Development and Implementation of a Real-Time Inpatient Palliative Care Screening Process to Promote Earlier Palliative Care Referrals

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Despite the previous development of criteria for palliative screening tools, there remains a lack of validated and practical screening processes for the general hospitalized patient population for everyday clinical use. This quality improvement project's aim was to implement a practical institution-based adult inpatient palliative care screening tool embedded into the electronic medical record with an automated alert process to assist in identifying patients earlier within hospital admission. The project used a preimplementation and postimplementation design and followed the Plan-Do-Study-Act process to measure the effectiveness of the tool and alert process in decreasing time from admission to palliative care referral and impact on referring patterns. During the project period, 1851 palliative care referrals were completed, and minimal difference (0.6%) was noted in the average time from admission to referral preimplementation and postimplementation ($P = .939$). There was a 3.7% increase in referrals postimplementation and a shift in referring service patterns ($P = .321$). Although the expected outcome of earlier palliative referrals during admissions was not met, the development and implementation of the tool and alert process is a step toward the creation of a standard practical tool for the general hospitalized patient population.

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As life expectancy and chronic disease continue to rise, palliative care has become a high priority for health care systems. Palliative care improves the quality of life, symptom burden, and patient satisfaction for patients with life-limiting and chronic illnesses while ensuring proper resource use and creating cost savings.[1-3] These benefits fulfill the Institute for Healthcare Improvement's Triple Aim of focusing on improving the patient experience of care and the health of populations while reducing health care costs.[4] The World Health Organization has recommended that health care providers initiate palliative care early on in the disease trajectory and not withhold it until the end of life.[5] Early palliative care for inpatient hospitalizations, regardless of patient acuity and level of care, is often defined as within 3 days of admission.[6] Research has demonstrated that timely identification of patients with a serious, life-limiting illness and referral within 3 days of a hospital admission improves patient-reported outcomes and is essential to providing early and effective palliative interventions.[1,2,6,7]

Regardless of the evidence surrounding the benefits of early referrals, hospitalized patients are often referred very late or not referred at all, and thereby do not receive the benefits of palliative care.[8,9] Previous studies reveal that clinicians are often inaccurate in determining prognosis, and as a result, palliative care is often implemented late.[7,10,11] Barriers to achieving early referrals include a lack of both education about palliative care benefits and processes to assist with identifying patients who may benefit from palliative care services.[2] To assist with barriers, it is recommended that palliative care be offered for all patients that have serious illnesses with an option to "opt-out" to make palliative care the default rather than a choice.[12]

A consensus panel convened by the Center to Advance Palliative Care (CAPC) determined general criteria for use on hospital admission and on each hospital day, based

on national standards, research findings, and expert opinion, to identify patients at high risk for unmet palliative care needs.[13] Developed screening tools generally use many of these criteria. However, there remains a lack of current, validated palliative screening tools and processes for the general hospitalized patient population that have been practically implemented into daily practice as well as a paucity of evidence surrounding available tools' impact on the early initiation of palliative care.[1,14,15]

Previous initiatives focusing on the implementation of screening tool processes using Plan-Do-Study-Act (PDSA) cycles and logic model methodology reported increases in appropriate referrals to palliative care from 9% to 36%.[3,8] Two studies examined the implementation of palliative screening processes in medical intensive care units (MICUs) and their sample sizes varied from 223 to 610 observations.[16,17] Hurst et al[16] used a quasi-experimental design with 2 geographically separate units at teaching hospitals, and Jenko et al[17] used a preimplementation and postimplementation design at 1 community hospital. Both studies reported a reduction in time from admission to the MICU to palliative care referral by 1 day. Screening processes can assist in identifying patients earlier within hospital admissions with unmet palliative care needs and increased risk of death.[11,15-18]

At our large hospital in Northern Virginia, we noted late referrals to palliative care, often occurring in the last days of life. The hospital is a 923-bed academic medical center, with more than 25000 admissions each year. The hospital completes approximately 1600 palliative care referrals annually, with referrals initiated on average 5.16 days after admissions. Few initiatives currently exist within the organization to promote earlier referral to palliative care.

