Guidance and Best Practices for Nuclear Cardiology Laboratories during the Coronavirus Disease 2019 (COVID-19) Pandemic: An Information Statement from ASNC and SNMMI

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Background
The COVID-19 pandemic is affecting all aspects of clinical practice including nuclear cardiology. Given the urgency, WHO and CDC have issued general recommendations with key goals to reduce mortality and morbidity, minimize disease transmission, protect healthcare professionals and preserve healthcare system functioning. This Information Statement from ASNC and SNMMI seeks to provide guidance and best practices for nuclear cardiology laboratories during the COVID-19 pandemic.

General Principles for COVID-19 Protection
- Physical distancing (at least 1-2 meters)
- Hand hygiene
- Rescheduling non-urgent visits
- Rescheduling elective surgeries and procedures
- Using separate spaces for patients with known or suspected COVID-19 to prevent spread
- Ensuring supplies are available
- Promoting use of telehealth

Screening Checklist
- Have you had a fever?
- Have you had a cough?
- Have you had difficulty breathing?
- Have you been unusually tired?
- Have you had muscle aches?
- Have you had diarrhea recently?
- Is your sense of smell less than it usually is?
- Is your sense of taste less than it usually is?
- Have you been exposed to any person with the virus in the last 2 weeks?
- Have you been exposed to any person who was a high risk of getting the virus in the last 2 weeks?
- Have you traveled to any place where a lot of people have COVID-19?

Adapting NC During COVID-19 Pandemic
- Patients referred for nuclear cardiology procedures are frequently greater than 60 years of age and have other comorbidities that place them at a high-risk for adverse outcomes with COVID-19.
- The various steps to minimize patients and healthcare professionals exposure to COVID-19 are listed below, tracking the patient journey from pre-procedure planning before the test, to steps taken on arrival for the test, during the test, and after the test for image interpretation and reporting (Figure).

Figure: Key Steps to Minimizing COVID-19 Exposure during the Patient’s Journey through the Nuclear Cardiology Laboratory

1. BEFORE ARRIVAL for the test
   - Screen patients by history on the phone
   - PPE for healthcare professionals
   - Consider triage for COVID-19 risk
   - Triage for COVID-19 risk
   - Postpone non-urgent tests
   - Separate patients spatially, minimize attendants
   - Review test indications again

2. ON ARRIVAL for the test
   - PPE for healthcare professionals
   - Screen patients by history again
   - Consider temperature screen
   - Separate patients spatially, minimize attendants
   - Review test indications again

3. DURING the test
   - Minimize contact for written consent/consider verbal consent
   - Preferentially use rapid protocols
   - Preferentially use vasodilator stress/Avoid exercise stress
   - Room/equipment handling per local infection control policies
   - Review lung findings on hybrid SPECT/PECT/CT

4. AFTER the test
   - Avoid sharing computers and sanitize keyboards
   - Use telehealth, where possible, for image interpretation and reporting
   - Use telehealth, where possible, to discuss results with teams

