ASNC Webinar: COVID-19 Preparedness
Questions and Answers from COVID-19 Webinar

Archived COVID-19 Webinar

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COVID-19 Preparedness for Nuclear Cardiology Labs: Insights from the USA, China, and Singapore

The discussion was recorded March 24, 2020. ASNC leaders and global leaders in China and Singapore addressed their unique experiences relating to mitigating risk of COVID-19 exposure in the nuclear cardiology practice.

These insights may be applied immediately to help protect patients and personnel.

Topics include:

- Insights on the patient journey through the imaging lab from changes and prioritizing orders, patient and staff precautions, equipment considerations, changes to the interpretation, the reporting experience in the reading room, and more.
- New imaging and test preparation considerations for protection of technologists as they interact with patients.
- Insights from members of the Chinese Society of Nuclear Medicine based in Wuhan and Shanghai.
- Successful lessons learned from Singapore.
- Methods to specifically protect nuclear cardiology personnel from potential COVID-19 exposure.

Program Faculty

Introduction	Panelists	
Sharmila Dorbala, MD, FASNC ASNC, President Brigham and Women's Hospital, USA	**USA** **Stephen Bloom, MD, FASNC – ASNC Board of Directors** Midwest Heart & Vascular Specialist, USA	**CHINA** **Hongcheng Shi, MD, PhD** Vice President, Chinese Society of Nuclear Medicine Zhongshan Hospital Fudan University Shanghai, China
SiJin Li, MD, PhD President, Chinese Society of Nuclear Medicine Shanxi Medical University Hospital, Shanxi, China	**Regina Druz, MD, FASNC – ASNC Board of Directors** Integrative Cardiology Center of Long Island, USA	**Xiaoli Lan, MD, PhD** Secretary, Chinese Society of Nuclear Medicine Union Hospital, Tongji Medical College,Huazhong University of Science and Technology Wuhan, China
Moderator **Hicham Skali, MD** Brigham and Women's Hospital, USA	**Jolene Fantony, RT(N), CNMT** Brigham and Women's Hospital, USA	**SINGAPORE** **Felix Keng, MBBS, FASNC** National Heart Center, Singapore
		Aaron Tong, MBBS National Heart Center, Singapore

Abbreviation list:
ASNC, the American Society of Nuclear Cardiology (https://www.asnc.org)
CCTA, coronary CT angiography
CNMT, Certified Nuclear Medicine Technologist
CZT scanners, cadmium-zinc-telluride scanners
HIPAA, Health Insurance Portability and Accountability Act (by U.S. Congress in 1996)
LHC, left heart catheterization
MDI, metered-dose inhaler
MPI, myocardial perfusion imaging
PAPR, powered, air-purifying respirator
PPE, Personal Protective equipment
SCAI, Society for Cardiovascular Angiography & Interventions (http://www.scai.org)
SNNMI, Society of Nuclear Medicine & Molecular Imaging (https://www.snmmi.org)

Questions and Answers from COVID-19 Webinar:

Evaluate risk benefit of testing

- **There is a lot of disagreement on which studies should be canceled and which should be performed. Do you have an algorithm for selecting which patients to cancel and how to evaluate risk benefit of testing? Does this vary based on the region?**
  What studies are considered urgent in this situation? Are there any specific patient studies you are not performing because of the COVID-19?

  Dr. Dorbala: This is a very practical question. Any studies that are urgent and likely to change patient management and outcomes in the short term should be performed with protections for staff and patients. This may be important for outpatients, for inpatients, and for emergency department patients to facilitate hospital bed availability. All elective studies should be postponed.

  A careful discussion with the referring provider may help identify which studies to safely postpone. Regional variation is possible based on other testing availability and local practice patterns. An information statement developed by ASNC/SNMMI provides more guidance on this topic (https://zenodo.org/record/3738020#.XodFES2ZM6W).

  Dr. Keng: [For] Patients at high risk or positive patients, there is no real urgency.

  Dr. Skali: For non-COVID patients, after discussion with referring physician, we would avoid performing any study that is not likely to lead to a change in the short-term management of the patient. We would try not to perform exercise-based tests.

