

Table 1: Safe Reintroduction of Cardiovascular Procedures and Diagnostic Tests during the COVID-19 Pandemic: Guidance from North American Societies

| Response Level<br>(in collaboration with public health officials) | Level 2<br>Reintroduction of some services   | Level 1<br>Reintroduction of most services   | Level 0<br>Regular services<br>(ongoing COVID-19 testing/surveillance and monitoring of PPE availability)  |
|---|--|--|--|
| <b>INTERVENTIONAL and STRUCTURAL CARDIOLOGY</b>                   |  |  |  |
| <b>STEMI</b>  | <ul style="list-style-type: none"> <li>COVID-19 status may be unavailable at time of STEMI. Use of PPE will be dictated by regional health authority and COVID-19 penetrance.</li> <li>PPCI for most patients. Selective pharmacoinvasive therapy as per regional practice.</li> <li>If moderate/high probability or COVID-19 +ve consider alternative investigations (TTE and/or CCT) prior to cath lab activation or pharmacoinvasive therapy</li> </ul> | <ul style="list-style-type: none"> <li>COVID-19 status may be unavailable at time of STEMI. Use of PPE will be dictated by regional health authority and COVID-19 penetrance.</li> <li>PPCI for most patients. Selective pharmacoinvasive therapy as per regional practice.</li> <li>If moderate/high probability or COVID-19 +ve consider alternative investigations (TTE and/or CCT) prior to cath lab activation or pharmacoinvasive therapy</li> </ul> | <ul style="list-style-type: none"> <li>COVID-19 status may be unavailable at time of STEMI. Use of PPE will be dictated by regional health authority and COVID-19 penetrance.</li> <li>PPCI for most patients. Selective pharmacoinvasive therapy as per regional practice.</li> <li>If moderate/high probability or COVID-19 +ve consider alternative investigations (TTE and/or CCT) prior to cath lab activation or pharmacoinvasive therapy</li> </ul> |
| <b>ACS (NSTEMI/UA)</b>  | <ul style="list-style-type: none"> <li>NSTEMI (High Risk) – Invasive strategy (Refractory symptoms, hemodynamic instability, significant LV dysfunction, suspected LM or significant proximal epicardial disease, GRACE risk score &gt;140)</li> <li>Medium Risk NSTEMI – Selective invasive strategy</li> <li>Low Risk NSTEMI and UA – Medical therapy</li> </ul>   | <ul style="list-style-type: none"> <li>NSTEMI (High Risk) – Invasive strategy (Refractory symptoms, hemodynamic instability, significant LV dysfunction, suspected LM or significant proximal epicardial disease, GRACE risk score &gt;140)</li> <li>Medium Risk NSTEMI – Invasive strategy</li> <li>Low Risk NSTEMI and UA – Selective invasive strategy</li> </ul>   | Routine service for all cases  |