PROJECT PURPOSE AND AIMS

The purpose of this quality improvement project was to implement a practical institution-based real-time adult inpatient palliative care screening tool with an automated alert process that was embedded into the electronic medical record (EMR), Epic. The specific aims of the project included (1) development of an evidence-based screening process for inpatient adults aimed at identifying the need for palliative care referrals within 3 days of admission, (2) implementation of the developed screening and referral process at the selected setting, (3) evaluation of the impact of the screening and referral process in reducing the time from hospital inpatient admission to palliative care referral, and (4) exploration of possible factors that potentially influenced referral patterns preimplementation and postimplementation, including the total number of palliative care referrals and referring services.

METHODS

This single-institution quality improvement project used a preimplementation and postimplementation design to examine the effect of the institution-based real-time inpatient palliative care screening process and followed the PDSA process. Data were collected for 6 months before implementing the intervention (June 15, 2021-December 14, 2021) and for 6 months after its implementation (December 15, 2021-June 14, 2022). The project was reviewed by the University's Human Research Protection Office and the care site's institutional review board and was deemed as not human subjects research, but rather a quality improvement project. The health care system's Division Chief of Palliative Care & Geriatrics, Medicine Service Line Leadership including the nursing leader, and the Palliative Care and Hospice Executive Council approved this quality improvement project, as did the institution's Nursing Research and Evidence-Based Practice Council.

Setting and Sample

The project occurred at a 923-bed academic medical center in the Eastern United States for 17 months. The medical center is part of a 5-hospital health care system and is the flagship care site that highly focuses on life-saving interventions. It is a Level 1 Trauma Center and is designated by the Joint Commission as a Comprehensive Stroke Center and by the American Nurses Credentialing Center as Magnet designated. This care site also has a renowned organ transplant program and offers transplants for heart, lung, kidney, and pancreas.

The medical center's palliative care service is a fully staffed interprofessional team. The team consists of 8 physicians, 3 nurse practitioners, 3 licensed clinical social workers, and 1 board-certified chaplain. About 50% of the team is new to the hospital and was hired within the last 2 years. The team evaluates palliative care referrals throughout the institution.

Adult inpatients older than 18 years receiving a palliative care referral, except those admitted to the behavioral and women's health service lines, were included in the preimplementation and postanalysis. The same population of patients was screened through the developed process. The hospital averages 3000 admissions/month and 130 palliative referrals/month. It was estimated that approximately 800 patients, on the basis of the average monthly number of palliative care referrals for 6 months, would be included in the preimplementation and postimplementation phases for a total sample size of 1600.

Intervention

A workgroup developed the screening tool criteria based on a literature review of evidence-based tools and best practices.[2,3,6-11,13-17,19] This group also determined the automated alert and implementation process. Key stakeholders (nursing, providers, case management) and palliative care clinicians were included to allow review for the face validity of the selected tool criteria. The EMR informatics team, comprised of several nurses, was involved in reviewing

the capability and functionality of the EMR in reference to the screening criteria (Table 1). A significant number of the screening criteria focused on nursing documentation within the EMR and their workflows. It was determined that the screening tool would automatically update continuously on the basis of predetermined criteria and documentation within the patient's EMR chart, creating a composite score (Table 1). This decision was made largely from the feedback of the bedside nurses within the workgroup to optimize workflow and to improve their confidence in advocating for palliative referrals for patients. The EMR informatics team also helped establish the electronic alert process sent to the attending provider for patients meeting the threshold score.

The process outlines suggested actions based on patient screening tools composite score (Table 2). The composite scores are accessible to nursing and can be added to their patient lists for review. The threshold score for referral recommendation was initially set at 13. Following a PDSA cycle and process review, the threshold score was lowered to 11 to ensure patients with unmet palliative care needs were identified by the tool.

Upon opening a patient's chart, an automated best practice advisory or alert is displayed to indicate that the threshold score for a palliative care referral has been met. The alert includes a palliative care order with the option to opt-out and enter a reason for not referring to palliative care. The alert will trigger each time the chart is opened until acknowledged by the provider. Once the alert is acknowledged, it will not trigger again until a new attending provider is assigned to the patient.