- **Is there a truly urgent/emergency output for nuclear stress tests? If urgent, those patients are scheduled for catheterization and omit non-invasive testing. As the outbreak is increasing, should all tests be canceled for a period of time?**
  Dr. Bloom: We recommend performance of only urgent tests and postponement of the rest of the tests. Cancelling all tests is not recommended. Testing is important to manage patients with ischemic heart disease and to discharge inpatients and emergency patients expeditiously, so hospital beds are available for COVID or other patients.

- **If the indication is that strong, why not cath?**
  Dr. Skali: Coronary angiography also increases exposure risk to staff and should be performed under strict conditions. See SCAI document.

- **Does or should limiting studies to appropriate patients during this time also apply to cardiac PET MPI studies?**
  Dr. Skali: Indeed, this recommendation extends to all testing. If there is no immediate change to the short-term management of the patient, the test should be postponed. Cardiac PET may be preferred during this time over SPECT, if available, as pharmacological stress is recommended, and the test duration is typically shorter than a SPECT.

- **Is there a reason to preferentially use pharmacologic stress rather than exercise stress to reduced risk for staff exposure? Is there concern about using albuterol MDIs** [metered-dose inhaler] **or nebulizers in the setting of possible occult COVID-19 infection? Do you have patients wear masks during their time in the nuclear cardiology laboratory?**
  Dr. Skali: There is high-droplet exposure with exercise, and likely with nebulizer treatments. We would recommend converting to pharmacologic testing if absolutely necessary to do the test.
  Dr. Keng: High-risk patients [should] wear surgical masks throughout all procedures.

- **Would stopping the performance of treadmill exercise help with minimizing contamination/spread of the virus to staff? Specifically, would switching all testing to pharmacologic stress instead of exercise recommended?**
  Dr. Skali: Exercise stress test increases the risk of droplet exposure. In most cases, pharmacological testing—especially with regadenoson—would be safer and shorter than exercise testing.

- **Should we avoid treadmill stress in all or just suspected COVID patients?**
  Pharmacologic testing is preferred. Exercise increases exposure risk to droplets.

  Dr. Skali: It is probably safer to assume all patients are high risk and avoid exercise testing in all. Consider pharmacologic stress testing or other modalities for ischemia after discussion with referring physicians.

- **When would you definitively consider doing a treadmill? Or is that not an option at all?**
  Dr. Bloom: I would consider a treadmill in a patient low risk for COVID-19 (i.e., no symptoms, no cough or respiratory issues etc.). But for now, pharmacological testing is my first, second, and third choice. Once again, in a few months, when COVID-19 testing is more available, it will help us decide who can exercise.

Testing procedures

- **If criteria for screening includes exposure to someone who has tested positive, how do you address the issue that the majority of areas and people still don't have access to COVID-19 testing.**
  Dr. Keng: Testing of COVID-19-suspected people and two-layer screening cannot be over emphasized. If testing is not available, then it may be prudent to differ imaging, if possible, until testing can be widely and easily performed, in the interest of safety.

Dr. Tong: Screening with signs, symptoms, risk factors. Going by clusters and contact tracing may help. For example, even if there is no direct contact with a COVID-19 patient, but the person screened belongs to an institution/group/area with suspected cases, then there are still heightened measures taken. As community spread worsens, it is envisioned that contact history will become less important.

- **With a SPECT MPI specificity barely in the 30% range, wouldn't it be prudent to proceed with CCTA or LHC instead of SPECT MPI in high-risk patients who are, presumably, high-risk (which is usually the reason the test cannot wait)?**
  Dr. Bloom: The specificity for SPECT MPI ranges from 29% for the detection of isolated branch vessels in patients with coronary bypass, 50% without bypass and 64%–71% for first-order branch vessels. Test specificity is driven low by a referral bias and normalcy rates with nuclear myocardial perfusion imaging in the 85% range.[Beller GA, Zaret BL. *Circulation.* 2000;101:1465-78.] It is a clinical decision to decide who is at high risk to proceed to a SPECT MPI or heart catherization. Many MPIs will be postponed when the patient can be treated medically safely with no urgent testing. CCTA is an excellent test as well, but does expose multiple healthcare workers, and like MPI, should be performed if it is likely to change management and outcome.

  When we are able to test patients for COVID-19, then elective testing will change, hopefully in the next few months.

