Early reports of the coronavirus disease 2019 (Covid-19) revealed that older adults with pre-existing co-morbid conditions were at highest risk of death. Our institution developed and implemented a triage framework in the Emergency Department utilizing the Clinical Frailty Scale (CFS) to promote patient-centered care during our Covid-19 surge. A triage clinician assessed 40 patients aged 70 and older from April 7 to May 22, 2020. In addition to recommendations for medication management, fall risk reduction, delirium prevention and advance care planning, the triage clinician directed patients with a CFS of 1-3 to usual care (n=8, 20.0%), a CFS of 4-6 to geriatric co-management (n=6, 15.0%), a CFS of 7-9 to palliative care triage (n=23, 57.5%) and 7.5% (n=3) to both palliative and geriatric care. This novel triage framework was integrated into a busy practice environment and rapidly directed limited geriatric and palliative care resources to where they were most needed.

Introduction

In December 2019, the first cases of coronavirus disease 2019 (Covid-19) caused by a novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), were noted in Wuhan City, China. While there were wide variations in clinical presentation, from pneumonia and acute respiratory distress syndrome to no symptoms at all, the severest cases with the highest risk of death most commonly occurred in older adults ≥70 years of age, particularly those with pre-existing co-morbid conditions.
While there were wide variations in clinical presentation, from pneumonia and acute respiratory distress syndrome to no symptoms at all, the severest cases with the highest risk of death most commonly occurred in older adults ≥70 years of age, particularly those with pre-existing co-morbid conditions.

The United States population is aging rapidly, with the number of people ≥65 years of age expected to grow from 49.2 million (15.2% of the population) in 2016 to 82.3 million (21.7% of the population) by 2040. As the number of cases of Covid-19 grew in the U.S., our 793-bed, urban, academic hospital assembled an interprofessional team from geriatrics, palliative care, and the emergency department (ED) to ensure that resources were available for older adults presenting to the ED. After an extensive review of the limited Covid-19 literature that was available in March 2020, we found that most reports focused on age or co-morbid status alone as prognostic indicators.

Frailty, a state of decreased physiological reserve leading to a decreased ability to tolerate biological stress, has been well described in the literature as a powerful predictor of adverse patient outcomes, including mortality, disability, hospitalization, and institutionalization. Frailty can identify those who are at risk of poor outcomes independent of age. Many validated tools for identifying and quantifying frailty have been described. One such tool, the Clinical Frailty Scale (CFS), is a simple 9-point scale for classifying patients on a spectrum from “very fit” to “terminally ill” that is feasible for clinicians to implement in busy practice environments. The CFS has very good inter-rater reliability and has been validated for risk-stratifying critically ill patients, particularly in an ED. Our team developed a geriatric Covid-19 ED triage framework, based on the CFS, to promote patient-centered care in a time of operational crisis and to rapidly direct limited palliative care and geriatric resources to patients most in need of them.

Program Development and Implementation

A core team consisting of a geriatrician, a palliative care physician, and a geriatric surgery physician assistant (PA) assembled in early March 2020 to discuss how to best support the ED staff in caring for older adults with Covid-19. At our institution, inpatient palliative care is a 24/7 service that covers all inpatient admissions and involves three consult teams, each consisting of a palliative care physician, a nurse practitioner, and a social worker. When high-volume service admissions for palliative care declined prior to the Covid-19 surge, existing palliative care resources were restructured to create a new Covid-19 inpatient palliative care unit and to provide more robust coverage for the ED. The inpatient geriatric service at our institution consists of three co-management teams embedded in the departments of Internal Medicine, Orthopaedic Surgery, and Trauma as well as a Geriatric Surgery consult service comprising a PA and a geriatrician. Given the increase in surgical procedure cancellations and the decrease in general medical admissions, the geriatrician and PA on the Geriatric Surgery consult service and the Internal Medicine co-management geriatrician were able to extend coverage to the ED during weekday daytime hours.
After an extensive literature review, we began to discuss which older adults would most benefit from our limited geriatric and palliative care resources. A triage framework based on frailty assessment was designed and presented to a 9-member interprofessional team consisting of an ED physician, an ED physician assistant, an ED nurse, a critical care physician, and additional palliative care physicians and geriatricians. The team met twice weekly to discuss workflow, barriers, dissemination, and concomitant educational resources for ED clinical staff. During this time, we also designated a new Geriatric ED Covid-19 triage pager number, a new consult order in the electronic medical record (EMR), and a weekday 9 a.m. to 5 p.m. call schedule. This new triage framework was introduced to all ED staff during departmental meetings prior to rollout. The Mass General Brigham Healthcare Institutional Review Board approved the data collection for this initiative.

