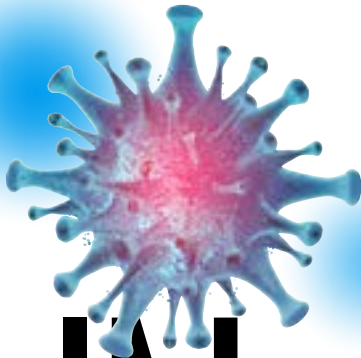




WORKING WITH COVID-19

Insights into the Newly Published American
Society of Echocardiography COVID-19
Statement Update: Lessons Learned and
Preparation for Future Pandemics



IN

2020, ASE published a statement guiding echocardiography laboratories in best practice during the COVID-19 pandemic.

Since this publication and additional statements focused on specific patient populations (pediatric, perioperative), the pandemic has evolved and so have our tools protecting and treating COVID-19 infection. ASE convened an expert writing group to address the current state of the COVID-19 pandemic and advise echocardiography laboratories on operation during future pandemics.






The [ASE COVID-19 Statement Update: Lessons Learned and Preparation for Future Pandemics](#) covers the following important areas: indications for echocardiography, application of echocardiographic services in a pandemic, transmission and mitigation strategies, role of cardiac POCUS/critical care echocardiography (CCE), unique/alternative imaging modalities, and training in echocardiography.

When recommending for preparedness for future pandemics, the writing group followed a disaster-response planning model: conventional, contingency, and crisis standards of care and preparedness. Conventional care standards are the high standards of performance when resources are not limited. Contingency care standards anticipate shortages and find ways to conserve resources or to substitute with alternative techniques, without compromising usual standards. In crisis standards resources are insufficient to maintain usual standards of care and, in many instances, necessitate deferring or canceling nonurgent studies.



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Most of the guidance in this statement applies to contingency standards of care.

	Conventional	Contingency	Crisis
 Indications	<ul style="list-style-type: none"> AUC 	<ul style="list-style-type: none"> Defer non-urgent 	<ul style="list-style-type: none"> Only emergent, likely to survive
 Transmission control	<ul style="list-style-type: none"> Standard 	<ul style="list-style-type: none"> Limited protocol No ECG 	<ul style="list-style-type: none"> Very limited protocol, or POCUS* only
 POCUS/CCE	<ul style="list-style-type: none"> Standard 	<ul style="list-style-type: none"> Use to triage full exam Remote guidance 	<ul style="list-style-type: none"> POCUS* only Decision without imaging
 Alternative imaging	<ul style="list-style-type: none"> Standard 	<ul style="list-style-type: none"> CT/CMR/nuclear in place of TEE 	<ul style="list-style-type: none"> Decision without imaging
 Training	<ul style="list-style-type: none"> Standard/hybrid 	<ul style="list-style-type: none"> Remote as default Simulators 	<ul style="list-style-type: none"> Remote only

Central Illustration Practice applications in pandemic standards of care. AUC, Appropriate Use Criteria; ECG, Electrocardiogram; POCUS, Point of Care Ultrasound; CCE, Critical Care Echocardiography; CT, Computed Tomography; CMR, Cardiac Magnetic Resonance Imaging; TEE, Transesophageal Echocardiogram. (This Central Illustration is from the American Society of Echocardiography COVID-19 Statement Update: Lessons Learned and Preparation for Future Pandemics, Published in the November 2023 *Journal of the American Society of Echocardiography*. Reprinted with permission from Elsevier Inc.)

It is important to keep in mind that while this document refers to the COVID-19 pandemic with respect to disease-specific management, the recommendations made may be broadly applicable in any future pandemic.

INDICATIONS FOR ECHOCARDIOGRAPHY

Indications for echocardiography during a pandemic are based on the expected manifestations of the infection and the expected echocardiographic findings.

Echocardiographic Findings in Acute COVID-19 Infection

One of the most common indications for echocardiography in patients with COVID-19 infection is suspected left-sided heart failure, and the test is used to determine the presence, the severity and potential causes of left ventricular (LV) systolic dysfunction including acute coronary syndrome, stress (takotsubo) cardiomyopathy, myocarditis, and multisystem inflammatory syndrome. LV diastolic dysfunction has also been found in patients with acute COVID-19 infection, however, the exact incidence and the mechanism for development of isolated diastolic

dysfunction is unknown.

At least as common as the incidence of LV dysfunction in acute COVID-19 is the incidence of right ventricular (RV) dilation and dysfunction. The potential mechanisms include any potential cause of LV dysfunction as well as acute pulmonary hypertension or acute cor pulmonale caused by acute respiratory distress syndrome, pneumonia, or pulmonary thromboembolism. Echocardiography is the noninvasive test of choice to determine the severity and possible etiology of pulmonary hypertension. Pericardial effusions leading to tamponade can be seen, although uncommon.

Echocardiographic Findings in Postvaccine Myocarditis

Myocarditis and pericarditis occur rarely following administration of COVID-19 mRNA vaccines. Echocardiographic findings in myocarditis include reduced or normal ejection fraction, increased wall thickness, mild regional wall motion abnormalities, diastolic dysfunction, RV systolic dysfunction, pericardial effusion, and abnormal LV global longitudinal strain (GLS).

Echocardiographic Findings in Long COVID Syndromes

“Long COVID” is defined as symptoms persisting ≥ 4 weeks after acute infection, and “post-COVID syndrome” for symptoms persisting for ≥ 12 weeks. Longitudinal echocardiographic studies show discrepant results, and further research is needed to determine the reversible nature of any identified LV dysfunction.