- **What about blood volume analysis for evaluating blood plasma and transudation rate, which can be helpful directing fluid resuscitation for COVID-19 patients who develop capillary leak syndrome?**
  This may not be a necessary test to guide management, and clinical judgement is recommended.

- **For outpatients only, would you recommend one-day rest/stress vs stress only to minimize having patient return for rest images?**
  Dr. Bloom: Consider minimizing patient's time in nuclear whenever possible. If low probability of Cad and normal prior exam, consider stress first scan.
  Dr. Keng: Please consider all measures to minimize contact and duration in the lab, be it postponing test, same-day, stress-only, rest-stress, software, and hardware approach.

- **One day or two days protocol?**
  Dr. Skali: To reduce patient and staff exposure, consider one-day protocol whenever possible.

- **What about patients with probable lung embolism and confusing respiratory symptoms?**
  In case of emergency, nuclear medicine imaging can be performed. Of course, protection is very important.

- **We would leave the decision whether to image higher risk patients to the primary physician, after a thorough discussion with the imaging physician.**
  Dr. Bloom: Involving the referring physician in the decision process is very important.

- **If you only do pharmacological stress testing, what happens when the patient incorrectly has caffeine?**
  Dr. Skali: If the vasodilator test is necessary, then it can be rescheduled. This can be avoided by careful patient instructions on the phone on the day prior to the test while the screening questionnaire is administered. If a return visit is challenging for the patient, an exercise study can be considered, assuming the patient can exercise adequately.

- **There may be a few of us who remember the days before MPI studies were even available. Should we consider not performing any MPI studies, exposing nuclear cardiology personal from patients and patients from staff, but rather revert to low-level exercise testing post myocardial infarction. I would also submit that identifying intermediate risk individuals on an outpatient basis would override the risk of virus expose. Thoughts?**
  Dr. Dorbala: The performance of an MPI should lead to immediate changes in short-term management. Otherwise, all MPI testing should be postponed.

- **To confirm with Dr. Skali, you switch all nuclear test to pharmacological stress, even for asymptomatic patient with negative epidemiologic and clinic markers? Even if only doing outpatients?**
  Dr. Skali: All non-urgent tests should be postponed. If a test is to be done, pharmacologic testing should be preferred.

- **Do you approach inpatient testing differently than outpatient testing? Also, we have no availability for routine testing in our area of the United States at this time.**
  Dr. Bloom: Inpatients may have more acute symptoms than outpatients at times, and there may be more of a need to do a pharmacological MPI. However, atypical chest pain admitted to the hospital are not getting the test currently; [these patients] are postponed and followed by telemedicine visits from our office, as of this week.

- **One speaker recommends doing stress-only test. But other speaker recommends pharmacological stress test. Is there a consensus among the societies? Or is this anecdotal or best assumption?**
  Dr. Dorbala: ASNC and SNNMI are releasing an information statement that will indicate the most expeditious protocols that should be used. (See https://zenodo.org/record/3738020#.XodFES2ZM6W.) For nuclear cardiology studies, vasodilator stress is recommended, with exercise reserved for select cases, if preferred by the referring provider. Stress first with vasodilator testing could be an excellent option at this time.

- **When doing prone imaging as an addition to the images, would you consider it as a part of the test, or does that get coded separately?**
  Prone imaging is considered part of the test and is not coded separately.

Managing and screening non-COVID-19 patients

- **Is there still not an obligation to serve hospitalized patients who have illnesses *other* than COVID-19?**
  Dr. Keng: This is the majority of our inpatient work! We will try our best not to image suspected and COVID-positive patients.

- **If a patient has no symptoms and really wants their test, would you allow testing?**
  It depends on the clinical indication and current policies. Would discuss with referring physician.

- **Should we take a patient's temperature prior to imaging?**
  Dr. Skali: Measuring patient's temperature on arrival provides an added level of screening. Some institutions are measuring temperatures of patients and staff. We suggest you follow local policies.

- **Do you test asymptomatic patients for the virus during the screening process?**
  Dr. Lan [from China]: Because Wuhan [is] the center of the disease, at present all patients [here] should receive virus screening before PET imaging. Only the negative patients can be examined by PET.
  Dr. Keng: I am sure there were some, which is why we assume all patients are high risk and staff take the necessary precautions to mitigate the risk.

