

Response to COVID-19 in Breast Imaging

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Coronavirus disease 2019 (COVID-19) is a novel respiratory virus first identified in Wuhan, China, in late 2019. Symptoms vary from asymptomatic (particularly at younger ages) to severe acute respiratory distress syndrome. Death is estimated to occur in 1-2% of those who contract the disease; most of these occur in patients age 60 years and older.

While COVID-19 is not known to have any effect on the breast or the risk of breast cancer, responsible leadership requires protection of our patients, staff, and radiologists in reducing potential exposure and disease, as well as the effective use of breast imaging staff and radiologists.

Here we ask select leaders in breast imaging to respond either specifically or in general to the following questions:

- 1) What is necessary breast imaging?**
- 2) What will be done if care will be delayed for 1 month? 2-3 months? Longer?**
- 3) How are you protecting staff?**
- 4) How are implementing social distancing?**
- 5) What do breast radiologists do when the schedule is mostly cleared out?**
- 6) What do staff do when the schedule is mostly cleared out?**

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New York University Langone Health (NYU) is a large academic health care center in New York City. The catchment area includes the tri-state region of New York, New Jersey, and Connecticut. Our practice is a mix of a National Cancer Institute designated Cancer Center, several outpatient imaging centers as well as tertiary care hospitals. Our breast imaging team includes 47 radiologists with expertise in breast imaging. In 2019, NYU Langone Health performed more than 150,000 mammographic examinations.

- 1) What is necessary breast imaging?**

Diagnostic examinations and Procedures

NYU has a patient-centric practice that balances providing breast imaging services to our patients with the potential risk of contracting COVID-19 by our patients, technologists, support staff and radiologists. We have continued to perform diagnostic examinations but our volume of diagnostic examinations has

decreased because we have stopped performing screening mammography and screening US. In our practice, some asymptomatic patients with above average risk patients, e.g. those with a personal history of breast cancer, may be scheduled as a diagnostic exam. Some of these women do not wish to postpone their exam and are relieved to know that their mammogram was normal. Also, we continue to perform all percutaneous – US, tomosynthesis, and MRI-guided breast biopsies as well as non-wire localizations. Further, our radiologists are prioritizing the reviews of outside films to expedite biopsies and pre-surgical evaluations of cancers. There is a shift to non-wire localization when possible so that patients can be rapidly rescheduled as OR availability opens up. Occasionally, we have been able to offer a diagnostic workup with same-day biopsy for outpatients.

Screening Examinations

NYU has postponed all screening mammograms and screening breast ultrasound examinations.

Breast MRI

Add-on breast MRIs are performed, but only if approved by the radiologist, e.g. staging for extent of disease. We are also performing screening breast MRIs on high risk patients who do not want their examinations delayed.

2) What will be done if care will be delayed for 1 month? 2-3 months? Longer?

Following a department of surgery mandate, all breast cancer surgeries, including elective surgeries (benign disease, discordant lesions, high-risk lesions) and for cancers are on temporarily on hold. The exceptions are for emergencies such as hematoma or a devitalized flap. We offer oral therapy for patients with a delay in their breast cancer surgeries. Our surgeons, medical oncologists and radiation oncologists are developing protocols for cancers that are not amenable to delay or to oral therapy. A helpful guide for the management of our breast cancer patients is the American Society of Breast Surgeons executive summary regarding the COVID pandemic (1).

3) How are you protecting staff?

To protect our staff, NYU implemented “source control” as the standard of practice. At this time, no visitors are allowed to accompany the patients. As of Thursday, April 2, 2020 all patients arriving at the NYU Perlmutter Cancer Center are given a mask. They are then screened by a nurse in the lobby of the NYU facilities (Table 1). If an answer in the affirmative to any of the above questions is obtained, the patient is instructed to wear a face mask and is placed in an isolation room. A referring clinician or the radiologist, wearing full personal protective equipment (PPE), assesses the patient and triages as follows: Fine, the patient may proceed to the breast imaging department; go home and get a virtual consult; or go to the Emergency Department (ED). If the patients are allowed to proceed to the breast

imaging department, they are again screened by our front desk. If they are symptomatic, they are rescheduled, sent to virtual urgent care or ED.