After the screening process was built within the EMR, the project lead and 1 workgroup member tested the process during a 1-month period through 50 chart reviews in the active EMR. Charts were initially reviewed and scored with the Supportive and Palliative Care Indicators Tool, which is a tool completed on paper to assess the needs of patients who have deteriorating health. This tool has evidence of validity and reliability for the general population and incorporates several criteria from the CAPC Consensus Panel.[13,20-25] Those results were compared with screening results that would have been obtained using the new process. Several changes to the process criteria were made on the basis of the chart review process and evaluation before initiating the new process to improve the tool's accuracy in identifying patients.

Inpatient providers, bedside nurses, and case managers were introduced to the new process and its implementation through the institution's newsletters and emails distributed before introducing the new process. Educational instruction sheets were created to assist providers and nursing with navigating the new automatic process.

Measurement and Evaluation Plan

Time from admission to palliative care referral and referral patterns were compared preimplementation and postimplementation of the new screening process. Time from admission to palliative care referral was collected from the EMR and reported as days from admission to palliative referral. Potential factors influencing referral patterns, including the total volume of palliative referrals and referring service were also collected from the EMR. Preimplementation and postimplementation means, standard deviations, and range for time to referral were analyzed using the Mann-Whitney U test, and specific time ranges (3 days, 5 days, 7 days) to referral and referring service were analyzed with the χ^2 test using IBM SPSS (v28.0).

RESULTS

During the project period of 12 months, a total of 36 662 inpatient admissions occurred, with 18 438 occurring 6 months preimplementation and 18 224 occurring 6 months postimplementation. Before the implementation of the screening and alert process, the average time from admission to referral was 5.16 days (SD, 8.34; range, 0.00-80.53). In the 6 months postimplementation, the average time was 5.13 days (SD, 8.56; range, 0.01-97.80). There was less than an hour difference after the implementation of the new screening process (P = .939; SD, 8.46; range, 0.00-97.80). The cumulative percentages of palliative care referrals that occurred within 3, 5, and 7 days of inpatient admission for preimplementation and postimplementation are included in Table 3. There was a 1.7% increase in referrals that occurred within 3 days of admission after the implementation of the new screening process (P = .458).

The number of palliative care referrals was compared preimplementation and postimplementation of the screening and alert process. A total of 1851 palliative referrals were ordered during the project period. In the 6 months before the intervention, there were 909 palliative referrals with an average of 152 referrals per month. In the 6 months postintervention, there were 942 palliative referrals with an average of 157 per month. This demonstrated an overall increase of 3.7% in palliative care referrals (P = .321). The largest referring services both preimplementation and postimplementation were the hospitalists and critical care providers, and a statistically significant increase was noted for oncology services (P = .035) (Table 4).

DISCUSSION

Summary of Key Findings

There were several key findings noted during the implementation of the new automated screening tool and alert process within the EMR. A practical EMR embedded automatic tool and alert process were successfully initiated on the selected launch date. There was a 0.6% decrease in average time to a palliative care referral from admission. The number of referrals occurring within 3 days of admissions and the average number of palliative care referrals reported each month increased, although neither difference

