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Deferral and Resumption of Lung Cancer Screening After COVID-19 Surge: Patient Perspectives From Two Institutions

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BRIEF DESCRIPTION OF THE PROBLEM

The coronavirus disease 2019 (COVID-19) pandemic continues to be a significant worldwide burden with many countries under lockdown or stay-at-home orders. Beginning in early to mid-March 2020, there was a dramatic increase in the number of COVID-19 cases in the United States. In response, the Centers for Disease Control and Prevention advised that all health care facilities should prioritize urgent and emergency visits and delay all nonemergent tests, visits, and elective procedures [1]. The ACR urged imaging centers to reschedule nonurgent outpatient imaging including lung cancer screening (LCS) [2-4]. The goal of these advisories was to ensure staff and patient safety and prepare hospitals for a potential surge in COVID-19 cases.

The purpose of this article is to report a bi-institutional experience and patient perceptions of the deferral and rescheduling of LCS CT at two tertiary academic institutions in the United States.

WHAT WE DID: DEFERRAL AND RESCHEDULING OF LCS AND PATIENT SURVEY

Setting

Brigham and Women's Hospital (BWH) in Boston, Massachusetts, and

National Jewish Health (NJH) in Denver, Colorado, are urban tertiary or quaternary academic medical centers in the United States with long-standing LCS programs and perform more than 1,200 low-dose screening CT scans annually. Many of the LCS patients at NJH travel long distances to seek care or are from out of state. Conversely, the majority of the BWH LCS patients are local, living in the greater Boston area.

Description of the Rescheduling Process

The deferral of patients because of the COVID-19 pandemic began in mid-March of 2020. The Commonwealth of Massachusetts developed a four-phase reopening plan. As part of phase 2, beginning on May 25, 2020, health care providers were allowed to incrementally resume in-person elective, nonurgent procedures and services. Routine nonurgent care would resume later in phase 2, allowing preservation of capacity for COVID-19 patients and non-COVID-19 urgent and emergent care. On May 22, 2020, the radiology plan was translated into the plan for LCS CT recovery summarized in [Table 1](#), including resumption of LCS CT on June 1, 2020. Patients with higher Lung Imaging Reporting and Data System score and who were furthest

from the recommended follow-up date were prioritized for rescheduling.

In Denver, starting in mid-March, the NJH LCS program navigators contacted patients scheduled for upcoming LCS CT and explained that the examinations would be postponed to a later date in accordance with Centers for Disease Control and Prevention guidelines for COVID-19. These patients became part of a growing list in the "due" and "overdue" queues in the NJH tracking system. Patients due for follow-up of Lung Imaging Reporting and Data System 3 or 4 CTs were contacted and asked to schedule their follow-up CTs. Follow-up imaging occurred on these patients as scheduled unless the patient wanted to delay imaging. Beginning May 4, National Jewish Health opened for routine care at about 50% capacity. The LCS navigators started contacting patients in the overdue and due queues in the tracking system and rescheduled their LCS CTs, summarized in [Table 1](#).

Patient Safety Considerations

The BWH radiology recovery plan released on May 21, 2020, included safety measures to limit potential transmission of COVID-19. All patients were verbally screened for symptoms of COVID-19 and given a mask to wear upon arrival. Steps taken

Table 1. LCS prioritization classification

Brigham and Women’s Hospital		National Jewish Health	
Priority Category	Description	Priority Category	Description
1	Lung-RADS category 3 or 4; Lung-RADS category 1 and 2 that would be more than 90 days overdue for annual LCS CT; Lung-RADS category 0	1	Patients who were overdue or due for 1, 3 or 6-month follow-up CT
2	Patients who were due or overdue for their annual LCS CT	2	Patients who were overdue for their annual LCS CT
3	Patients who were newly referred and needed a baseline LCS CT	3	Patients who were due for their annual LCS CT
		4	Patients who were newly referred and needed a baseline LCS CT

LCS = lung cancer screening; Lung-RADS, Lung Imaging Reporting and Data System.

to ensure patient safety included limited waiting room capacity to allow for social distancing and increased time between scans to allow time for additional tasks including room cleaning and patient interviews to

eliminate patient handling of pens and paper forms.

