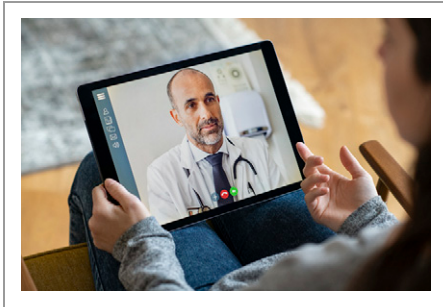


On Treatments and Tests Deferred: Preparing for Collateral Damage from COVID-19

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On a new-normal afternoon of calling patients virtually for follow-up visits, I was jolted by a conversation that typically would have ended with a seamlessly executed plan. I called Ms. M, my 67-year old patient with interstitial lung disease. She promptly answered the phone, having been recently reminded of her virtual appointment by our clinic coordinator. She explained that she was still coughing, and that perhaps her dyspnea had worsened, though it was hard to tell as she was sheltering in place. As our conversation went on, I was slowly becoming aware that the challenges of this visit were going to transcend beyond the initial stumble of how to check someone into the virtual waiting room. Exactly how far could she walk before having to stop because of dyspnea? Did her lungs sound different? Had her forced expiratory volume in 1 second declined? Was her fibrosis progressing? Was a computed tomography (CT) scan worth exposing her to the risk of coronavirus disease

(COVID-19) infection? Would I increase immunosuppression even if it was progressing? Each clinic visit now posed these new and unanticipated dilemmas.

As we grapple with the COVID-19 pandemic, much attention has rightfully focused on overcrowded emergency rooms and intensive care units (ICUs). However, signs of subtler collateral damage for non-COVID conditions are starting to emerge across specialties (1–4). Telehealth visits have provided some degree of normalcy to our lives (5) by offering opportunities to communicate with patients, hear their concerns, allay anxiety, and discuss symptoms. Moreover, they allow patients and family members to avoid logistical barriers, such as parking and transportation; these benefits have led to dramatically increased rates of telehealth appointments (6). However, as outpatient pulmonary medicine physicians, we wonder how to optimally address the diagnosis and treatment of our patients' lung diseases during this pandemic.

In addition to the unease we feel from being unable to perform our physical exam maneuvers—our inability to clearly see clubbing across the computer screen or hear the high-pitched inspiratory squeaks—the tests that take the place of our eyes and ears are equally missing in these times.

The unique risk of aerosol generation accompanying pulmonary function tests (PFTs) and bronchoscopies has caused most centers to limit their performance. CT, the next best diagnostic test in the absence of

histopathology, also bears the risk of exposing the patient to the healthcare environment. Pulmonary rehabilitation, a successful therapeutic intervention, has been closed for the same reason.

Deferring these diagnostic and treatment modalities may seem inconsequential in the short term, but with the uncertain trajectory of the pandemic, how long must patients wait for these “elective” procedures? And will their absence drive up exacerbations and admissions for chronic lung disease, as has been predicted for other conditions (7, 8)?

Beyond these challenges, patients are also avoiding accessing the healthcare system as a whole, as during the Ebola outbreak, leading to rise in mortality for other conditions (9). As emergency non-COVID cases, such as heart attacks and strokes (10–12) and hospitalizations for chronic conditions, such as heart failure and cirrhosis, decline across hospitals (13, 14), we are also seeing increased all-cause mortality, raising concerns for even more devastating consequences of the pandemic (11, 15, 16).

Each clinic visit leaves us haunted, imagining a patient with massive hemoptysis because of progression of undiagnosed lung cancer or one with worsening dyspnea due to uncontrolled inflammation in the absence of adequate immunosuppression. To prevent a postpandemic wave of deferred diagnoses and unchecked disease progression, we need to strategically plan and restructure care

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delivery for outpatient pulmonary medicine. We describe the following three major domains that deserve consideration: before the visit, during the visit, and after the visit.

Part 1: Before the Visit: Scheduling, Screening, Staffing, and Testing

- 1) **Scheduling:** Deferred appointments during the pandemic could lead to significant delays for both new consultations and established patients alike. We suggest that referrals, new and old, for clinic visits and bronchoscopies, be rigorously prescreened using a combination of patient health status, progression of symptoms, and acuity of diagnosis in consideration to create a tiered triage system. Rescheduled visits should be tracked to avoid loss to follow-up. Strict criteria, with buy-in from clinic staff and faculty, for virtual versus in-person visits should be established.
- 2) **Screening:** With reduced physical check-in load, staff can be used for screening phone calls before visits to clinics and PFT labs, with positive screening used to trigger testing. Practices of single entrance/exit points, in-person symptom screening, and visitor restrictions, already utilized at most hospitals, should be adopted by stand-alone clinics.
- 3) **Staffing:** Physicians at risk for severe illness because of age, comorbidities, pregnancy, living with high-risk contacts, or other concerns should be given the option to pursue virtual visits only rather than in-person visits (17). Because both ambulatory and inpatient volumes are unpredictably affected during the pandemic, physician staffing should be evaluated holistically across the pools of ICU, pulmonary consult, PFTs, and bronchoscopy. A robust jeopardy system should be created to account for illness or quarantine in case of exposure, and providers should be counselled to remain flexible.
- 4) **Testing:** Wherever possible, patients should undergo universal asymptomatic testing before aerosolizing procedures, such as bronchoscopy and PFTs. This necessitates new workflows, such as requiring testing to return as negative