TABLE 1 Palliative Screening Process Criteria and Scoring

Section 1	
• Diagnosis: metastatic cancer, ESRD or CKD stage 5, ESLD, COPD, CHF, interstitial lung disease, ALS, multiple myeloma, leukemia, glioblastoma, anoxic brain injury	3 points per criteria met Max points for section: 12
• Deterioration index ≥ 60 (Epic-based clinical acuity score used to predict patient decompensation)[19]	
• Uncontrolled pain or dyspnea	
• Left ventricular assist device, extracorporeal membrane oxygenation, recent transplant within 1 year	
Section 2	
• Diagnosis: dementia, Parkinson disease, CVA, encephalopathy, cardiac arrest or ventricular fibrillation	2 points per criteria met Max points for section: 20
• Uncontrolled nausea or vomiting, delirium, agitation or confusion	
• Enteral feeding	
• Ventilator, >7 days	
• Bilevel positive airway pressure, >3 days	
• High flow nasal cannula ≥ 20 LPM, >5 days	
• 3 or more ED or inpatient admissions in the last 6 months	
• LOS > 10 days	
• Current ICU admission	
• Previous palliative referral	
Section 3	
• Nursing home resident	1 point per criteria met Max points for section: 7
• Difficulty swallowing	
• Dialysis (hemodialysis, peritoneal dialysis, or currently on continuous renal replacement therapy)	
• Home oxygen	
• Needs assistance with 3 or more ADLs	
• BMI < 18.5	
• Previous hospice order	
Total score = Section 1 + Section 2 + Section 3	
Key:	
• Maximum total of 3 points for diagnosis-related scores and symptoms (pain, dyspnea, nausea or vomiting, delirium, and agitation or confusion). Maximum total of 2 points for previous hospice or palliative orders	
• Pain, dyspnea, nausea or vomiting, and delirium need an associated scoring diagnosis for points to be assigned.	
• Patients may receive 0 points in any given section if criteria are not met.	
For example: A patient with CHF, COPD, dementia, uncontrolled pain, LOS > 10 days, current ICU admissions, and a nursing home resident would receive a total of 11 points (Section 1, 6 points; Section 2, 4 points; Section 3, 1 point)	
Abbreviations: ADL, activity of daily living; ALS, amyotrophic lateral sclerosis; BMI, body mass index; CHF, congestive heart failure; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; CVA, cerebrovascular accident; ED, emergency department; ESLD, end-stage liver disease; ESRD, end-stage renal disease; ICU, intensive care unit; LPM, liters per minute; LOS, length of stay.	

TABLE 2	Palliative Screening Process Total Scores and Suggested Actions	
Composite Score	**Suggested Action**
Score 0-5 = green/negative	No palliative care referral needed at this time
Score 6-10 = yellow/monitor	Consider palliative care referral(if appropriate)
Score 11 or above = red/positive	Best practice advisory sent to attending physician to place palliative order (if appropriate)

reached the level of significance. The referring services and palliative referral usage demonstrated a shift in the number of referrals from different services and teams preimplementation and postimplementation.

Interpretation

Although multiple studies have generated criteria for palliative care consultation, particularly in the ICU setting, there is little information or resources on validated palliative screening processes for the general hospitalized population and their practical implementation into clinical practice.[1,14,15] The need to incorporate palliative care early in inpatient admissions is essential to quality patient care.

This quality improvement project was designed to decrease the time from inpatient admission to palliative care referral. Although a practical EMR-embedded screening tool and alert process were successfully implemented through the project, there was essentially no difference (0.6%) in the average time from admission to a palliative care referral noted in this project. These findings are inconsistent with other screening tool studies typically implemented in ICUs that decreased the time from admission to palliative referral by 1 day.[16,17]

Timely identification of patients within 3 days of admission leads to improved patient-reported outcomes.[1,2,6,7] Results of this project included a modest increase in the average number of palliative care referrals and a small increase in the number of referrals occurring within 3 days of admissions. Studies conducted with the intention of increasing palliative care referrals with the use of a screening process show varied results. In a pilot project at 3 community-based hospitals, there was a 9.2% increase in referrals after the implementation of a screening tool.[8] Another pilot project at a community hospital focusing on patients with chronic obstructive pulmonary disease noted a 36% increase in appropriate referrals through the use of a screening tool.[3] Another project that occurred in the ICU at an academic medical center noted that 80.1% of patients who met the criteria on the screening tool were not referred to palliative care.[26] It is also important to note that in a national survey of 53 palliative care programs that standardized referral criteria, increased palliative team workload and inappropriate consults were noted as disadvantages and potential burdens on the palliative providers.[27]

The pattern of referring services appeared to change in this project with the implementation of the screening process and alert with a shift in the number of referrals from different medical teams and services. The change in pattern revealed a statistically significant increase in oncology referrals and a decrease in unknown services as well as a marginally significant increase in surgery. Unknown service is listed as the referring service when a provider is not affiliated with a specialty area within the EMR. Variations in referral patterns often exist among specialists based on their understanding of palliative care, the patient's disease trajectory, attitudes toward death and dying, how the service is described (palliative care vs supportive care), and experiences with palliative care.[28,29] The implementation of the screening tool and alert process may have played a positive role by changing culture and increasing referrals from oncology and surgery.