Diagnosing and managing patients with COVID-19

- **Other than people with underlying respiratory diseases, is there a population of patients who may be considered to be at higher risk to contract this virus or to have more severe symptoms and outcomes if they contract the virus? For example, diabetic patients, patients with known heart disease, patients on certain medications?**
  Cardiovascular disease patients and those with comorbidities, including immunocompromise and advanced age, are at higher risk of COVID-19 complications.

- **What are signs of COVID on an MPI?**
  Dr. Keng: If you have SPECT/PET/CT, then look at Lung CT as well.
  Dr. Dorbala: Although myocarditis like clinical presentations have been described, we are not aware of any specific COVID signs on myocardial perfusion imaging.

- **People with COVID-19 symptoms are being told they don't qualify for testing unless they are presenting with life-threatening symptoms.**
  We hope this misconception is rare. Urgent tests should be performed to guide patient management and typically are not delayed due to COVID-19 symptoms. Some institutions recommend testing for COVID-19 prior to the test.

- **What is the recommendation to use adenosine or dobutamine for stress on patients with coronavirus?**
  Dr. Skali: MPI should be postponed in COVID-19-positive patients.

- **A very common cited indication for MPI testing is shortness of breath (SOB). How does one differentiate SOB due to cardiac issues vs COVID-19 symptoms upon arrival? Are we just relying on taking temperature?**
  Dr. Keng: I would look at risk profile (e.g., contact with known patient, travel, etc.). [For] high-risk patients with these symptoms, I would defer to a later date, as there is no advantage gained by performing MPI immediately. I would agree that temperature by itself is not an ideal screening tool; history is equally important.

- **Many patients have few or no symptoms.**

Yes, some patients have no symptoms. In this case, history of exposure is more important. If there is a history of exposure, but without symptoms, these patients should be considered as potential patients. They can perform nuclear medicine examinations, but the staff in the department of nuclear medicine need to pay attention to protection.

- **What was the second clinical manifestation?**
  That is CT imaging features. Ground glass opacities, consolidation, reticular pattern, and crazy-paving pattern are typical CT manifestations of COVID-19.

- **Is there concern about albuterol use pre- or post-vasodilator stress in patients who might have COVID-19? Might this increase risk for aerosolization of the virus?**
  Dr. Skali: All aerosolized procedures, including nebulizers, increase the droplet exposure risk and should be avoided in suspected COVID patients. Otherwise, MPI should be postponed in this group of patients.

- **Will ASNC have some examples of COVID positive CTs for reference on the website?**
  Dr. Dorbala: This is a good thought. ASNC will post COVID positive CT scan examples on the COVID resource section of the website.

Personal Protective Equipment

- **What kind of PPEs [Personal Protective Equipment] should technologists and staff use?**
  Dr. Keng: Everyone in the stress and imaging lab wears surgical masks throughout the day. Gloves [are worn] when there is patient contact, which is very often. If we encounter high-risk or positive patients, full PPE, including N95 plus gown plus gloves plus face shield. Those unable to [secure] N95 mask(s) are advised not to perform these studies, or don PAPR [powered, air-purifying respirator] as last resort. Needless to say, cleaning is of the utmost importance after stress test and imaging.

- **Are physicians, technologist, and staff performing stress tests recommended to use PPE with ALL patients. Especially when they can be in close contacts with patients?**
  Dr. Bloom: At my hospitals, all suspected or confirmed patients with COVID-19 wear masks (if not intubated) and gloves upon entry, and staff wear PPE (N95 mask, googles and gloves). With low-risk patients, we wear gloves and class 1–3 masks, because there is a shortage of N95 masks. This will probably change in the next few months as more N95 masks become available.

- **Should I wear protective eyewear while starting IVs on low-likelihood patients who have been screened?**
  Dr. Bloom: Probably not. Consider surgical mask. Definitely follow hospital policies.

- **Is it recommended that all patients wear masks (procedure masks) when undergoing nuclear testing?**
  Dr. Tong: Yes, all patients should wear masks throughout the entire procedure. When available, all patients and all healthcare providers should wear a mask based on local institutional policies.