Our mammography and ultrasound units are ALWAYS being wiped down between patients, even before the COVID-19 pandemic. We use germicidal wipes (Sani-cloth, PDI, Woodcliff Lake, NJ) with the recommended contact time on each part of the unit that touches the patient. In addition, our cleaning staff is extremely diligent, and clean all doorknobs, light switches, surfaces, keyboards, iPads for patient consent, handles on cabinets, etc, multiple times a day. Our staff feels adequately protected with these measures.

4) How are implementing social distancing?

The breast imaging appointments are being spread out throughout the day. Mammograms are now every 30 minutes rather than every 15 minutes. Also, we removed chairs from our waiting rooms and all patients are instructed to sit 6 feet away from each other.

Our technologists are not allowed to congregate in the tech area. Instead, they are sent to various mammography rooms, ultrasound rooms, and reading rooms if available. All staff and radiologists must wear a facemask.

5) What do breast radiologists do when the schedule is mostly cleared out?

The breast radiologists are working on many academic pursuits that are consistent with the academic mission of our medical school. These tasks include research projects, writing manuscripts, preparing talks, and grant submissions. To support a departmental initiative to increase peer learning, we will perform a thorough analysis of positive predictive value 1, 2, and 3 of all imaging modalities to improve patient care. Another priority of our radiology leadership is to develop teaching files, including radiology-pathology teaching files for our medical students. As well, our radiology leadership is fostering the understanding of artificial intelligence (AI) among the breast radiologists. Therefore, they are encouraging breast radiologists to review educational material on AI. Breast radiologists may participate in ongoing AI reader studies and may assist with image annotation and segmentation. Finally, all radiologists may volunteer to be redeployed and to assist elsewhere in the hospital.

6) What do staff do when the schedule is mostly cleared out?

Staff are being deployed elsewhere within the cancer center and within the radiology department. They are tasked with materials management, rescheduling patients both for radiology department and cancer center clinicians, assisting with filing and paperwork, specimen transport, and updating the protocol and procedure manuals.

Table 1: Screening questionnaire for potential exposure to COVID-19.

1) Have you had muscle aches, unusual tiredness, or other flu-like symptoms in the past 5 days?
2) Have you had a fever in the last 5 days?
3) Have you had a cough in the last 5 days?
4) Have you had any loss of smell in the last 5 days??
5) Have you had any change in taste in the last 5 days?
6) Have any close family members or other direct contacts had a fever and cough in the last 5 days?
7) Have you had any contact with family members or close contacts that have been exposed to the coronavirus?
8) Inquiry about travel history, although this is less important because NYC has the largest number of COVID-19 cases in the United States.

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Risk versus Benefit: A New Meaning in the Time of COVID-19

What they say about living in “interesting times” is proves true. As my associate Michael Cohen pointed out to me, we as breast imaging radiologists have worked daily our entire careers to address the immediate needs of our individual patients, to assuage their fears and expedite their care. How disconcerting it is for us now to be faced with a new take on the risk versus benefit equation!

Our Emory Breast Imaging division encompasses 5 breast centers served by 13 faculty (2 of whom share appointments with other divisions) and 5 fellows. Our hospitals run the spectrum from tertiary care center to hybrid private practice/academic model to large public hospital. Despite these disparate settings, our radiology leadership has been able to marshal a cogent, highly effective, unified voice in leading response to this crisis.

In Breast Imaging, we have done the following:

-Initially, all patients were cancelled for a two-week span. This is being continued in a rolling manner, week over week.

-No screening patients are being done.

-We ran lists to identify all Breast Imaging Reporting and Data System (BI-RADS) 4 and 5 patients, all outstanding BI-RADS 0 (recall only), and all patients who were on the schedule but cancelled. We triaged these for urgency and created spreadsheets that allow us to track each group. We are adding patients who call in with new symptoms, triaging them as well. By doing this, we will know who to schedule first when full-service resumes.

