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Community-Based Primary Care Management of 'Long COVID': A Center of Excellence Model at NYC Health+ Hospitals

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INTRODUCTION

Most patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) survive novel coronavirus disease 2019 (COVID-19). Many experience 1 of more than 200 reported ongoing symptoms after acute infection, regardless of severity.¹ These symptoms constitute what both patients and health care workers termed “long COVID” early in the pandemic and is also now called “Post-Acute Sequelae of SARS-CoV-2 infection” (PASC).² Although not fully understood or characterized, long COVID generally refers to survivors of COVID-19 who experience symptoms after 4 weeks since original onset of acute COVID-19 symptoms.^{3,4} A reliable prevalence for PASC overall and stratified by disease severity has not been determined, but a conservative estimate of long COVID in a recent study suggests at least 13% of community-treated COVID-19 survivors experienced long COVID symptoms 28 days or longer.⁵ At the other end, among COVID-19 hospitalized survivors in 1 study, an estimated 76% experienced at least 1 symptom after acute infection persisting 6 months after infection.⁶ The recovery phase for survivors remains incompletely understood, and survivors' ongoing medical needs present immediate challenges and opportunities for primary care and population health. But given the overall number of individuals with a history of SARS-CoV-2 infection, even 13% presents a scenario that might place significant strain on health care systems for effectively addressing PASC.

People with PASC need a responsive health care system that provides high-value, patient-centered care in the setting

of rapidly evolving but limited clinical and research guidance for treatment. The public health and economic burden of PASC could potentially be staggering if even a small percentage of COVID-19 survivors are affected.⁷ Academic Medical Centers play a crucial role in providing an array of subspecialized services for survivors in communities where they exist,⁸ but they alone cannot provide the anticipated volume of care to all survivors. In this article, we offer an approach for providing COVID-19 survivorship care tailored to community health center (CHC) clinical settings. We discuss: 1) the emerging scope of potential post-COVID-19 complications; 2) how New York City's municipal public health system designed CHCs with an explicit focus on post-COVID-19 care; and 3) how primary care should proactively engage survivors of COVID-19.

COMPLICATIONS AFTER ACUTE COVID-19

Ranging from asymptomatic to life-threatening, the course of acute COVID-19 can largely be managed in the community with increasing severity requiring in-patient hospitalization or intensive-care-unit level of care. Acute COVID-19 primarily affects the respiratory system but multiple organ systems are often involved. Although severity of disease has correlated to recovery trajectory, patients can develop PASC even after a mild course of COVID-19 with symptoms lasting 6 months or more.⁹ COVID-19 complications that may require close outpatient follow-up after hospitalization include acute respiratory distress syndrome (ARDS), hypoxia, cardiac arrhythmias, myocarditis, myocardial injury, pulmonary embolism, stroke, and acute hepatic and kidney injury.^{10,11} At a population level, the most common physical symptoms emerging appear to be fatigue, dyspnea, chest discomfort, and cough, often lasting 2 months or longer after acute COVID-19.^{12,13}

The mental health impact of acute COVID-19 also appears substantial. Conditions include anxiety, depression,

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post-traumatic stress disorder, and cognitive problems including memory impairment, “brain fog,” and concentration issues. In a large retrospective study, 18.6% of COVID-19 survivors received a psychiatric diagnosis, including 5.8% of survivors having a first-time diagnosis.¹⁴ Another study seeking to understand the neuropsychiatric sequelae of COVID-19 and the probability of subsequent depression symptoms found that 52.4% met criteria for major depressive disorder.¹⁵ The mental health impact of both the global pandemic and PASC-related neuropsychiatric sequelae may present an unprecedented challenge for both health care systems and society.¹⁶

Sequelae from conditions such as acute respiratory distress syndrome have historically been addressed in postintensive care outpatient clinics, but these clinics are few in number and unlikely to meet the demand of the number of severely ill survivors in highly impacted areas. Additionally, the burden of PASC among nonhospitalized and hospitalized individuals with moderate COVID-19 in many areas exceeds the capacity of the relatively few specialized hospital-based post-COVID centers.

A COVID-19 CENTERS OF EXCELLENCE APPROACH

NYC Health+ Hospitals, the nation’s largest municipal public health care system, started designing an innovative primary care post-COVID-19 care model during the end of the initial New York City SARS-CoV-2 pandemic surge in spring 2020.¹⁷ Out of necessity, we approached clinical services planning using the limited data available at the time about post-COVID-19 sequelae and tracking updates in the literature to refine our approach where possible. We defined a ‘center of excellence’ as a clinical setting created with content-specific expertise, best practices, research initiatives, a broad scope of services, and a continuous performance improvement mindset. Three new COVID-19 Centers of Excellence were built in areas of New York City—Bronx, Queens, and Brooklyn—hardest hit by the COVID-19 pandemic as part of NYC Health+ Hospitals’ coapplicant federally qualified health center and 2 have opened for patient care.

