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Pragmatic Innovations in Post-Acute and Long-Term Care Medicine
Feasible new, practical products or approaches intended to improve outcomes or processes in post-acute or long-term care

Design and Implementation of a Skilled Nursing Facility COVID-19 Unit

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A B S T R A C T

Coronavirus disease 2019 (COVID-19) has challenged the health care system's capacity to care for acutely ill patients. In a collaborative partnership between a health system and a skilled nursing facility (SNF), we developed and implemented an SNF COVID-19 unit to allow expedited hospital discharge of COVID-positive older adults who are clinically improving, and to provide an alternative to hospitalization for those who require SNF care but do not require or necessarily desire aggressive disease-modifying interventions.

Keywords: COVID-19, coronavirus, skilled nursing facility, SNF, COVID unit, long-term care facility

Problem/Significance

Age and comorbidities (including obesity, frailty, diabetes, cardiovascular disease, and pulmonary disease) are associated with morbidity and mortality from Coronavirus Disease 2019 (COVID-19).[1,2] Older adults have been disproportionately affected by the COVID-19 pandemic, with 80% of US deaths in those older than 65.[3] Residence in a skilled nursing facility (SNF) increases mortality risk, likely related in part to system factors, including underfunding, inadequate staffing, suboptimal infection control, and lack of personal protective equipment (PPE).[4,5] The pandemic has challenged health system capacity for acutely ill patients. A SNF COVID-19 unit could expedite hospital discharge of clinically improving COVID-positive older adults and provide an alternative to hospitalization for those in the emergency department (ED) or assisted living facilities (ALF), helping alleviate this burden. Such a unit would need to overcome the system factors that contribute to high COVID-19 morbidity and mortality among SNF residents.[5] Herein, we describe a novel collaboration between a health system (Mayo Clinic, Rochester, MN) and an SNF to implement a COVID-19 unit.

Innovation

A longstanding relationship between the health system and SNF, including a health system physician serving as facility medical director and regular joint leadership meetings, was key in creating the SNF COVID-19 unit (Table 1). Safe nurse staffing ratios, a long-term challenge for SNFs, were achieved via a professional services agreement in which volunteer health system nurses supplement SNF nurse staffing by filling shift needs reported by the SNF. The SNF pays the health system an hourly rate for nurse time, invoiced monthly. Health system nursing and facility administrators meet regularly to address operational issues. Unit closure is determined by health system leadership based on hospital capacity status.

Implementation

The 56-bed SNF, part of a continuing care retirement community owned by a national nonprofit chain, consists of 3 wings in a cloverleaf pattern. The 18-bed COVID-19 unit occupies the distal portion of the middle wing and has a separate entrance with anteroom for donning/doffing PPE. Other infection control measures include the following: infection control training for all staff; negative-pressure private rooms; universal droplet precautions (N95 mask, eye protection, gown and gloves); no nursing station to avoid congregation (charting completed using mobile workstations); dedicated emergency kit; and separate laundry, meal delivery carts, and break/conference rooms. The dedicated nature of the unit, including physical space, personnel, and equipment, facilitates conservation of PPE.

Six geriatricians and 3 advance practice providers (APP) with experience in SNF practice staff the unit (1 physician and 1 APP each week). Physicians complete new admissions in the afternoon and APP are present either in the morning or all day (depending on unit census) to complete follow-up visits (every other day for all patients). Potential admissions are evaluated by physicians, who are on-call 24 hours per day. Those from ALF are triaged using an intake form including demographic information, primary care provider information, goals of care (including resuscitation status), proxy decision-maker contact information, vital signs, COVID-19 signs/symptoms,

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Table 1
Key Features of an SNF COVID-19 Unit

Shared administrative structure between SNF and academic health system, with weekly joint meetings
Shared nurse staffing model using combination of SNF and health system nurses
Team-based provider staffing model using a weekly rotation of APPs and physicians with experience in SNF medicine
Strong interdisciplinary team focus, including daily virtual team rounds and weekly provider handoffs
Rigorous infection control practices, including negative-pressure air exchanger, physically separate unit with dedicated entrance/exit and anteroom for PPE donning/doffing, reliable PPE supply and universal use (N95, eye protection, gown, gloves by all providers/staff when on unit), dedicated nursing staff, dedicated facilities (break room, conference room, laundry facility), private rooms, and infection control training for all staff
Heavily protocol-driven including defined admission/transfer/discharge criteria, standardized triage assessment for admissions from ALFs, and end-of-life respiratory distress protocol
Telemedicine emphasis with visits conducted via real-time audio-visual connection (with 3-way conferencing capability) and 24/7 physician availability
Ready availability of COVID-specific clinical expertise via phone or e-consultation from infectious disease and infection prevention specialists
Access to COVID-specific medical therapies: Bamlanivimab (after approval from infectious diseases specialists given limited supply), tailored emergency kit including dexamethasone and low-molecular weight heparin [Remdesivir availability (after use in hospital for at least 48 hours) is under discussion]
Targeted respiratory care including ability to provide moderate-high flow nasal oxygen support and use of breath-actuated nebulizers to minimize aerosolization
On-site basic diagnostic services, including lab/phlebotomy and portable x-ray (Monday–Friday)
Prioritization of care that matters most: temporary discontinuation of nonessential medications (including vitamins and supplements) and self-administration of topical agents when feasible
Universal admission advance care planning and rapid access to hospice services for end-of-life patients

date/type of positive test, oxygen needs, baseline functional and cognitive status, and comorbidities.