before checking in for procedures. Symptom-triggered testing should be used in other areas; establishing separate respiratory screening clinics may be helpful.

Part 2: During the Visit

All physicians, clinic staff, patients, and visitors should abide by universal masking in clinics and adequate personal protective equipment (N95 masks, face shields, gowns, and gloves) should be available for aerosol-generating procedures. Clinic appointment times should be staggered, and patients should be roomed promptly to avoid crowds in waiting rooms. Medical equipment, such as blood pressure cuffs, pulse oximeters, chairs, and examination desks, needs to be disinfected thoroughly between patients. During visits, clinicians should stay in individual exam rooms and avoid congregating in group workspaces (17).

Part 3: After the Visit

Explicitly discuss follow-up needs with the patient and reach a shared decision on the timeline and modality of follow-up visit (in-person vs. virtual). Drive-through options for laboratory testing and pharmacy pick-up or delivery should be prioritized when available. We also suggest exploring opportunities for home-based monitoring and therapy wherever possible. For patients in whom frequent spirometric assessments are believed to be necessary and useful in guiding treatment, home-based spirometry should be considered to minimize exposure risk (18, 19). Opportunities for virtual pulmonary rehabilitation should be explored (20), and grounds gained on enhanced telehealth reimbursement practices should be retained beyond the acute phase of the pandemic.

The Known Unknowns

In this section, we focus on areas of uncertainty, or the “known unknowns,” in which the pulmonary community will need to work together and in collaboration with

other disciplines to tackle the unique challenges in delivering care in the postacute phase of the pandemic. Although consensus disease-specific recommendations from experts would help guide clinicians in certain areas, many questions demand the generation of new evidence to enable effective disease management in the context of altered, and often reduced, monitoring.

A few examples are as follows:

- 1) Can PFTs and radiologic monitoring be spaced out without compromising the management of specific interstitial lung diseases?
- 2) Should laboratory-based biomarkers be investigated in comparison with current disease monitoring approaches such as PFTs and CT scans?
- 3) Are certain immunosuppressive agents safer than others with regard to the risk of acquiring coronavirus-related illness?
- 4) Could a tiered approach be developed to inform decisions about immunosuppression by integrating severity of illness, risk of infection, and anticipated outcome from the drug, as has been attempted in oncology (21)?
- 5) Should step-down of controller medications be avoided during this time to minimize the risk of exacerbations?

In addition, there is a need for studying the validity, feasibility, and efficacy of home-based monitoring and treatment tools, such as spirometry, accelerometers, and virtual pulmonary rehabilitation, to allow a realistic consideration of their deployment and use in the near future.

Disparities in Pulmonary Care in the COVID Era

For all its benefits, telehealth also has the potential to worsen disparities in health care (22, 23), particularly among patients who are unhoused or with poor access to technology. Moreover, we have already seen that the coronavirus pandemic has further exacerbated racial disparities and is disproportionately affecting Black and Latinx populations (24). Analogous to approaches applied in the global health arena, strategies such as using community health workers and providing virtual communication devices with affordable internet (25) will be crucial in ensuring equity for the care of all communities. Special attention should also be paid to ensure virtual care delivery

is age friendly, and we should engage family members to help patients navigate the use of electronic devices when needed.

Rearranging visits to promote outpatient pulmonary facilities requires a thorough consideration of major structural resources, including staff, personal protective equipment, and testing. Because these will vary regionally and temporally, we suggest a rolling line of communication among the leadership of clinical divisions, clinics, PFT labs, and bronchoscopy suites to examine their availability in the context of

local trends in coronavirus infections. To avoid inertia, active vigilance and ongoing modulations based on weekly updated case counts and demands for outpatient facilities can guide frequent reassessment and expansion or restrictions of these services as time progresses.

Although our intensivists are restructuring ICUs, generating new evidence, and planning for the impending rise in patients suffering from post-intensive care syndrome, the outpatient pulmonologists have incredibly important

challenges to address in the next phase of this pandemic. We can only fight the unforeseen consequences of care deferred by preparing and planning for this future state. ■

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