Recent initiatives within the health system focusing on advance care planning and mortality potentially created a greater positive response from oncology and surgery to recommended palliative referrals through the screening process. Qualitative interviews with providers about the process and deferrals for palliative referrals on patients meeting the threshold score may help improve the process and its implementation in the future. In addition, future PDSA cycles can focus on more direct education and

TABLE 3	Cumulative Percentage of Palliative Referrals Preintervention and Postintervention		
Time to Palliative Referral	**Preintervention n = 909**	**Postimplementation n = 942**	**% Change Postintervention**
3 days	523 (57.5%)	558 (59.2%)	1.7% (P = .458)
5 days	639 (70.3%)	666 (70.6%)	0.3% (P = .849)
7 days	715 (78.7%)	732 (77.6%)	1.1% (P = .621)

TABLE 4	Referral Service Patterns — Percentage of Total Referrals and Change Postintervention		
Referring Service	**Preintervention n = 909**	**Postintervention n = 942**	**% Change Postintervention**
Surgery	20 (2.2%)	35 (3.7%)	1.5% (P = .055)
Oncology	11 (1.2%)	24 (2.54%)	1.34% (P = .035)
Critical care	139 (15.3%)	155 (16.5%)	1.2% (P = .494)
Advanced heart failure	32 (3.5%)	41 (4.35%)	0.85% (P = .358)
Trauma	12 (1.3%)	17 (1.8%)	0.5% (P = .401)
Pediatrics	3 (0.3%)	7 (0.7%)	0.4% (P = .343)
Emergency department	5 (0.6%)	7 (0.7%)	0.1% (P = .605)
Pulmonary	6 (0.7%)	5 (0.5%)	(0.2%) (P = .718)
Intermediate care	55 (6%)	54 (5.7%)	(0.3%) (P = .771)
Neurology	17 (1.9%)	13 (1.38%)	(0.52%) (P = .404)
Other	61 (6.7%)	55 (5.8%)	(0.9%) (P = .439)
Gynecology oncology	37 (4%)	27 (2.9%)	(1.1%) (P = .156)
Cardiac	16 (1.8%)	6 (0.6%)	(1.2%) (P = .026)
Unknown	12 (1.3%)	0 (0%)	(1.3%) ($P \le$ .001)
Hospitalists	495 (54.5%)	496 (52.6%)	(1.9%) (P = .437)

in-servicing for providers on palliative care and the new process, as the initial mode of education and communication may have impacted the outcome.

Limitations and Weaknesses

This quality improvement project took place in a single academic medical center, and there were several challenges that may have impacted the overall results. The intent was to create an automated screening tool and alert process through the use of objective information within the EMR. However, several aspects in which the screening tool pulls information are determined and documented by the bedside nurse, which may introduce variability in interpretation (eg, ADLs and symptoms). Further collaboration with nursing to learn more about opportunities related to documentation and workflows impacting the screening criteria and education on the criteria within the tool may help reduce variability.

Another limitation was the lack of provider documentation of major diagnoses in the patient's problem list in the EMR. The screening tool process uses the patient's problem list to capture diagnosis criteria, and without the inclusion of all appropriate diagnoses, critical points within the scoring system may have been missed. The underreporting of severity and conditions may have produced lower scores that did not meet the threshold to recommend a palliative referral.

An additional limitation is related to the best practice alert sent to providers suggesting a palliative referral. Ultimately, the provider makes the clinical decision regarding the referral after the suggestion alert. Varying levels of understanding about palliative care and/or previous experiences may impact the provider's clinical decision to refer to palliative care. The best practice alert was also fairly easy to bypass because entering a comment on the reason for bypassing the referral was not required. This may also be an opportunity for future PDSA cycles dependent on EMR functionality.