-We are seeing all patients triaged as urgent. These are patients who have or may well have breast cancer and would undergo therapy in the near-term (known cancer needing localization, extent of disease determination, highly suspicious screening imaging findings or clinical symptoms, or probable abscess. We have sub-triaged our “time-sensitive patients” to see who might benefit from evaluation in the near-term.

-We are limiting our patient-facing days to 2 per week and bundling cases on those days, so we can limit physician and technologist exposure.

-We have enacted minimal staffing. When attending faculty aren't onsite, they are doing academic work. Fellows are assigned to sites when their presence might expedite care but are otherwise being encouraged to study at home, work on projects. A few technologists are coming in even on non-patient-facing days to call patients, do paperwork, quality assurance, etc.

-Our technologists and radiologists are using surgical masks, eye protection, and gloves during all patient contacts. We explain that this is not because we are sick but for simply everyone's safety. Patients have welcomed this.

-We have moved our waiting room furniture and are scheduling patients at single half hour intervals to promote social distancing.

-We are continuing to send reminder letters so as not to disrupt this safety chain, but have included an insert explaining that for now our appointments are markedly limited due to COVID-19, but we will have extended hours when routine service resumes. We thought that it was important to continue to send the letters for full transparency and in case patients wanted to seek care at another center. We did suspend sending the certified letters we send to patients who have not returned for care despite reminder (and to their referring physician) as a form of terminal communication, as these, in this setting, serve no actionable purpose for the patient--she can't get an appointment! We will print and send them as appropriate once operations have resumed.

The new and disconcerting risk versus benefit conundrum for all us comes when assessing those patients below the urgent category: attempting to balance the risk of exposure against the benefit of (minimally) earlier diagnosis (assuming a delay of month or two). Do we bring in a patient and risk possible community exposure to her, our technologists, breast center staff, and ourselves for a finding that is unlikely to be breast cancer? At Emory, we are trying to be clear-eyed in assessing, on a patient-by-patient basis, whether we feel the need for evaluation outweighs the risk of community exposure and possible infection.

Unfortunately, as we are all finding, this is difficult and necessarily subjective. The one thing I know: we breast imaging radiologists will approach this task with diligence and vigilance, in a way that serves the most in the best manner possible.

Donna Plecha, MD

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University Hospitals of Cleveland Health system is an academic, research-oriented healthcare system, associated with the Case Western Reserve University School of Medicine, with 18 affiliated hospitals and multiple outpatient facilities. Working in alignment with our institution's COVID-19 Incident Command Center, executive leadership as well as the breast multidisciplinary leadership team we have defined our essential and non-essential breast procedures and imaging exams. Governor DeWine issued a stay at home order for the state of Ohio which went into effect March 23.

- 1. What is necessary Breast Imaging?** Our Incident Command Center and executive leadership agreed to suspend all screening exams including mammography, MRI, and ultrasound. We are calling patients two weeks ahead of their appointment in a rolling fashion. We have not rescheduled them at this time and have informed them we will be calling them in the future to reschedule them. Our team has discussed prioritizing our high-risk patients when we begin screening in the future. We have started planning capacity optimization for when we do start screening again such as expanding hours on weekends to accommodate the volumes of backlog where and when appropriate.
- 2. What will be done if care will be delayed for 1 month? 2-3 months? Longer?** We are currently offering diagnostic imaging and biopsies. After the stay at home order was put in place by the Governor, diagnostic studies have diminished due to patient preference to reschedule. We are tracking those that canceled, and no shows so that we can reschedule them in the future. We will reach out to category 3 patients to reschedule their diagnostic follow up exam.
- 3. How are you protecting staff?** Our patients and staff have their temperature taken and answer screening questions before entering our buildings. All of our technologists are encouraged to wear surgical masks. Our staff does feel adequately protected. To conserve personal protective equipment (PPE), the staff are encouraged to use one mask during the entire shift, unless the mask is no longer clean.
- 4. How are you implementing social distancing?** We have implemented physical distancing of at least 6 feet among staff, and patients. In our multidisciplinary breast centers, providers are transitioning to telehealth visits with the majority of patients which has drastically reduced the number of patients and staff on site. We are also limiting staff hours because of the decrease in patient volume. The staff is focused on maintaining safe distances between patients in all waiting areas. To conserve PPE, the staff are encouraged to use one mask during the entire shift, unless the mask is no longer clean.