- **Do you use N95 masks?**
  Dr. Lan: The medical staff who have contact with the patient use N95 masks, such as the nurses who inject the imaging agents and technicians. The doctors who issue the reports could use surgical masks.

Cleaning procedures

- **Are you cleaning after every case—even if the patient is not COVID positive or suspected?**
  Dr. Keng: We clean after every patient, regardless of COVID status. We assume everyone is infected. This necessarily increases the time taken per scan but should be implemented in the long term. The intensity of cleaning is important. Standard wipe down of all surfaces with Mikrozid® is what is practiced now, with terminal cleaning of imaging room for COVID-positive patients. Thus, we would schedule these patients at the end of the morning and afternoon sessions.

- **Regarding meticulous hygiene, in the absence of bleach (sodium hypochlorite) cleaners, what is the best solution to clean with?**
  Dr. Keng: Mikrozid® wipes to all surfaces, until further instructions from ID; replace whatever can be replaced after each patient; terminal cleaning at the end of morning and afternoon session.

- **When you say cleaning of PET scanning room, please specify what this means. What do we do for MRSA patients or is there a different protocol?**
  Please follow policies and recommendations from local infection control services and manufacturer specifications.

- **How well does the air disinfectant spray work? Even though we have negative air pressure rooms (because we also do V/Q scans) our infection control specialist said we have to wait an hour for the air to clear before disinfecting the room.**
  Dr. Keng: Everyone in stress-positive imaging lab wears surgical masks throughout the day. Gloves when there is patient contact (which is very often). If we encounter high risk/positive patients, full PPE including N95 plus Gown plus gloves plus face shield. Those unable to [secure] N95 mask are advised not to perform these studies, or don PAPR [powered, air-purifying respirator] as a last resort. Needless to say, cleaning is of the utmost importance after stress test and imaging.

- **We use CaviCide spray on our machines and treadmill in between patients. How good is this solution to kill CoVID-19 virus?**
  Dr. Keng: Clorox spray vs wipes vs Mikrozid wipes. No knowledge at all, presently.

- **Are alcohol-based wipes proven effective against COVID 19?**
  Dr. Lan: Research shows that 75% alcohol can kill the virus.
  Dr. Keng: I think high-concentration alcohol is effective.

Studies and recommendations

- **What studies are recommended in this pandemic situation?**
  Dr. Dorbala: This is a very practical question. All studies that are urgent and likely to change patient management and outcomes in the short-term should be performed with protections for

staff and patients. This may be important for outpatients, and for inpatients and emergency department patients to facilitate hospital bed availability. All elective studies should be postponed. A careful discussion with the referring provider may help identify which studies to safely postpone. An information statement developed by ASNC/SNMMI provides more guidance on this topic and will be published soon.

- **Do you have different recommendations for hospitals compared to free-standing imaging centers?**
  Dr. Skali: These recommendations are likely similar for all.
  Dr. Keng: I suppose no inpatients for free-standing centers. The problem is trying to separate inpatients from outpatients in the imaging facility. We try our best to separate them at all times, but it is difficult when space is limited. I think when the community spread is rampant, then there will be no difference between inpatients and outpatients.

- **Can you please repeat which patients would be good candidates for stress only?**
  Dr. Dorbala: We currently use a stress-first imaging approach. If the stress imaging is normal, rest scan can be avoided. Though possible with all scanners, attenuation correction, or CZT scanners may be helpful to minimize need for rest scan. (See Dorbala et al. *J Nucl Med.* 2015; 56:592-599 for details on stress first/stress only imaging.)

Logistics and other concerns

- **Do you have any recommendations for a remote reporting diagnostic workstation?**
  Dr. Druz: There are several options. Depending on the specific image processing and reporting workstation, the software can be installed on the user's organization-approved laptop for remote access. This usually requires an appropriate software license is purchased. Otherwise, if using a HIPAA-compliant video platform (Zoom, for example), a screen-share function may allow partial access for image review but is unlikely to allow remote workstation control with reporting features. There are systems that import images and reporting modules into the Cloud. It depends on the manufacturer of your processing platform.

  Dr. Keng: Remote interpretation and reporting are preferred to reduce patient contact. [There is] no need to do it from home, but a room away from the imaging facility would be good.