Nurses work 12-hour shifts, with numbers varying based on unit census. Vital signs are monitored every 8 hours with abnormalities or changes in condition promptly reported via a standardized notification process. Portable x-ray and phlebotomy are available weekdays. Virtual interdisciplinary team rounds are held each morning (7 days/week), and formal virtual handoff between off-going and oncoming APP/physician precedes this on Mondays.

To minimize provider COVID-19 exposure and ensure 24-hours-a-day availability, the unit is equipped with 2 tablets for telemedicine visits (real-time audio-video communication with 3-way conferencing capability), meeting SNF requirements under COVID-19 Centers for Medicare and Medicaid Services waiver.[6] Physical examinations are performed by a nurse with provider guidance, assisted by peripheral devices including a wireless stethoscope. Orders and notes are e-faxed directly to the unit.

Medical capabilities specific to COVID-19 management (Table 1) include a tailored emergency kit, COVID-directed monoclonal antibodies (antivirals not currently available but under discussion), oxygen support (up to 4 L per minute via nasal cannula or 10 L per minute via nasal pendant in end-of-life situations), and breath-actuated nebulizers given risk of aerosol spread with traditional nebulizer treatments.[7] Clear admission, hospital transfer, and discharge criteria are used (Supplementary Tables 1–3). To preserve nurse time for critical tasks, nonessential medications, including vitamins and supplements are held and patients are allowed to self-administer topical medications when able. Infectious diseases specialists are available for telephone or e-consultation. Advance care planning discussion and documentation are conducted with patient/family at admission. Hospice care is readily available (same-day enrollment).

Evaluation

The unit partially opened (on-campus ALF residents only, no shared staffing from health system nurses) on November 12, 2020. Six patients were admitted during the initial 2.5 weeks, 4 directly from ALF and 2 ALF residents after ED evaluation. Full opening (including shared staffing) occurred on November 30, 2020. In the 2 weeks since, there have been 7 admissions, 6 from the hospital and 1 from a transitional care unit. Since initial opening, there have been 2 ED visits, 1 hospital readmission, and 1 death (patient on hospice) among unit patients. Four patients discharged from the unit, all to ALF. Nurse staffing since full opening has consisted of 29% SNF nurses and 71% health system nurses.

Early lessons gleaned from semi-structured interviews of unit staff, providers, and leadership include the importance of adequate orientation for health system nurses (many of whom have never previously worked in an SNF), explicit communication of tasks that nurses will need to perform (to ensure health system nurses have the necessary skills to effectively function in the SNF role), close communication between unit physician and SNF admissions coordinator when evaluating potential admissions, importance of provider access to SNF electronic medical record, and ensuring that necessary equipment (including bladder scanner and point-of-care international normalized ratio machine) is present at opening.

Comment

Collaboration between health systems and SNFs has been recognized as a key strategy to optimize COVID-19 outcomes for older adults since early in the pandemic.[8] Several multifaceted collaborative approaches have been described. These have generally involved health systems providing SNFs with pre-outbreak education and planning, then sending a multidisciplinary response team to SNFs during an outbreak to assist with infection control, testing, triage, and facilitating hospital transfers.[9–11] At least one of these interventions involved a health system provider completing daily telemedicine rounds on infected SNF residents, although this was consultative in nature and seemingly aimed mainly at monitoring and triage, including anticipating potential upcoming hospital transfers.[11] Although our model falls under the same philosophical umbrella of health system–SNF collaboration, our approach is fundamentally different in that the SNF is used as a means to offload acute hospitals when capacity becomes strained. This leads to a more bidirectional collaboration than the preceding models, wherein the SNF helps the health system by absorbing patients who would otherwise be hospitalized, and the health system helps the SNF by augmenting staffing.