APPLICATION OF ECHOCARDIOGRAPHY SERVICES IN A PANDEMIC

Decisions about performance of studies should incorporate benefit and risk for the patient, as well as risk for the staff, within the context of conventional, contingency, or crisis standards of care. Although there are no appropriate use criteria specific for COVID-19, criteria can be extrapolated. The complexity and potential risk associated with specific tests (aerosolizing TEE and exercise stress echocardiography vs. nonaerosolizing TTE and dobutamine stress echocardiogram) as well as the local prevalence of infection should be considered. In crisis standards of

care, it may be necessary to consider the trajectory of the patient. Each facility should develop screening and triaging protocols that should be reassessed and modified as the prevalence of COVID-19 in the community changes. The patient’s COVID status should not be a reason to deny an appropriate test or affect timeliness benchmarks.

INFECTION/TRANSMISSION MITIGATION STRATEGIES

Personal Protective Equipment

The level of personal protective equipment (PPE) depends on the COVID-19 risk as well as institutional policy and resources. Standard care requires hand washing, use of gloves, and possible use of surgical face mask. Droplet precautions require gown, gloves, head cover, face mask, and eye shield. Airborne precautions required during TEE requires N-95 or N-99 respirator masks, powered air-purifying respirator systems, and possibly shoe covers, because of the increased risk for aerosolization. During TTE, symptomatic patients and the scanning sonographers should wear masks.

Recommendations for Avoiding Pathogen Transmission During Echocardiography

1.	For inpatients, examination should be performed at the bedside, and for outpatients, a dedicated room should be used to avoid crossover with more vulnerable patients.
2.	PPE as dictated by local protocols is required.
3.	Physical barriers between sonographer and patient may be advised.
4.	Handheld devices may further mitigate infection risk due to their smaller size, making them easier to clean.
5.	Echocardiographers should take steps to minimize patient contact time, which may include importing the ECG from the patient’s telemetry system when possible or using time-based acquisitions.
6.	It is advisable to perform a limited study with images specifically targeted at answering the clinical question and for de novo cases, addressing the most common expected findings.
7.	Offline measurement analysis is encouraged in this setting to further reduce patient contact time.
8.	To save time, UEAs should be prepared and brought into the room if there is an anticipated need.
9.	Appropriate postprocedural disinfection of equipment is required.

(Table 2 from the American Society of Echocardiography COVID-19 Statement Update: Lessons Learned and Preparation for Future Pandemics, Published in the November 2023 *Journal of the American Society of Echocardiography*. Reprinted with permission from Elsevier Inc.)

Vaccines

Vaccination is one of the most effective countermeasures for mitigating a pandemic. Decisions about mandating vaccines and reassigning staff with religious or medical exemptions to vaccination depend on institutional policies.

Limited, Focused Studies

To reduce exposure time and therefore transmission, it is advisable to perform a limited study with images specifically targeted at answering the clinical question. Importing the ECG from the patient's telemetry system where possible or using time-based acquisitions may reduce contact. When a comprehensive study is required, offline analysis is recommended. Ultrasound enhancing agents should be considered and be made readily available for use in portable echos.

Unique/Alternative Imaging Modalities

The risk of aerosol generation during TEE and deep breathing or coughing during exercise stress echocardiography have led to an increase in alternative imaging modalities that could provide similar diagnostic information. However, in some situations the benefits of TEE or stress echocardiography may outweigh the risks.

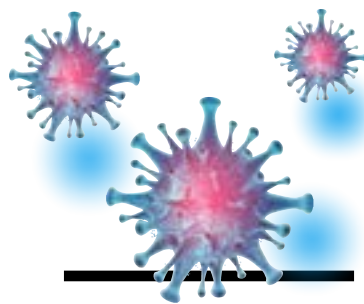
POINT-OF-CARE ULTRASOUND AND CRITICAL CARE ECHOCARDIOGRAPHY

POCUS can be used to guide the need for further imaging and to allow for more focused TTE. If a full TTE is indicated, requiring POCUS prior to it may add unnecessary exposure and may delay care. However, in crisis or severe contingency standard situations, POCUS/CCE may be the only modality available. Ideally, they should be formally interpreted, documented, and archived. Barriers for implementing a POCUS/CCE program should be addressed ahead of future pandemics.

TRAINING IN ECHOCARDIOGRAPHY

Scanning

Considering the risk of future pandemics, sonography schools and clinician training programs should explore hybrid learning models, which involve a mix of in-person, simulator-based, and online instruction. Asynchronous online instruction and simulators are crucial in crisis standards of care. An



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alternative approach is extending the time to acquire the requisite number of cases.

Interpretation

Remote learning platforms can provide wider accessibility and flexibility for trainees. Technology allows interactivity and reliable use of instructional tools to engage learners. Recording of sessions allows for creating content repositories. The efficacy of remote learning is similar to in person instruction, provided a comprehensive and structured approach is followed.

A blended method is likely the optimal approach, therefore adopting the technology and protocols to allow remote learning is recommended.

CONCLUSION

This statement addresses echocardiography practice in current and future pandemics. Specific indications and decisions about the performance of echocardiography services, infection/transmission mitigation strategies, the role of cardiac POCUS/CCE, unique/alternative imaging modalities, and training in echocardiography remain key areas for planning and preparation.