Safety features that were put in place at NJH included separate entrances for possible COVID-19 patients. On arrival all patients were

verbally screened and received temperature checks. All patients and staff were required to wear masks and practice social distancing. Patients were offered the option of having their shared decision making

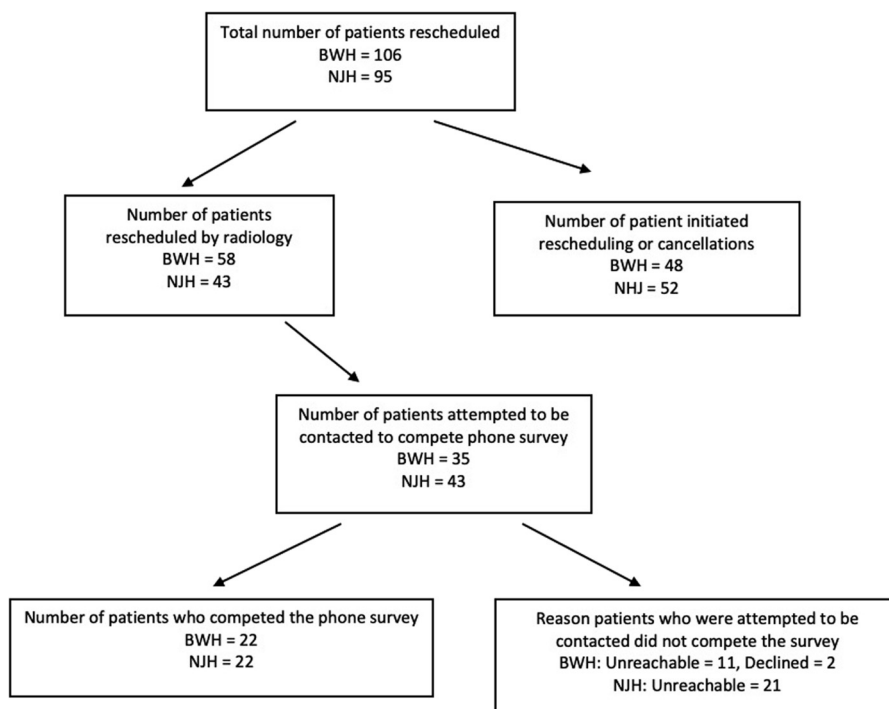


Fig 1. Flowchart summarizing number of rescheduled lung cancer screening CTs and number of patients completing telephone survey. BWH = Brigham and Women’s Hospital; NJH = National Jewish Health.

Table 2. Survey demographics

Demographics	n = 44
Age(y), mean (range)	64 (56-80)
Sex, n (%)	
Female	28 (64%)
Male	16 (36%)
Number of survey respondents	
BWH	22
NJH	22
Number of days LCS CT delayed	
BWH	54
NJH	131

BWH = Brigham and Women's Hospital; LCS = lung cancer screening; NJH = National Jewish Health.

visits be done via telehealth. When the shared decision making visit was completed ahead of time by telehealth, the patient was sent directly to radiology on arrival, which helped minimize time in the waiting room.

Patient Survey

A five-question telephone survey (e-only Appendix) was created to assess how patients felt about the delay and rescheduling of their LCS CT scan, in terms of health, safety, and anxiety. Institutional review board approval was granted to both institutions for this study. While speaking to patients to reschedule, patients were asked if they would be willing to participate at the end of the telephone call.