At least 2 other SNF COVID-19 units, perhaps the most similar reported models to our own, have been described, one in a Veterans Affairs hospital/post-acute facility in southern California and another in a post-acute facility in Barcelona, Spain.[12,13] The Veterans Affairs unit was physically attached to an acute hospital, took only post-acute patients referred from that hospital who were in the recovery phase of COVID-19 with clinically mild signs/symptoms, and relied entirely on in-person provider visits. The Barcelona unit had a similar target population (both post-acute and direct access) and referral sources (hospital, ED, community) to our own, but also relied completely on in-person visits and benefited from being housed in a facility with much greater baseline provider support (dedicated physicians already present on a daily basis and on-call 24 hours per day before the pandemic). Both other units provided a comprehensive model of clinical care similar to our own, including management of COVID-19 and other acute/chronic medical issues, rehabilitation, and palliative care. Our unit builds on and

advances prior work in a number of important ways, including the bidirectional health system–SNF collaboration, our unique approach to overcoming staffing challenges (a shared nurse staffing agreement between the health system and SNF), a robust infection control infrastructure, and telemedicine emphasis that allows the unit to run smoothly without physical provider presence (likely enhancing feasibility of such a model for SNFs that may otherwise have difficulty with implementation, such as those located in rural areas). We provide another in a series of important examples highlighting how health systems and SNFs can collaborate to optimize COVID-19 care for older adults, which can hopefully serve as a blueprint for others as the pandemic continues to unfold.

Recent Food and Drug Administration approval of the first COVID-19 vaccine heralds a future when pandemic control will improve. However, COVID-19 will remain a major concern in SNF for at least several months. Vaccine distribution will take time, and even once residents and employees have access, compliance may be limited.[14] Duration of protection remains unknown. COVID-19 may become endemic and cause periodic outbreaks (similar to influenza). SNF COVID-19 units are an important tool that can help health systems and SNFs address the current pandemic and future outbreaks.

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Supplementary Table 1
SNF COVID-19 Unit Admission Criteria

Confirmed active infection with severe acute respiratory syndrome coronavirus-2 real-time polymerase chain reaction from nasopharyngeal or nasal swab, or point-of-care antigen testing during an established cluster outbreak
Presence of attributable COVID-19 symptoms* AND meets requirements for SNF care (regardless of referral source: hospital, ED, assisted living facility) including patients desiring end-of-life care
Oxygen requirement of 4 L/min by nasal cannula or less AND stable requirement over the past 48 hours (unless receiving end-of-life care, in which case can accommodate 10 L/min by nasal pendant)
Completion of medical triage evaluation by the unit physician

*New signs or symptoms include any of the following: fever (can be objective [100.0°F] or subjective), cough, shortness of breath, sore throat, nausea, vomiting, diarrhea, respiratory distress, chills, myalgia, loss of sense of smell and/or taste, delirium or significant deterioration in functional status without another identified cause

Supplementary Table 2
SNF COVID-19 Unit Hospital Transfer Criteria

Return to the hospital is within patient's goals of care AND
Worsening dyspnea with increasing oxygen requirements OR
Hemodynamic instability (hypotension [systolic blood pressure <90] and/or tachycardia [heart rate >110]) OR
Progressive acute kidney injury (creatinine increase of at least 50% from recent baseline) OR
Other acute uncontrolled/unexplained symptoms

Supplementary Table 3
SNF COVID-19 Unit Discharge Criteria

SNF COVID-19 Unit Criteria for Discharge to General (Non-COVID) SNF Bed
Mild to moderate illness and not severely immunocompromised†
a. At least 10 days have passed since symptoms first appeared* AND
b. 72 hours have passed since last fever without the use of fever-reducing medications AND
c. Symptoms (eg, cough, shortness of breath) have improved.
Severe illness or severely immunocompromised‡
a. At least 20 days have passed since symptoms first appeared* AND
b. 72 hours have passed since last fever without the use of fever-reducing medications AND
c. Symptoms (eg, cough, shortness of breath) have improved. Consider consultation with infection control experts to determine isolation duration.
Clinical stability
a. Maintaining normal oxygen saturation on room air or has stable/improving oxygen requirements (no more than 4 L/min via nasal cannula) for at least 24 hours
b. Heart rate 55–110 beats per minute or within previous baseline rate and rhythm
c. >48 hours after receiving immune-modulatory therapies have passed
Ongoing need for SNF (if no and meets above criteria, can discharge to assisted living or private home)

*Patients may be kept on the unit for up to 30 days beyond isolation period end date for bed control management.

†Mild Illness: Individuals who have any of the various signs and symptoms of COVID-19 (eg, fever, cough, sore throat, malaise, headache, muscle pain) without shortness of breath, dyspnea, or abnormal chest imaging. Moderate Illness: Individuals who have evidence of lower respiratory disease by clinical assessment or imaging, and a saturation of oxygen (SpO2) ≥94% on room air at sea level.

‡Severe Illness: Individuals who have respiratory frequency >30 breaths per minute, SpO2 <94% on room air at sea level (or, for patients with chronic hypoxemia, a decrease from baseline of >3%), ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO2/FiO2) <300 mm Hg, or lung infiltrates >50%.