Table: Some examples of nuclear cardiology studies and selection

<table>
<thead>
<tr>
<th>Indication</th>
<th>Urgency</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Myocardial Perfusion Imaging for Ischemic Heart Disease</td>
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<tr>
<td>Recent acute coronary syndrome: evaluation of ischemia in a moderate to high-risk patients considered for urgent coronary revascularization</td>
<td>Priority 1</td>
<td>Perform test using precautions</td>
</tr>
<tr>
<td>New or accelerating symptoms Canadian Cardiovascular Society Class IV-V where diagnosis of CAD is uncertain (intermediate pretest likelihood), or where suspicion of CAD, is high but coronary angiography has greater risk.</td>
<td>Priority 1</td>
<td>Perform test using precautions</td>
</tr>
<tr>
<td>Preoperative evaluation: evaluation of ischemia in moderate to high-risk patients for pre-operative evaluation, in whom surgical procedure is urgent and revascularization is a consideration.</td>
<td>Priority 1</td>
<td>Perform test using precautions</td>
</tr>
<tr>
<td>Stable angina for evaluation of ischemia follow up when there is no urgent revascularization plan</td>
<td>Priority 2 or 3</td>
<td>Postpone test</td>
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<tr>
<td><strong>18F-FDG PET viability</strong></td>
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<tr>
<td>Patient with ongoing symptoms being considered for CABG in the next 2 weeks where viability imaging will impact revascularization decision (such as patients with multiple comorbidities)</td>
<td>Priority 1</td>
<td>Perform test using precautions</td>
</tr>
<tr>
<td>Stable chronic ischemic cardiomyopathy evaluation prior to cardiac transplant listing</td>
<td>Priority 2 or 3</td>
<td>Postpone test</td>
</tr>
<tr>
<td><strong>99mTc-PYP imaging for transthyretin cardiac amyloidosis</strong></td>
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<tr>
<td>Heart failure where transthyretin cardiac amyloidosis is suspected</td>
<td>Priority 1 or 2</td>
<td>Perform test in select cases or Postpone test</td>
</tr>
<tr>
<td>Follow-up evaluation: Known cardiac sarcoidosis on therapy</td>
<td>Priority 2 or 3</td>
<td>Postpone test</td>
</tr>
<tr>
<td><strong>18F-FDG PET for sarcoidosis</strong></td>
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<tr>
<td>Initial evaluation: Heart block or VT and suspected cardiac sarcoidosis</td>
<td>Priority 1 or 2</td>
<td>Perform test using precautions</td>
</tr>
<tr>
<td>Follow-up evaluation: Known cardiac sarcoidosis on therapy</td>
<td>Priority 2 or 3</td>
<td>Postpone test</td>
</tr>
<tr>
<td><strong>18F-FDG PET for infective endocarditis</strong></td>
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<tr>
<td>Initial evaluation: Suspected prosthetic or device infection</td>
<td>Priority 1</td>
<td>Perform test using precautions</td>
</tr>
<tr>
<td>Follow-up evaluation: FDG PET prosthetic valve infective endocarditis</td>
<td>Priority 2 or 3</td>
<td>Postpone test</td>
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<tr>
<td><strong>MUGA scan for LVEF estimation</strong></td>
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<tr>
<td>Assessment of left ventricular function, as an alternative to echocardiography with short duration of patient-staff interaction.</td>
<td>Priority 1</td>
<td>Perform test using precautions</td>
</tr>
<tr>
<td>Initial evaluation: Prior to initiation of cardiotoxic chemotherapy</td>
<td>Priority 1</td>
<td>Perform test using precautions</td>
</tr>
<tr>
<td>Follow-up evaluation: Prior to subsequent chemotherapy</td>
<td>Priority 1</td>
<td>Perform test using precautions</td>
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<tr>
<td><strong>Organ transplant</strong></td>
<td></td>
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<tr>
<td>Liver transplant: preoperative evaluation in patient with intermediate or high cardiovascular risk and poor life expectancy from liver disease without transplantation*</td>
<td>Priority 1 or 2</td>
<td>Perform test using precautions or Postpone test</td>
</tr>
<tr>
<td>Kidney transplant: preoperative evaluation**</td>
<td>Priority 2 or 3</td>
<td>Postpone test</td>
</tr>
<tr>
<td>Heart transplant: Routine evaluation for transplant vasculopathy</td>
<td>Priority 2 or 3</td>
<td>Postpone test</td>
</tr>
</tbody>
</table>

Conclusions
- Changes to nuclear cardiology procedures are essential to minimize risk of viral exposure and transmission to healthcare personnel and patients during the COVID-19 pandemic.
- Nuclear cardiology laboratories are urged to follow local, state, public health, and institutional policies and these may change day to day with the evolution of the pandemic.
- ASNC and SNMMI recommend that all non-urgent nuclear cardiology studies be postponed and urgent studies performed with careful precautions listed in this document.
- Our goal is to keep the patients and healthcare professionals safe while providing clinical useful information to guide the management of patients with heart diseases.

Timing of Nuclear Cardiology Test
- All non-urgent nuclear cardiology studies should be postponed, and only urgent studies performed with precautions to minimize exposure of healthcare professionals and patients.
- Each nuclear cardiology test should be evaluated and placed in one of three categories during the COVID-19 pandemic (Table):
  - Priority 1: perform test as scheduled. The test should be expected to drive a meaningful treatment change that could be implemented in the immediate future and would have a clear short-term benefit.
  - Priority 2: postpone test by 2-4 months.
  - Priority 3: postpone test by >4 months.
- Some institutions use a 4-category triage scheme.