- **To Dr Keng, I am an advocate of staff working in rotation in current circumstances, and you kindly mentioned that this practice might not be sustainable in the long run. Is that your experience?**
  Dr. Keng: I would advocate rotational work ONLY if you have enough staff numbers for such work. That is, one group stays home whilst another group works in the lab. However, when there is not enough staff for separation, then it cannot work out. Our experience from SARS is that in the medium term, most hospitals cannot continue with separation, with fatigue and boredom at home setting it.

  In my unit, there is not enough staff for separation, but we try to keep all staff separated during work to specific areas, and even during meals. We also separate washrooms for staff use. Hopefully these measures will help mitigate the problem. Should anyone become COVID positive, at least the rest can continue to work.

The other point is social distancing. I am afraid hospitals were not built with social distancing in mind, perhaps we need to keep that in mind for future hospitals.

- **Have your labs limited weekend testing during COVID outbreak?**
  Dr. Dorbala: Our hospital does testing every day and has not limited it to weekend testing. This is primarily because weekend testing is important to expedite timely discharge and make timely management decisions on inpatients and emergency room patients.

- **How many of the panelist sites are encouraging physicians to report studies from home when possible?**
  Dr. Skali: All our reporting is done remotely.
  Dr. Tong: On-site reporting [at our institution] but in a designated room away from the clinical area.

- **Ideally, which telemedicine platform(s) do you recommend for consenting?**
  Dr. Druz: To clarify, telemedicine platforms vary in their ability to store and forward electronic documents. However, an electronic document can be forwarded through an existing patient portal for a patient to review. Some portals allow electronic signature. Thus, if using virtual workflow for consent, make sure an electronic version of the consent is available to refer to during screenshare, and downloadable through a patient portal, or available to be sent to a patient email for signature.

- **Other than the logistics of generator delivery, what effect on Technetium supplies do you expect COVID-19 to have?**
  Dr. Dorbala: The travel restrictions imposed during the COVID-19 pandemic have the potential to create radiotracer shortage. At this time, no shortages have been reported in the U.S., but shortages have been reported in some Asian countries.

  Dr. Keng: We have generator delivery problems, as commercial flights are being cancelled. We have had to source from different countries [Europe] using cargo planes. I do not think there is a manufacturing problem at this time.

- **Can a CNMT** [Certified Nuclear Medicine Technologist] **describe stress test, obtain consent, and apply telehealth billing? Or only an MD or NP, or PA?**
  Dr. Druz: A CNMT can do all mentioned EXCEPT for billing. However, as you are aware, a physician supervising the test still needs to provide informed consent to a patient after a CNMT describes the test and the procedure, etc. This would make an encounter billable under the new guidelines only. ASNC will be conducting a separate telehealth webinar where we will discuss tips and other workflows that are possible with telehealth.

- **Is verbal informed consent (rather than written) being used presently at many hospitals?**
  At this stage, we don't know how diffuse this practice is. But it could be generalized.
  Dr. Keng: It would be good practice during epidemic situations, we are getting legal advice on this, i.e., we record verbal consent.

- **I would suggest disposable pens to be used for written consent, which the patient can keep.**
  Yes, anything to minimize contact. Follow local practice.

- **What is life like now in China? Is there still very strict social distancing or is life beginning to return to normal?**
  Dr. Lan: Now, it has gradually returned to normal. Wuhan will restart completely in 10 days. This means everything is back to normal.

- **Dr Lan, after initial reductions in volumes have you increased your volumes now that COVID is plateauing in China?**
  Dr. Lan: Now our work is gradually returning to normal. Although Wuhan was locked down for two months, the PET center of my hospital began to check patients for more than one month. At first, there were fewer patients, but gradually more tumor patients received PET examinations. Today we have 27 patients. I believe it will be normal soon.

Administrative queries and comments

- **Will this webinar be available to view after completion? Is there a Spanish translation or is it only in English?**
  Yes, the webinar is available on the ASNC website. Currently, it is available in English only.

- **Congratulations for this Webinar. I received the answer to many of my questions. I believe this webinar was one of the most important that ASNC has made. It can be lifesaving to nuclear medicine staff. Congratulations. Hugs from Brazil!**
  Thank you

- **Congratulations to the entire facility on an incredibly important and informative webinar. Thank you to our colleagues in China for sharing their knowledge.**
  Thank you