On March 30, 2020, our triage clinician became available to assess all patients ≥70 years of age in the ED who were being admitted to the hospital with confirmed or suspected Covid-19. The triage clinician was not contacted during the first week. Our interprofessional team regrouped to discuss the challenges of information dissemination and the implementation of new workflows amid an evolving crisis response and determined that a proactive approach was needed in order to relieve the burden from our ED colleagues. On April 7, 2020, the triage clinician began remotely checking the ED patient list for eligible patients and quickly identified many patients ≥70 years of age with Covid-19. First, the triage clinician reviewed the vital signs of each patient and would offer an urgent in-person palliative care consultation if the patient appeared to be unstable (as indicated by hypoxia and/or tachypnea) or in need of urgent intubation. If the patient was clinically stable, the triage clinician would call the patient and/or health care proxy (HCP) to calculate the CFS and would triage the patient to one of three care pathways: usual care (CFS 1-3), geriatric co-management (CFS 4-6), or palliative care (CFS 7-9). An overview of our final workflow is shown in Figure 1.
FIGURE 1

Geriatric ED Covid-19 Triage Framework
Flowchart illustrating our final workflow.

Targeting Resources

From April 7, 2020 to May 22, 2020, the triage clinician assessed 40 patients with a mean age (and standard deviation) of 82.6 ± 7.6 years. The mean CFS score, based on 36 patients, was 5.9 ± 1.9; the CFS could not be assessed for the remaining 4 patients, who were in need of urgent care. The patients were mostly English-speaking (28 patients; 70.0%), female (21 patients; 52.5%), and living at home prior to hospitalization (20 patients; 50.0%). Demographic data are shown in Table 1.

The largest proportion of patients were triaged to palliative care (23 patients; 57.5%), followed by usual care (8 patients; 20.0%) and geriatric co-management (6 patients; 15.0%); the remaining 3 patients (7.5%) were triaged to both palliative care and geriatric co-management. Of the patients who were triaged to palliative care, 9 were clinically unstable in the ED and received an urgent palliative care consultation. In addition to targeting consultant resources to where they were most needed, the triage clinician also made recommendations for medication management, fall risk
reduction, delirium prevention, and advance care planning. The most common recommendations were for formal documentation of HCP/Massachusetts Medical Order for Life-Sustaining Treatments (MOLSTs) (11 patients), non-pharmacological delirium-prevention measures such as preserving the sleep-wake cycle and ensuring the availability of personal sensory equipment (8 patients), and withholding potentially inappropriate medications (8 patients). Table 2 provides a full overview of triage clinician recommendations.

With strict limitations on inpatient visitors and increased use of virtual technologies to limit the utilization of personal protective equipment, we were concerned about the high risk for delirium in the older adult Covid-19 population, particularly as many of the triaged patients (15 patients; 37.5%) had an underlying diagnosis of dementia. Furthermore, a common presenting sign of Covid-19 in older adults is altered mental status or confusion.13 Nearly half of our patients

---

Table 1. Demographic Characteristics

| Variable                        | No. of Patients (N = 40) |
|---------------------------------|--------------------------|
| Age**                           |                          |
| 70-74 years                     | 6 (15.0%)                |
| 75-79 years                     | 8 (20.0%)                |
| 80-84 years                     | 11 (27.5%)               |
| 85-89 years                     | 7 (17.5%)                |
| 90+ years                       | 8 (20.0%)                |
| Sex                             |                          |
| Male                            | 19 (47.5%)               |
| Female                          | 21 (52.5%)               |
| Race/Ethnicity                  |                          |
| Caucasian                       | 22 (55.0%)               |
| Hispanic                        | 10 (25.0%)               |
| African American                | 8 (20.0%)                |
| Primary Language                |                          |
| English                         | 28 (70.0%)               |
| Spanish                         | 10 (25.0%)               |
| Other                           | 2 (5.0%)                 |
| Primary Residence               |                          |
| Home                            | 20 (50.0%)               |
| Lives alone                     | 7                        |
| Lives with spouse, sibling, or friend | 6                |
| Lives in multi-generational home | 7                        |
| Assisted-living facility        | 2 (5.0%)                 |
| Skilled-nursing facility        | 18 (45.0%)               |
| Comorbidities                   |                          |
| Diabetes                        | 15 (37.5%)               |
| Hypertension                    | 37 (92.5%)               |
| Heart failure                   | 12 (30.0%)               |
| Chronic kidney disease          | 19 (47.5%)               |
| End-stage renal disease         | 4 (10.0%)                |
| Dementia                        | 15 (37.5%)               |
| HCP*                            |                          |
| HCP form completed in EMR       | 28 (70.0%)               |
| HCP name on file, but no form in EMR | 6 (15.0%)           |
| No HCP                          | 6 (15.0%)                |
| MOLST† on file                  | 18 (45.0%)               |

