

## **A COVID-19 Toolkit for Interventional Radiologists**

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is a novel Coronavirus that has quickly spread across the globe causing Coronavirus disease 2019 (COVID-19), with cases rapidly increasing in the United States. On March 11, 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic. Given the importance of protecting healthcare workers during the pandemic, the SIR is releasing information and guidance for Interventional Radiologists to plan for the management of COVID-19 patients. This is a rapidly changing situation, and information will be updated as new information is released.

The average incubation period is currently estimated to be 5-6 days, with 97.5% of patients presenting with symptoms within 11.5 days of exposure<sup>1-3</sup>. Currently, 80% of cases are considered mild to moderate based on a WHO study of the initial outbreak in China<sup>2</sup>. However, the same study demonstrated a 21.9% crude fatality ratio (CFR) in laboratory confirmed cases in those 80 year of age or older, and a 3.8% CFR in confirmed cases overall. Patients with pre-existing medical conditions such as cardiovascular disease (13.2% CFR), diabetes (9.2% CFR), hypertension (8.4% CFR), and respiratory disease (8.0% CFR) also had a higher mortality risk. In addition, healthcare providers (HCP) remain at significant risk of developing COVID-19, with 1,716 providers becoming infected out of over 72,000 patients in China as of February 11, 2020<sup>4</sup>. More recent estimates are over 3,000 HCP<sup>5</sup>. However, many of these cases occurred early in the outbreak, and infection to HCP can be reduced or eliminated with adoption of recommended precautions<sup>5-7</sup>. Thus, it is clear that the high-risk groups are elderly, those with certain pre-existing medical conditions, and healthcare providers. Planning should therefore take these factors into consideration.

There is no available data for the role of IR in management of COVID-19 patients and persons under investigation (PUI). Nonetheless, IR has a critical role in the management of patients within the healthcare system, and could conceivably be called to assist in the management of a COVID-19 positive patient. IR suites may also be located near radiology services where COVID-19 patients may undergo imaging. Proper, and early, preparation is therefore crucial to reduce exposure to health care workers and other patients in IR.

**Planning:**

- Regardless of the number of COVID-19 patients at the facility, we recommend immediate plans be put in place to screen and/or manage COVID-19 patients
- We recommend IR teams be involved with their local COVID-19 response teams, or equivalent. Early involvement can help to streamline the flow of patients and minimize unnecessary patient and healthcare provider exposure.
- Develop plans with guidance from local resources, including infection control
- Emphasize to staff and visitors that [CDC recommendations to protect yourself and others](#) must be followed
- Staffing models should be discussed to take into account minimizing exposures and working with reduced staffing

**Personal Protective Equipment (PPE):**

- Refer to [CDC](#) and [WHO](#) guidelines for appropriate use of PPE and ensure local policy is followed
- **Conservation of PPE through training and appropriate use is critical during the COVID-19 pandemic as the CDC is reporting “increased volume of orders and challenges in meeting order demands”**
- [Advice on mask use](#) and [hygiene](#) outside and within the healthcare setting is described by WHO

Based on [CDC guidance](#) as of March 15, 2020 (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/caring-for-patients.html>), the following recommendations are being made in the pre-procedure setting which incorporate CDC recommendations, including [infection prevention in the healthcare setting](#):

A. Geographic Areas Currently Identified as Low Risk	
Outpatient Centers and Outpatient Based Labs (OBL)	<ul style="list-style-type: none"> <li>• Ensure adequate PPE is available on-hand and securely stored, <a href="#">proper usage is defined with staff</a>, and <a href="#">education on usage is provided</a></li> <li>• Institute a phone screening system to identify patients at high risk of COVID-19</li> <li>• Screen persons using <a href="#">CDC guidelines of at-risk patients</a> prior to entry when possible</li> <li>• For persons who screen positive at the facility, develop a plan for immediate isolation or management of the patient and protection of HCP, <a href="#">including use of a mask for the patient and staff, and maintenance of 6 feet of distance</a></li> <li>• Ensure proper <a href="#">EPA-approved disinfectants</a> are available to clean isolation areas</li> </ul>