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| <b>Elective Cath Lab Cases</b> | <ul style="list-style-type: none"> <li>Outpatients with symptoms AND non-invasive testing suggesting high risk for CV events in the short term.</li> </ul>   | <ul style="list-style-type: none"> <li>All outpatients who are clinically considered to be moderate and high risk.</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>TAVR</b>                    | <ul style="list-style-type: none"> <li>Inpatients and outpatients with severe symptomatic aortic stenosis</li> </ul>   | <ul style="list-style-type: none"> <li>Most patients accepted by the Heart Team</li> <li>Stable cases may still be deferred</li> </ul>                                    | Routine service for all cases |
| <b>MitraClip</b>               | <ul style="list-style-type: none"> <li>Inpatients and outpatients with severe symptomatic mitral regurgitation</li> </ul>  | <ul style="list-style-type: none"> <li>Most patients accepted by the Heart Team</li> <li>Stable cases may still be deferred</li> </ul>                                    | Routine service for all cases |
| <b>ASD/PFO</b>                 | <ul style="list-style-type: none"> <li>Selective cases</li> </ul>  | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul>   | Routine service for all cases |
| <b>LAAC</b>                    | <ul style="list-style-type: none"> <li>Selective cases</li> </ul>  | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul>   | Routine service for all cases |
| <b>Other</b>                   | Selective cases: <ul style="list-style-type: none"> <li>Pulmonary hypertension</li> <li>Adult congenital</li> </ul>  | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul>   | Routine service for all cases |
| <b>CARDIOVASCULAR SURGERY</b>  |  |   |                               |
| <b>Coronary</b>                | <ul style="list-style-type: none"> <li>Inpatients waiting for surgery</li> <li>Outpatients with progressive symptoms or LV impairment</li> </ul>   | <ul style="list-style-type: none"> <li>All inpatients waiting for surgery</li> <li>Majority of outpatients</li> <li>Stable cases may still be deferred</li> </ul>         | Routine service for all cases |
| <b>Valve Surgery</b>           | <ul style="list-style-type: none"> <li>Inpatients waiting for surgery</li> <li>Outpatients with severe symptomatic valvular disease or LV impairment</li> </ul>  | <ul style="list-style-type: none"> <li>All inpatients waiting for surgery</li> <li>Majority of outpatients</li> <li>Stable cases may still be deferred</li> </ul>         | Routine service for all cases |
| <b>Other</b>                   | <ul style="list-style-type: none"> <li>Acute aortic dissection</li> <li>Valvular endocarditis</li> <li>Heart transplant/VAD</li> <li>High risk cardiac tumours</li> <li>Severe symptomatic congenital heart disease</li> </ul> | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul>   | Routine service for all cases |
| <b>ELECTROPHYSIOLOGY</b>       |  |   |                               |
| <b>Ablation</b>                | <ul style="list-style-type: none"> <li>Pre-excited AF</li> <li>AF with recurrent admissions +/- CHF</li> <li>Drug refractory VT</li> </ul>   | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul>   | Routine service for all cases |
| <b>Devices</b>                 | <ul style="list-style-type: none"> <li>PPM for all inpatients and selective high-risk outpatients</li> <li>Secondary prevention ICD and selective primary prevention ICD.</li> </ul>   | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul>   | Routine service for all cases |

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|  | <ul style="list-style-type: none"> <li>• Device generator elective replacement indicator activated</li> </ul>  |   |                               |
| <b>Other</b>                                     | Selective cases: <ul style="list-style-type: none"> <li>• Lead replacement, revision and extraction with infection or inappropriate shocks</li> <li>• Implantable loop recorder for syncope</li> <li>• Ambulatory monitoring</li> <li>• Cardioversion</li> </ul> | <ul style="list-style-type: none"> <li>• Majority of cases</li> <li>• Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>ECHOCARDIOGRAPHY</b>                          |  |   |                               |
| <b>Transthoracic Echocardiography</b>            | <ul style="list-style-type: none"> <li>• All inpatients</li> <li>• Selective outpatients in which TTE will alter short term management</li> </ul>  | <ul style="list-style-type: none"> <li>• Majority of cases</li> <li>• Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Transesophageal Echocardiography</b>          | <ul style="list-style-type: none"> <li>• All patients where TEE will alter short term management. Given potential for false -ve COVID-19 testing, consider aerosol level PPE for possible AGMP.</li> </ul>   | <ul style="list-style-type: none"> <li>• Majority of cases</li> <li>• Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Exercise Testing with Imaging</b>             | <ul style="list-style-type: none"> <li>• Selective cases where exercise testing will alter short term management</li> <li>• Pharmacologic testing preferred over exercise testing</li> </ul>   | <ul style="list-style-type: none"> <li>• Majority of cases</li> <li>• Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>CARDIAC COMPUTED TOMOGRAPHY</b>               |  |   |                               |
| <b>CT Coronary Angiography</b>                   | <ul style="list-style-type: none"> <li>• All inpatients and selective symptomatic outpatients</li> </ul>   | <ul style="list-style-type: none"> <li>• Majority of cases</li> <li>• Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Structural Heart Disease</b>                  | <ul style="list-style-type: none"> <li>• Preprocedural structural heart disease planning for all inpatients and selective outpatients</li> </ul>   | <ul style="list-style-type: none"> <li>• Majority of cases</li> <li>• Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Other</b>                                     | Selective cases: <ul style="list-style-type: none"> <li>• Pulmonary vein assessment for AF ablation planning</li> <li>• Cardiac masses</li> <li>• Congenital heart disease</li> </ul>  | <ul style="list-style-type: none"> <li>• Majority of cases</li> <li>• Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>CARDIOVASCULAR MAGNETIC RESONANCE IMAGING</b> |  |   |                               |
| <b>LV/RV Assessment</b>                          | <ul style="list-style-type: none"> <li>• All inpatients and selective outpatients</li> <li>• Consider alternate imaging modality</li> </ul>  | <ul style="list-style-type: none"> <li>• Majority of cases</li> <li>• Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Infiltrative/inflammatory</b>                 | <ul style="list-style-type: none"> <li>• All inpatients and selective outpatients</li> </ul>   | <ul style="list-style-type: none"> <li>• Majority of cases</li> </ul>   | Routine service for all cases |