*The mean CSF, based on 36 patients, was 5.9 ± 1.9. **The 40 patients had a mean age (and standard deviation) of 82.6 ± 7.6 years. †H-CP = health-care proxy, EMR = electronic medical record. ‡MOLST = Massachusetts Medical Order for Life-Sustaining Treatment.

Source: The authors.
experienced delirium during their inpatient admission (17 patients; 42.5%); the median number of days of delirium was 3 (inter-quartile range [IQR], 3). The triage clinician provided delirium-prevention recommendations and anticipatory pharmacological guidance for patients who were at risk for delirium. Additionally, we ensured that all patients had access to geriatric or palliative care consultation should delirium develop later in their hospital course.

**Safeguarding What Matters**

Goals-of-care discussions were crucial to our framework and were discussed with and documented for every stable patient. Of the 18 patients with a MOLST on file, 17 (94%) had a code status order in the ED consistent with their MOLST. Additionally, of the 6 patients who were admitted to the intensive care unit, 4 were intubated in accordance with their goal of pursing life-sustaining care and 2 did not require intubation. The majority of patients (29 patients; 72.5%) had a code status change during their admission, with 14 (48.3%) of the changes occurring in the ED. A full report of code status transitions can be found in the Appendix. Every patient had a code status on file at the time of discharge or death, and all patients who died in the hospital received comfort measures at the time of death. Figure 2 summarizes the patient code status at presentation, discharge, and death.

**Table 2. Geriatric Triage Recommendations**

| Geriatric Triage Recommendation                        | Number of Times Recommended |
|--------------------------------------------------------|-----------------------------|
| Consultant care                                        |                             |
| Urgent palliative care consult                         | 9                           |
| Routine palliative care consult                        | 17                          |
| Geriatric consult                                      | 9                           |
| Social work consult                                     | 5                           |
| Advance care planning                                  |                             |
| Further goals-of-care discussion                       | 6                           |
| Documenting MOLST/HCP*                                 | 11                          |
| Delirium risk                                          |                             |
| Non-pharmacologic delirium prevention                   | 8                           |
| Anticipatory pharmacologic delirium management          | 2                           |
| Medication optimization                                |                             |
| Withholding potentially inappropriate medications       | 8                           |
| Home medication adjustment                             | 3                           |
| Medication safety                                      | 4                           |
| Fall risk reduction                                    |                             |
| Orthostatic vital signs                                | 2                           |
| Mobility order                                         | 2                           |

*MOLST = Massachusetts Medical Order for Life-Sustaining Treatment, HCP = health-care proxy.

Source: The authors.
FIGURE 2

Code Status at Presentation, at Discharge, and at Death
Bar graph showing the code status for all 40 patients at presentation, discharge, and death.

Outcomes

For the 26 patients who survived their hospital stay, the median time to discharge was 8 days (IQR, 6). For the 25 patients who survived and for whom the CFS score could be calculated, the mean score was 5.4 ± 2.0; the CFS score could not be assessed for the remaining patient because of the need for urgent care. The majority of surviving patients were discharged to a rehabilitation or skilled nursing facility (13 patients; 50.0%), followed by home with services (8 patients; 30.8%), home without services (3 patients; 11.5%), assisted living (1 patient; 3.8%), and home with palliative care (1 patient; 3.8%). For the 14 patients who died in the hospital, the mean time to death was 5.4 ± 3.5 days. For the 11 patients who died in the hospital and for whom the CFS score could be calculated, the mean score was 7.1 ± 0.7; the score could not be calculated for the remaining 3 patients because of the need for urgent care. The mortality rate was 35.0% (14 of 40 patients) at 30 days and 45.0% (18 of 40 patients) at 90 days.
“Our novel framework, in which the CFS was used to triage older adult patients in the ED with confirmed or suspected Covid-19, was successful in rapidly directing limited palliative care and geriatric resources to the patients most in need.”