5. **What do breast radiologists do when the schedule is mostly cleared out?** The end of March and beginning of April is spring break for many Ohio schools, therefore we commonly have several breast imaging radiologists on vacation with very few on site at this time. A few radiologists have volunteered to take vacation time that was not planned during this time. We have limited the number of sites that need a radiologist present by moving diagnostic patients to certain days at different sites. We are still giving educational conferences via WebEx to residents and catching up on research and other administrative duties. The institution has mandated every physician fill out a survey to list individual skill sets in case repurposing of physicians needs to be implemented in the future. This has yet to be determined.
6. **What do staff do when the schedule is mostly cleared out?** Staff hours will continue to be reduced in proportion to volumes. Human Resources has sent out options for staff regarding paid time off and non-paid leave. Some of our technologists are able to fill ultrasound, CT or plain film shifts in the system-wide Radiology department.

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When the COVID-19 pandemic first hit the Houston area, it was difficult to know the appropriate actions because MD Anderson is a quaternary cancer center with a significant number of non-local patients. We are dedicated to providing cutting-edge cancer care for patients who travel from around the world, and it was challenging to define the immediate steps when the concepts of containment, isolation, and social distancing became the driving forces. The fundamental tenants of “saving the greatest number of lives” and “doing no harm” provided reason and clarity in unprecedentedly anxiety-provoking times. Centralized discussion occurred early on. In conjunction with our colleagues in the Houston area, along with the rapidly evolving “standards” of the nation, we started with postponing all screening and routine surveillance breast imaging exams in mammography, ultrasound, and MRI, even in patients at high-risk.

Our decision to not provide screening and routine surveillance breast imaging exams were substantiated by Texas Governor Abbott’s issuance of Executive Order GA-09 on March 24, 2020 and the Emergency Rules passed by Texas Medical Board immediately thereafter to enforce the Executive Order. In essence, “surgeries and medical procedures that are not immediately medically necessary” are “prohibited from being performed” through April 21, 2020. The goals are two-fold: 1) to reduce human interactions and therefore viral spread; 2) to conserve human and material resources (including personal protective equipment) in anticipation of overwhelming needs stemming from the pandemic. After the Executive Order issuance, additional breast imaging exams and procedures that are considered “not immediately necessary” expanded to include:

- BI-RADS 3 follow-up of probably benign lesions detected at mammography, ultrasound or MRI

- Short-term follow-up imaging (mammography, ultrasound, MRI) after percutaneous biopsy
- Short-term follow-up imaging (mammography, ultrasound, MRI) recommended as result of multidisciplinary conference discussion
- Clinically symptomatic patients that do not have standard-of-care guidelines for imaging as first line of care (due to low probability of breast cancer), such as pain or itching
- Second opinion review of prior imaging performed at outside facility (OSF), or repeat work-up of imaging evaluation already done at OSF, in absence of BI-RADS 6, 5, or 4C recommendation generated by OSF
- Biopsy of BI-RADS 4A mammography, ultrasound, or MRI lesions

It is important to establish a “standard operating procedure” in the setting of re-scheduling exams, including necessary steps if patients refuse to comply (which has been very few). Because Executive Order GA-09 stipulated date of April 21, 2020, we are re-scheduling patient appointments after that date, rather than postponing indefinitely or canceling altogether.

Because of the patient-facing nature of breast imaging, “working from home” is not feasible for many facets of our clinical services. To practice “social distancing” as much as possible, radiologists (attending and fellows) are divided into cohorts, so that one cohort of radiologists would work in the clinic contiguously for a set number of days, then stay home to perform non-clinical work for a set number of days, alternating with the other cohort, all the while maintaining clinical coverage and containing potential exposure. This reduction of clinic staffing at any one time is possible given the decrease in volume associated with the re-scheduling of non-essential exams. As much as possible, this “cohort-assignment” is coordinated with technologists schedule as well. Radiology residents are considered “non-essential” during this time (and hence not serving in the clinic). Interactions between radiologist and technologist are taking place via phone (rather than in-person) as much as possible, and any one radiologist would use the same reading station each clinical day. Non-clinical work consists primarily of administration and academic endeavors. Radiologists may also use this non-clinical time to obtain continuing medical education learning and credits.

