	<ul style="list-style-type: none"> <li>Evaluation for suppl O2</li> </ul>
Specialized Testing	CPET iCPET	<ul style="list-style-type: none"> <li>Unexplained dyspnea</li> </ul>
	Bronchoscopy	<ul style="list-style-type: none"> <li>Persistent infiltrates</li> <li>Concern for secondary opportunistic Infection</li> </ul>
	Dysautonomia Testing - Tilt Table/ QSART/Autoantibodies	

6MWT = Six-minute walk test, PFT = pulmonary function test, SBP = systolic blood pressure, DBP = diastolic blood pressure, HR = heart rate, ABG = arterial blood gas, CPET = cardiopulmonary exercise test, QSART = quantitative sudomotor axon reflex test.

**Referrals**

	<b>Ancillary and Subspecialty</b>	<b>Comments</b>
General	Comprehensive Pulmonary Evaluation	Fatigue, PEM, dyspnea
	Pulmonology	
Conditional	SLP: Cognitive Evaluation	All patients with complaints of cognitive impairment for MoCA testing
	Neuropsychology	Case evaluation for all patients with complaints of cognitive impairment
	Social Worker	Resources for Post-COVID care (e.g., disability, mental health counseling)
	Patient Support Group	All who are interested
	Neurology	Abnormal Neuropsychology Eval or localizing symptoms
	Cardiology	Abnormal cardiac testing, persistent cardiac symptoms
	Electrophysiology	<ul style="list-style-type: none"> <li>In general, most patients referred to general cardiology.</li> <li>Refer to EP if patient meets specific criteria: <ul style="list-style-type: none"> <li>Documented, sustained SVT, including AFIB/ AF</li> <li>Highly symptomatic PAC/PVC</li> <li>Sustained ventricular tachycardia (&gt;30 seconds)</li> <li>Highly symptomatic non-sustained ventricular tachycardia</li> <li>Persistently reduced LV function (LVEF &lt; 35%) &gt;3 months</li> <li>True syncope (without warning, resulting in bodily injury)</li> <li>Symptomatic bradycardia</li> </ul> </li> </ul>

**Referrals (Continued)**

	<b>Ancillary and Subspecialty</b>	<b>Comments</b>
	Rheumatology	Autoimmune features or abnormal laboratory evaluation
	Specialized Pulmonary • ILD Specialist • Bronchoscopy	Determined at general visit • Interstitial lung findings on imaging • Persistent infiltrates suggestive of alternate diagnosis (e.g., immunocompromised with infiltrates, COVID19 test negative or inconclusive, lobar atelectasis, lung mass, hemoptysis)
	Immunology	Persistent/recurrent infections or abnormal laboratory evaluation
	ENT, GI, Hematology, Renal, Endocrine	Depending on clinical scenario
	Occupational Medicine	Work related COVID infections; Worker’s compensation evaluation

PEM = post = exertional malaise, MoCA = Montreal cognitive assessment, SLP = speech-language pathology, EP = electrophysiology, ENT = otolaryngology, GI = gastroenterology.