**Ensuring Personalized Care for Diverse Older Adults**

Our novel framework, in which the CFS was used to triage older adult patients in the ED with confirmed or suspected Covid-19, was successful in rapidly directing limited palliative care and geriatric resources to the patients most in need. Palliative care Covid-19 frameworks integrating goals of care discussion in the ED have been utilized, but there is limited literature on geriatric-centered frameworks of care.\(^{14-16}\) We believe that this triage framework was successful largely because it could be quickly integrated into existing workflows, it could be utilized in a busy practice setting, and it provided structured, personalized care to a heterogenous population of older adults. Because this framework is independent from and parallel to ED workflows, it did not burden busy ED clinicians, which is a critical consideration when planning for other demanding clinical scenarios such as Covid-19 resurgences or influenza outbreaks.

McCarthy et al., in an early study of 247 patients with Covid-19 who were admitted to our larger Mass General Brigham Healthcare system in March 2020, reported that 29.1% of the patients experienced delirium, that 32.9% were discharged to a rehabilitation hospital, and that 13.0% died.\(^{17}\) In our geriatric cohort at Brigham and Women’s Hospital, 42.5% experienced delirium, 50.0% were discharged to a rehabilitation hospital, and 35.0% died within 30 days, suggesting that frail, older adults are at higher risk of poor outcomes and may receive the greatest benefit from targeted geriatric and/or palliative care interventions.

**Challenges and Limitations**

Despite our overall success, piloting the frailty-based triage framework was met with a variety of challenges. The triage clinician worked remotely and could not evaluate patients or their families in person because of Covid-19-related restrictions. The volume of patients also presented a challenge for the triage clinician as Covid-19 numbers surged. In response to this challenge, we, informed the ED responding clinician that we would be calling their patient (e.g., for informed assent), which reduced the number of phone interactions and allowed more patients to be triaged.

Our framework had important limitations. First, this framework was utilized by a single center, and, while we believe that it could be beneficial at other institutions, additional studies are needed. Second, our hospital had a trained geriatric PA who could be mobilized to this work, and other institutions may not have such a resource readily available. Third, our triage clinician was only available during daytime hours, and therefore our population of patients may not be reflective of the entire population of older adults with Covid-19 at our institution. Furthermore, we would need more triage clinicians to provide full 24/7 coverage, which could be resource-intensive. Finally,
many clinicians may not have experience utilizing the CFS; however, the CFS is designed to be rapidly implemented with brief instruction.18

**Building for the Future**

While the triage system was designed to be a surge-level service, feedback from intensive-care clinicians, ED physicians, hospitalists, and the administration indicated that the triage system helped to promote goal-concordant care and appropriate utilization of intensive care resources. Additionally, during weekends, the ED and ICU teams flagged patients who could have benefited from triage. Thus, we have begun to explore ways to incorporate extended triage coverage for overnight and weekend hours should future surges occur. Furthermore, the potential benefits of permanently integrating this triage framework in the ED are considerable. If applied to the general population of frail older adults, opportunities to provide such patients with early and targeted access to geriatric and palliative care resources may potentially decrease downstream complications such as delirium, may reduce unnecessary or costly testing, and may facilitate the provision of goal-concordant care. Our future work will explore mechanisms to readily identify frail older adults in the ED and to better understand the acceptability and impact of this framework among clinicians.

“If applied to the general population of frail older adults, opportunities to provide such patients with early and targeted access to geriatric and palliative care resources may potentially decrease downstream complications such as delirium, may reduce unnecessary or costly testing, and may facilitate the provision of goal-concordant care.”