Another limitation was difficulty accessing and interpreting data for the best practice alert sent to providers. This data includes the number of times the best practice alert was triggered and the number of palliative care referrals resulting from it. General data exists within the EMR about the best practice alert and outcomes; however, the data is not easily interpreted and is difficult to validate. The creation of an accessible and clear report and/or dashboard in the EMR of the best practice alerts and their outcomes would help provide accurate data and allow for further review with planning during an additional PDSA cycle.

In addition, it is important to note that the postimplementation period began during the 2021-2022 winter surge of COVID-19 (Figure). As COVID-19 admissions increased, there was little change in palliative care referrals. The focus

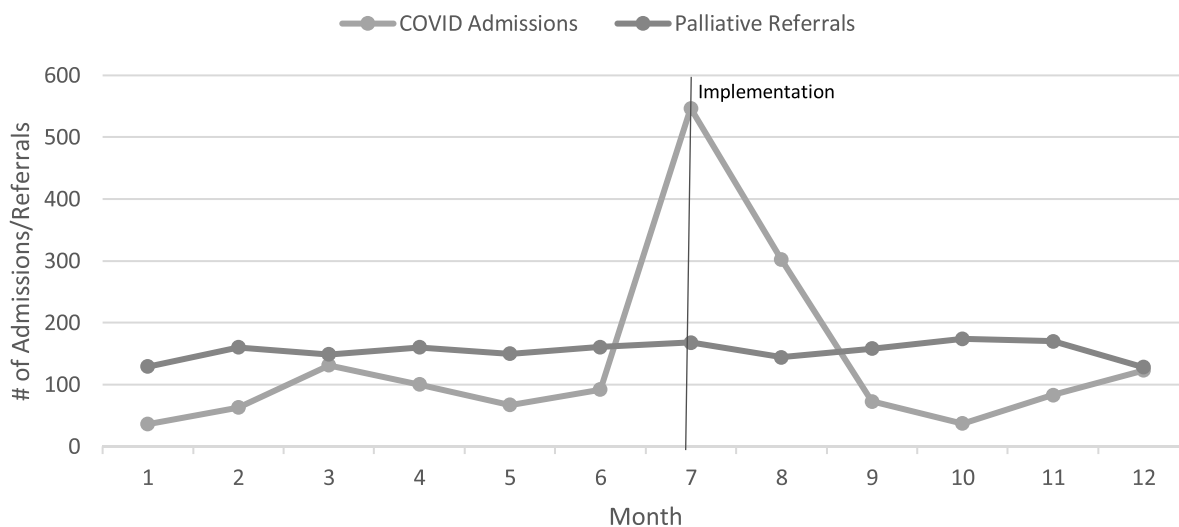## COVID Admissions & Palliative Referrals

FIGURE. COVID admissions (inpatient/observation) and palliative referrals.

of care may have changed during this period to meet the needs of the patients being admitted with COVID. In addition, this COVID surge may have been unsettling for many nurses and providers making it difficult to fully adopt and understand the newly launched process.

Further Implications for Study

This project is the foundational stages of the development and implementation of a practical EMR-based screening tool and alert process. Future research should focus on the reliability and validity of the developed tool. In addition, other potential studies should also look at the demographics of patients referred to palliative care, their outcomes, appropriateness of referrals, and the limitation of diagnosis entry and documentation and its impact. It is important to also survey attending providers for their feedback on the process and to learn more about deferring the recommendation for a referral. Surveying bedside nurses would assist with identifying the impact on their role and confidence to advocate for seriously ill patients. Enlarging the scope of this project to other hospitals within the health care system and other organizations will help determine if there is an effect in other settings.

CONCLUSION

The introduction of a real-time automatic practical EMR-based screening and alert process did not result in a significant reduction in the time from admission to palliative care referral in this quality improvement project. However, the build and implementation of this screening tool and alert process is an encouraging and progressive step toward a standardized tool and practical implementation for the general hospitalized population. This process is essential in streamlining nursing workflows and encourages identifying patients with

a high possibility of having unmet palliative care needs, which impacts quality of life, resource use, and quality of care. The health care site plans to continue to use and refine the implemented screening tool and alert process.
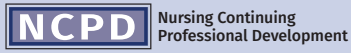
Acknowledgment

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