Our primary care COVID-19 Centers of Excellence provide longitudinal, general primary care services across the human life course as part of a long-term strategy for growth and serving the community; however, these centers include unique construction design and clinical programming compared with most CHCs. For example, each center includes a group of strategically located negative pressure examination rooms to accommodate current and potential future pandemic surges and patient entry and exit patterns to minimize infection transmission. These rooms dually function as regular examination rooms outside of a pandemic scenario. If and when another surge or airborne pandemic occurs, these facilities will be able to remain open for patient care and SARS-CoV-2 testing, whereas many CHCs across the country might again initially need to close their sites due to infection risk.

In addition to comprehensive primary care services, we posted to hire an array of mental health professionals, cardiologists, and pulmonologists to provide care for some of the more expected and prevalent PASC survivorship symptoms including fatigue, dyspnea, change in mood, and cardiopulmonary abnormalities. We also included diagnostic equipment that could be used for both PASC evaluation and for general patient care in the future, including pulmonary function testing, transthoracic echocardiograms, and chest radiography. From a value and financial sustainability perspective, we estimated subspecialty utilization for both survivorship needs ultimately transitioning to an onsite referral model for subspecialty care for common primary care outpatient subspecialty needs postpandemic.

In addition to onsite mental health, pulmonology, and cardiology, we refer to acute hospital facilities in our health care system as indicated for nephrology, hematology, and other subspecialties depending on a survivor’s sequelae. Local area voluntary hospitals began to design highly specialized post-COVID-19 clinics that include additional subspecialties, plus physical and occupational therapies. But most individuals with PASC may be able to have their health needs met in a CHC setting, so our approach balanced the emerging likelihood of specific survivor symptoms with financially sustainable approaches to what types and level of care exist at a COVID-19 Center of Excellence that doubles as a comprehensive primary care center.

LESSONS FOR COMMUNITY-BASED PRIMARY CARE

Providing high-value care to COVID-19 survivors with PASC in a community health care setting requires a 3-legged stool approach that focuses on patient experience, clinical services, and financial sustainability. Patients whose clinicians do not dismiss their symptoms and can communicate the knowns and unknowns about the trajectory of PASC may be more likely to have a better patient experience. Indeed, there is already concern that long COVID survivors might experience frustrations similar to those with myalgic encephalomyelitis or chronic fatigue syndrome around how the health care system and clinicians hear, address, and treat people living with symptoms of variable chronicity.¹⁸ A clinical care team needs to stay current in PASC education and commit to practicing patient-centered care in a way that communicates and identifies solidarity with patients amid potentially waxing and waning chronic symptoms.

Clinical services planning for COVID-19 survivors should incorporate local public health and health care market data to understand potential patient volume by geography. Services that CHCs might build out or enhance include mental health, pulmonology, and cardiology with clear patient referral pathways for additional services as needed to trusted clinicians who understand the impact and uncertainty surrounding PASC symptomatology. Community health centers may also procure additional diagnostic

equipment to aid subspecialists and primary care clinicians in the management of recovery, including pulmonary function testing, ambulatory oximetry, chest radiography, and transthoracic echocardiography given pulmonary and cardiac complications of COVID-19, equipment that postpandemic could focus on outpatient subspecialty care. Centers should offer robust mental health services from a team of mental health specialists, such as psychologists, psychiatrists, and social workers, for psychological distress, grief counseling, anxiety disorders, depression, and post-traumatic stress disorder. Survivors of COVID-19 and patients generally impacted by the pandemic may drive increased utilization of a variety of mental health services.

Existing or future health centers might consider building modifications to enhance patient care and diagnostic testing for potential future COVID-19 or similar outbreaks. These specifications, not necessarily common in CHCs, should include designated areas for personal protective equipment, donning and doffing, alternative waiting area setups, and minimizing exposure time between patient arrival and isolation in the clinic. Depending on available funding, clinic population catchment area and density, and health care system saturation, creating designated negative pressure rooms to minimize staff and patient exposure when interacting with patients suspected of having COVID-19 could also be considered. Pandemic preparedness measures such as these facilitate a primary care clinic's ability to provide safe care in a future pandemic and reduce economic losses due to full temporary closure.

Finally, a CHC must prioritize collecting and leveraging actionable population health data. Centers should query their electronic health record (EHR) to identify survivors of COVID-19 and use registries and queries to track disease complications and recovery. For example, we encourage our COVID-19 Centers of Excellence clinicians to use a standard note template designed for PASC care and specific medical encounter codes to monitor our patients as a population. COVID-19 has disproportionately affected racialized populations, and health centers can in part advance health equity by taking into account public health epidemiologic data to prioritize community outreach and also provide social services linkages patients to support recovery. Better understanding and characterizing the population health of survivors will guide refinement of how to allocate clinical services that meet survivors' physical and mental needs.

Primary care needs to rapidly address and meet individual and community COVID-19 survivorship needs, potential spectrum of complications, and the mental health impact of the pandemic. Although most patients are expected to recover, both patients and clinicians may need to temporarily confront uncertainty as the medical community continues to learn about PASC, making communication within the therapeutic relationship as crucial as ever. As clinics reopen in the areas hardest impacted by the COVID-19 pandemic, primary care practices should proactively reach out to patients who might have been hospitalized with severe illness to promote recovery course. Using

a centers of excellence framework, clinical practices should use population-level EHR data to track survivor recovery and service utilization, revisit and enhance clinical services offered, strengthen access to mental health care, and prepare for the next pandemic.

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