**Appendix**

**Patient Code Status Changes Over Time**

**Lynne O’Mara, MPAS, PA-C**
Senior Physician Assistant, Department of Surgery, Brigham and Women’s Hospital

**Shoshana Streiter, MD**
Instructor of Medicine, Division of Aging, Brigham and Women’s Hospital, Harvard Medical School,

**Ariela R. Orkaby, MD, MPH**
Assistant Professor of Medicine, Division of Aging, Brigham and Women’s Hospital, New England GRECC, VA Boston Healthcare System
Kei Ouchi, MD, MPH
Assistant Professor of Emergency Medicine, Department of Emergency Medicine, Brigham and Women's Hospital,

Rachelle Bernacki, MD, MS
Director of Quality Initiatives, Department of Psychosocial Oncology and Palliative Care, Dana-Farber Cancer Institute,

Acknowledgments

The authors wish to thank Christina Sheu for data abstraction and manuscript table drafting and revision; Tarsicio Uribe-Leitz, MD, MPH, for statistical analysis; Audrey Reust, PA-C, for ED implementation feedback; Nickolas Sadovnikoff, MD, and Masami Kelly for manuscript feedback; and Kathryn Britton, MD, Zara Cooper, MD, MSc, and Houman Javedan, MD, for executive sponsorship.

Disclosures: Lynne O’Mara and Shoshana Streiter have nothing to disclose. Ariela Orkaby discloses funding from VA CSR&D CDA-2 IK2-CX001800. Kei Ouchi has received funding from the National Institute on Aging, Emerging Leaders Career Development Award K76AG064434; Cambia Health Foundation, Sojourns Scholar Leadership Award; U.S. Department of State Bureau of Educational and Cultural Affairs, Fulbright U.S. Scholar Award. Rachelle Bernacki discloses funding from Cambia Health Foundation Sojourn Scholars.

References

1. Zhou F, Yu T, Du R. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet. 2020;395(6):1054-62

2. Wu C, Chen X, Cai Y. Risk Factors Associated With Acute Respiratory Distress Syndrome and Death in Patients With Coronavirus Disease 2019 Pneumonia in Wuhan, China. JAMA Intern Med. 2020;180(6):934-43

3. Wang D, Hu B, Hu C. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA. 2020;323(6):1061-9

4. U.S. Department of Health and Human Services, Administration on Aging. A Profile of Older Americans; 2017. Accessed February 27, 2020. https://acl.gov/sites/default/files/Aging%20and%20Disability%20in%20America/2017OlderAmericansProfile.pdf.

5. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. JAMA. 2020;323(6):1239-42

6. Joseph B, Pandit V, Zangbar B. Superiority of frailty over age in predicting outcomes among geriatric trauma patients: a prospective analysis. JAMA Surg. 2014;149(6):766-72
7. Fried LP, Tangen CM, Walston J. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci. 2001;56(6):M146-57

8. Orkaby AR, Nussbaum L, Ho YL. The Burden of Frailty Among U.S. Veterans and Its Association With Mortality, 2002-2012. J Gerontol A Biol Sci Med Sci. 2019;74(6):1257-64

9. Bentov I, Kaplan SJ, Pham TN, Reed MJ. Frailty assessment: from clinical to radiological tools. Br J Anaesth. 2019;123(6):37-50

10. Rockwood K, Song X, MacKnight C. A global clinical measure of fitness and frailty in elderly people. CMAJ. 2005;173(6):489-95

11. Lo AX, Heinemann AW, Gray E. Inter-rater Reliability of Clinical Frailty Scores for Older Patients in the Emergency Department. Acad Emerg Med.

12. Silva-Obregón JA, Quintana-Díaz M, Saboya-Sánchez S. Frailty as a predictor of short- and long-term mortality in critically ill older medical patients. J Crit Care. 2020;55(6):79-85

13. Zhou L, Zhang M, Wang J, Gao J. Sars-Cov-2: Underestimated damage to nervous system. Travel Med Infect Dis.

14. Lee J, Abrukin L, Flores S. Early Intervention of Palliative Care in the Emergency Department During the COVID-19 Pandemic. JAMA Intern Med. 2020;180(6):1252-4

15. Ankuda CK, Woodrell CD, Meier DE, Morrison RS, Chai E. A Beacon for Dark Times: Palliative Care Support During the Coronavirus Pandemic. NEJM Catalyst.

16. Borasio GD, Gamondi C, Obrist M, Jox R. COVID-19: decision making and palliative care. Swiss Med Wkly.

17. McCarthy CP, Murphy S, Jones-O’Connor M. Early clinical and sociodemographic experience with patients hospitalized with COVID-19 at a large American healthcare system. EClinicalMedicine.

18. Rockwood K, Fay S, Theou O, Dykes L. Top Tips to help you use the Clinical Frailty Scale. 2020 April. https://d29e3oc9-ac68-433e-8256-f6f9c1d4a9ec.filesusr.com/ugd/ bbd630_4ff6e0c26c914747929776b065a20aa0.pdf.