	<ul style="list-style-type: none"> <li>• Develop a plan for cleaning of isolation areas if utilized by screen positive persons using droplet cleaning protocols (<a href="#">refer to SARS cleaning protocol</a>) at a minimum</li> <li>• Categorize procedures as elective, urgent, and emergent</li> </ul>
Inpatient	<ul style="list-style-type: none"> <li>• Ensure adequate PPE is available on-hand and securely stored, <a href="#">proper usage is defined with staff</a>, and <a href="#">education on usage is provided</a></li> <li>• Integrate local policy into all precautions and plans</li> <li>• Begin plans on routing of patients to minimize exposure to other patients and HCP, including implementation of <a href="#">engineering controls</a></li> <li>• Identify <a href="#">air negative rooms</a> for procedures (if available) or designate rooms to be used for procedures on COVID-19 patients</li> <li>• Develop plans for terminal cleaning with <a href="#">EPA-approved disinfectants</a> of procedure rooms used to treat COVID-19 patients, if not already available. Planning should be done with <a href="#">environmental services</a> to ensure supplies are readily available.</li> <li>• <a href="#">Ensure N95 masks are available in a secure location</a> for all procedures where there is a risk of aerosol generating procedures. Additional local policies for N95 masks should be followed.</li> <li>• Ensure <a href="#">powered, air-purifying respirators (PAPR)</a> are available and proper training is performed per local policies</li> <li>• Categorize all procedural offerings as elective, urgent, and emergent – these categories are subjective and definitions should be agreed upon by local leadership/policy</li> <li>• Develop list of urgent and emergent procedures that can be offered for COVID-19 patients</li> <li>• Determine procedures that can be delayed/re-scheduled in case of worsening local infection rates</li> <li>• Develop work plan to minimize HCP involved in care of COVID-19 patients whenever possible</li> <li>• Ensure <a href="#">proper cleaning supplies</a> are available for reusable eye protection (e.g. leaded glasses) and lead/lead-alloy/alloy aprons</li> </ul>

	<ul style="list-style-type: none"> <li>For centers with medical trainees, develop or incorporate plans to limit trainee exposure in accordance with local policy</li> </ul>
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B. Geographic Areas Currently Identified as Minimal to Moderate Risk	
Outpatient Centers and Outpatient Based Labs (OBL)	<ul style="list-style-type: none"> <li>In addition to those in Table A, consider more aggressive screening including temperature/symptom checks and earlier triage in parking lots</li> <li>If staffing shortages are present, consider allowing exposed, asymptomatic HCP to work while wearing a facemask</li> </ul>
Inpatient	<ul style="list-style-type: none"> <li>Implement plans discussed in Table A, per local policy</li> <li>Limit visitor movement, per local policy</li> <li>If staffing shortages are present, consider allowing exposed, asymptomatic HCP to work while wearing a facemask per local policy</li> </ul>

C. Geographic Areas Currently Identified as Substantial Risk	
Outpatient Centers and Outpatient Based Labs (OBL)	<ul style="list-style-type: none"> <li>Cancel all elective and non-urgent procedures</li> <li>Consider requiring all HCP to wear a facemask when in the facility depending on supply</li> <li>Minimize HCP and staffing exposure</li> </ul>
Inpatient	<ul style="list-style-type: none"> <li>Follow local policy regarding cancellation of procedures</li> <li>Follow local policy regarding allowing HCP to work while asymptomatic or mildly symptomatic</li> <li>Restrict or limit visitors per local policy</li> </ul>

Resources:

WHO:

- [Rolling updates on COVID-19](#)
- [COVID-19 Situation Dashboard](#) – updates on number of cases and locations
- [Rational use of PPE for COVID-19](#)
- [Q&A on infection prevention and control for health care workers caring for patients with suspected or confirmed 2019-nCoV](#)

CDC:

- [Visual alert - Generic](#)
- [Print/Poster Resources for COVID-19](#)
- [Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 \(COVID-19\) in Healthcare Settings](#)
- [Interim US Guidance for Risk Assessment and Public Health Management of Persons with Potential Coronavirus Disease 2019 \(COVID-19\) Exposures: Geographic Risk and Contacts of Laboratory-confirmed Cases](#)
- [Implementation of Mitigation Strategies for Communities with Local COVID-19 Transmission](#)
- [What Healthcare Personnel Should Know about Caring for Patients with Confirmed or Possible COVID-19 Infection](#)

EPA:

- [SARS-CoV-2 disinfectant list](#)
- [COVID-19 Maps:](#)
- [JHU COVID-19 Map](#)
- [New York Times COVID-19 Map](#)

## References:

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4. The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19) — China, 2020[J]. *China CDC Weekly* **2**, 113–122.
5. Adams, J. G. & Walls, R. M. Supporting the Health Care Workforce During the COVID-19 Global Epidemic. *JAMA* (2020) doi:10.1001/jama.2020.3972.
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7. Schwartz, J., King, C.-C. & Yen, M.-Y. Protecting Health Care Workers during the COVID-19 Coronavirus Outbreak –Lessons from Taiwan’s SARS response. *Clin. Infect. Dis.* ciaa255 (2020) doi:10.1093/cid/ciaa255.