Data Analysis

Study data were collected and managed using the REDCap tool [5] and downloaded into JMP Pro (version 15, SAS Institute, Cary, North Carolina) for analysis. Fisher's exact test was used to evaluate

Table 3. Survey results (BWH and NJH combined data)

Survey questions	Responses, n (%)				
	1	2	3	4	5
1. On a scale of 1-5 (1 = strongly disagree to 5 = strongly agree), given the COVID-19 pandemic, I believe that delaying and rescheduling my LCS CT was appropriate.	0 (0)	0 (0)	4 (9)	0 (0)	40 (91)
2. On a scale of 1-5, I am concerned that the delay in receiving my LCS screening CT due to COVID-19 and lockdown could negatively impact my health.	21 (48)	6 (14)	10 (23)	2 (5)	5 (11)
3. On a scale of 1-5, I believe the delay to health care services during COVID-19 has had a negative impact on my mental health.	31 (70)	4 (9)	3 (7)	3 (7)	3 (7)
4. On a scale of 1-5, I am worried that postponing my LCS CT will make it difficult for me to get back on track with screening.	39 (89)	1 (2)	2 (5)	0 (0)	2 (5)
5. On a scale of 1-5, I am worried that coming in for my LCS CT will increase my risk of catching the virus.	18 (41)	4 (9)	9 (20)	8 (18)	5 (11)

BWH = Brigham and Women's Hospital; COVID-19 = coronavirus disease 2019; LCS = lung cancer screening; NJH = National Jewish Health.

potential association between survey responses and site or sex. Logistic regression analysis was performed to evaluate association between survey responses and patient age. A *P* value of <.05 was used as a threshold for statistical significance.

OUTCOMES AND LIMITATIONS

LCS Deferral

In total, 106 patients were deferred because of COVID-19 at BWH and 95 patients were deferred because of COVID-19 at NJH. A summarizing flowchart is shown in Figure 1.

There was a significant difference in the number of days screening was delayed between the two sites (BWH median of 54 days, NJH 131 days, *P* < .0001), which may be related to geographic factors of the screening populations with more patients coming from greater distances or out of state at NJH. The overall median number of days postponed was 88 days (range 17-156 days).

Of the 44 respondents, 28 (64%) were female, with a mean age of 64 years (range 56-80). Twenty-eight (76%) were annual follow-up LCS CT, and 9 (24%) were baseline scans (Table 2).

Survey Results

The results of the survey are summarized in Table 3. Overall, the vast majority (91%) of patients strongly agreed it was appropriate to delay their originally scheduled LCS CT because of the COVID-19 surge. Large majorities strongly disagreed that this delay would have a negative impact on their mental health or that the delay would make it difficult to get back on track with screening (70% and 89%, respectively). Just under half (48%) of patients strongly disagreed that the delay could negatively impact their health, and 16% agreed or strongly agreed that it could negatively impact their health. Similarly, under half (41%) of patients strongly disagreed that coming back for LCS CT now would present a risk of catching COVID-19, and 29% of patients agreed or strongly agreed that they would be exposed to risk of catching COVID-19 when they came for their CT. There were no statistically significant relationships between patient demographic factors or site and survey responses.

In summary, patients felt that rescheduling LCS CT was appropriate during the COVID-19 surge, and an organized approach to the rescheduling process with detailed patient tracking and individual patient telephone calls was effective at both of the

studied sites, suggesting this method would again be successful if a second COVID-19 surge necessitates deferring LCS CT examinations in the future. It is imperative that detailed patient safety measures are in place and that these are communicated to the patient, because patients expressed a perceived risk of returning to the hospital for their LCS CT.

Limitations

The first limitation of this study is that the survey did not undergo a rigorous validation process; however, this was not feasible given the time-sensitive nature and unique circumstances of the study. The survey was conducted by telephone, which may bias patient responses; however, patient willingness to participate was purposefully asked at the end of the call once rescheduling had occurred to reduce potential response bias. Another limitation was that a relatively small number of patients completed the survey, which limited the comparison of survey responses between sites. The limited number of responses and the inclusion of only tertiary or quaternary hospitals may also affect the generalizability of the study; however, the decision to make this a bi-institutional study was done to make the study more generalizable. Finally, there were

patients who did not to complete the survey, which raises the possibility of nonresponse bias.

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