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| <b>Disease</b>                       |   | <ul style="list-style-type: none"> <li>Stable cases may still be deferred</li> </ul>                            |                               |
| <b>Myocardial Viability</b>          | <ul style="list-style-type: none"> <li>All inpatients and selective outpatients</li> </ul>  | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Stress Cardiac Imaging</b>        | <ul style="list-style-type: none"> <li>All inpatients and selective outpatients</li> <li>Consider alternate imaging modality</li> </ul>   | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Other</b>                         | Selective cases: <ul style="list-style-type: none"> <li>Congenital heart disease</li> <li>Cardiac masses</li> <li>Vascular: thoracic aortic disease and pulmonary vein mapping</li> </ul>                     | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>NUCLEAR CARDIAC IMAGING</b>       |   |   |                               |
| <b>Exercise Testing with Imaging</b> | <ul style="list-style-type: none"> <li>All inpatients and selective outpatients</li> <li>Preference for vasodilator testing over exercise testing</li> </ul>  | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Myocardial Viability</b>          | <ul style="list-style-type: none"> <li>All inpatients and selective outpatients</li> </ul>  | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Other</b>                         | Selective cases: <ul style="list-style-type: none"> <li>LV assessment</li> <li>Preoperative organ transplant assessment</li> <li>Infiltrative diseases</li> </ul>   | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>HEART FAILURE / TRANSPLANT</b>    |   |   |                               |
| <b>Cardiopulmonary Testing</b>       | <ul style="list-style-type: none"> <li>All inpatients and selective outpatients</li> </ul>  | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Endomyocardial Biopsy</b>         | Selective cases: <ul style="list-style-type: none"> <li>Transplant surveillance in patients deemed to be at high risk for rejection</li> <li>Guide treatment in patients with presumed myocarditis</li> </ul> | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Right Heart Catheterization</b>   | Selective cases: <ul style="list-style-type: none"> <li>Facilitate transplant listing or candidacy for mechanical circulatory support</li> <li>Tailored hemodynamic therapy in cardiogenic shock</li> </ul>   | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>VASCULAR</b>                      |   |   |                               |

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| <b>Critical Limb Ischemia</b> | <ul style="list-style-type: none"> <li>All inpatients and selective outpatient cases</li> </ul>                 | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>TEVAR/EVAR</b>             | <ul style="list-style-type: none"> <li>All inpatients and selective outpatient cases</li> </ul>                 | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |
| <b>Other</b>                  | Selective cases: <ul style="list-style-type: none"> <li>Mesenteric ischemia</li> <li>Symptomatic DVT</li> </ul> | <ul style="list-style-type: none"> <li>Majority of cases</li> <li>Stable cases may still be deferred</li> </ul> | Routine service for all cases |

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