Timely action, well-considered communication, and coordination with our clinical colleagues are key, particularly as our institution is large in size, scope, and geographical footprint. Prior to re-scheduling breast imaging exams, we discussed our plans with our colleagues in breast surgery, medical oncology, radiation oncology, pathology, and cancer prevention. Similarly, our clinical colleagues discussed with us modifications in their practice (e.g. delaying surgery for low-grade DCIS or initiating upfront endocrine therapy for selected ER-positive cancers). Our usual standard practice is multidisciplinary and team-based, and it remains so currently.

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The University of Rochester Medical Center is comprised of Strong Memorial Hospital and the Golisano Children's Hospital, as well as six affiliate community hospitals up to 90 miles from Rochester. New York state has the highest number of COVID-19 cases, but these are largely in New York city currently. When I began in my role as Chair on January 1, 2020, I had no idea that I would be leading our department through a global pandemic.

On March 16, we began cancelling all non-urgent imaging examinations that were scheduled through March 29. Each division head worked with their respective teams to develop a list of examinations that could potentially wait. This was done in conjunction with other departments who were cancelling non-emergent clinic visits and surgeries in order to increase inpatient capacity as well as potential exposure to the virus for both patients and staff. For breast imaging, this included all screening examinations and non-emergent diagnostic studies such as short-term follow-up and work up of breast pain. Biopsy of lower suspicion lesions including those classified as BI-RADS 4A were also deferred. This approach is now supported in a joint statement by the American College of Radiology and the American Society of Breast Surgeons (2) and the Society of Breast Imaging (3). We quickly learned that some examinations that appeared to not be urgent would significantly affect patient management such as MRI after neoadjuvant chemotherapy.

As we moved up to the end of that two-week period, we had to consider which studies could wait two weeks but not a month or two. Since physicians were by then only seeing urgent patients in clinic, we accepted their request for imaging assuming that the indication for the study was also urgent. This particularly affects oncology and transplant service lines.

All staff can wear a surgical mask each day, and all mammography technologists have adopted this practice. Our technologists are in close patient contact for at least 5 minutes just for a regular mammogram. We will likely soon adopt universal masking of all staff and faculty for both inpatient and outpatient settings. Increasing the number of employees that work from home reduces the need for PPE in this scenario.

We have worked hard to have as many radiologists either reading at home or in an isolated location. As it takes 4-6 weeks to obtain new monitors, we are cannibalizing workstations and will back fill the reading rooms as we receive new monitors. New York state has eased the requirement for initial physicist inspection for workstations. We are not installing home workstations for mammography due to cost. However, as the volume of breast imaging (and musculoskeletal and neuroradiology) declines, we are reassigning breast radiologists who retain general skills to other areas of need (e.g. chest) and have installed diagnostic home workstations for them. We have restricted access to all reading rooms and put down tape to mark 6 feet of distancing around workstations.

Residents alternate working in shifts on site and having study time at home. Our attendings are quickly becoming expert at using a unified web-based video platform (Zoom, San Jose, CA) to review cases in real time with the trainees.

Technologists and other staff from breast and other imaging areas with lower volumes are being reassigned to areas of anticipated greater need such as CT, where that skill set is viable. As we have a large network, we are working to cross train at other sites as well.

People talk about the “first 90 days” as a crucial time for new leaders to establish trust and develop open lines of communication. I had plans for a leadership coach and several mentors, but there is no playbook for managing a department during a pandemic. We have daily system, hospital, key department leadership (division heads and vice-chairs), and core department leadership (operations) virtual meetings. I’m hopeful that this crisis will build collaboration between our subspecialty divisions and our community and regional sites. We can all be stronger for going through this together.

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