

JOURNAL OF GERIATRIC EMERGENCY MEDICINE

Fall 2023 | Volume 4 | Issue 4

Article 1 | Original Research



Evaluation of a Community-Based Teaching Hospital's Geriatric Emergency Medicine Initiative

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ABSTRACT

Introduction	To accommodate the complex healthcare needs of the rising geriatric population, Stamford Hospital's (SH) emergency department (ED) began a Geriatric Emergency Medicine Initiative (GEMI) in 2018 to improve our ED environment, practices, and focused assessments for our community-dwelling older adults.
Methods	This retrospective program evaluation describes SH's novel ED processes for at-risk older adults and compares GEMI and non-GEMI assessed patient outcomes using aggregate frequencies on throughput metrics such as length of stay (LOS), 72 hour and 30-day re-admission rates, and other outcomes of interest. Chi-square tests and group t-tests were used for all analyses with a p-value of 0.05 ($p < 0.05$) defining statistical significance.
Results	GEMI-assessed patients had a significantly lower 30-day all cause re-admission rate for fiscal year 2022 (readmission rate = 2%) when compared to the non-GEMI assessed cohort (readmission rate = 4.9%). GEMI-assessed patients were more likely to be admitted (25% vs 21%) and had a longer LOS in the ED observation unit but were less likely to return within 72 hours for a subsequent hospital admission (24% vs 28%, respectively).
Conclusion	SH's ED solidified its care pathway by creating the GEMI program with the goal of decreasing hospital admissions and reducing the LOS for at risk older adults. Successful implementation and care coordination by trained geriatric nurses optimized innovative system changes. These results are promising and reflect the substantial value the GEMI program offers to the communities we serve.

INTRODUCTION

The population of adults in the United States (US) aged 65+ is predicted to rise by 44% by 2040¹, outnumbering those younger than 18 by 2034 for the first time in US history.² Nearly 85% of those 65 and older are cited to be affected by at least one chronic health condition and 60% have two or more.³ Emergency departments (EDs) face a unique challenge due to the rising older adult patient population.⁴⁻⁶ In 2019, older adults age 65+ made up 45.4 visits per 100 persons in the ED, with the population of adults 75+ making up 59.8 visits per 100 persons and those 65+ in the US will reach over 72 million by 2030.^{7,8} Older adults require more resources, testing, treatments, and are more likely to be admitted to the general medical floors and the Intensive Care Units (ICU) when compared to younger populations.⁹ Geriatric syndromes, characterized as ailments with multifactorial etiologies, including delirium and impairments may affect activities of daily living and quality of life.^{7,11} Conditions frequently encountered in the ED among this population include neuropsychiatric disorders such as delirium, as well as falls, coronary disease, adverse drug effects related to polypharmacy, alcohol and substance abuse, abdominal

pain, and infections.¹² In addition, social problems, such as elder abuse and neglect, are often unrecognized or under-treated, which can lead to negative health impacts.^{11,13-16}

To improve care provision and competencies in treating older adults, many EDs in the US have revisited their models of care.^{9,12} The American College of Emergency Physicians (ACEP) together with the American Geriatrics Society, the Emergency Nurses Association (ENA), and the Society for Academic Emergency Medicine published the Geriatric Emergency Department (GED) Guidelines in 2014, which outlines ED accreditation and best practices for geriatric emergency care including staffing, transition of care, education programs, and new policies and protocols to reduce morbidity, mortality and re-admissions.¹⁷ The ACEP created the GED accreditation process in 2018 in order to create a tiered system of geriatric care competencies, and to provide assistance to GEDs in development of their programs.¹⁸ Criteria for any level of GED accreditation include staffing, education, policies and protocols, quality improvement, outcomes measures, equipment and supplies as well as physical environment augmentation. As of early 2023, there are a total of 253 accredited GEDs in the US, spanning from Level 1 to 3.^{9,17,19}

With hospitals increasingly establishing geriatric friendly EDs, robust evaluations have emerged in recent years.^{16,19-21} Depending on multiple factors, most report positive outcomes for healthcare systems, patients, as well as providers, with others finding limited benefit due to system level barriers or study design flaws.²²⁻²⁸ One systematic review evaluated the impact of interventions for older adults visiting the ED utilizing instruments to assess patient experience and satisfaction. Twenty-one studies met inclusion criteria; interventions spanning entire departments, including geriatric EDs and comprehensive geriatric assessment units, focused care coordination with discharge planning and referral for community services were associated with improved patient satisfaction. In addition, perception of care and quality improved with the provision of assistive listening devices and pharmacist involvement.²⁹

Similarly, single-site evaluations have reported an increase in satisfaction of ED patients older than 65, improvements in communication and efficiency among physicians and other ED staff³⁰ and re-admission rates.²⁵ A pragmatic trial evaluated a GED Intervention model for adults aged 70 years and older, involving educational programs for ED nurses and targeted geriatric assessments to streamline care for frail older adults.³¹ In the ED, the team provided swift, targeted geriatric assessments for frail older persons living in the community and, through careful interdisciplinary, management and planning, aimed to prevent unnecessary admissions. The patients involved in the intervention were more likely to be discharged with shorter LOS in the ED, and there was a modest reduction in costs per ED presentation, demonstrating the general effectiveness of these types of initiatives.³²

Our hospital achieved a Level 3 GED accreditation in 2018, signifying excellence in older adult care as represented by one or more geriatric-specific initiatives that are reasonably expected to elevate the level of elder care in one or more specific areas. The purpose of this study is to retrospectively examine patient and population level outcomes of the GED, as well as discuss successes, barriers, and next steps for the future of the initiative to inform providers aiming to establish or build a patient centered environment for older adults visiting the ED.

METHODS

Intervention

Stamford Hospital (SH) a 305-bed community-based teaching hospital serves a diverse patient population with 15% of the city's population aged 65 and older as of 2020. Stamford residents aged 65+ grew by 4% from 2010 to 2020, resulting in the largest age bracket increase compared to those of younger age.³³ SH's ED did not have a solidified care pathway for geriatric patients prior to 2018. With increasing attention being paid to the needs of older adults, as well as ED staff acknowledging the need to improve our care practices and procedures to accommodate our community dwelling older adults' health care

needs, SH implemented a collaborative multi-professional program in 2018, the Geriatric Emergency Medicine Initiative (GEMI).

It has been previously reported that GED interventions should include a composite of specific interventions rather than isolated strategies given the complexity of conditions presented by older adults as studies involving two or more interventions may be associated with the greatest effects on patient related outcomes.³⁴ As such, SH's GEMI team focuses on multi-faceted complex issues such as: frailty, depression, dementia and associated behavioral issues, falls, delirium, wound care, medication management, pain control, elder neglect and abuse, incontinence, placement assistance, caregiver burden and support, and palliative care/goals of care by implementing a Multi-Professional Collaborative Team (Figure 1).

Figure 1: GEMI Liaison Multi-Professional Collaborative Team



Legend: GEMI Liaison Multi-Professional Collaborative Team. Abbreviations: GEMI: Geriatric Emergency Medicine Initiative; PCP: Primary Care Provider.

GEMI Nurse Liaison Education and Training

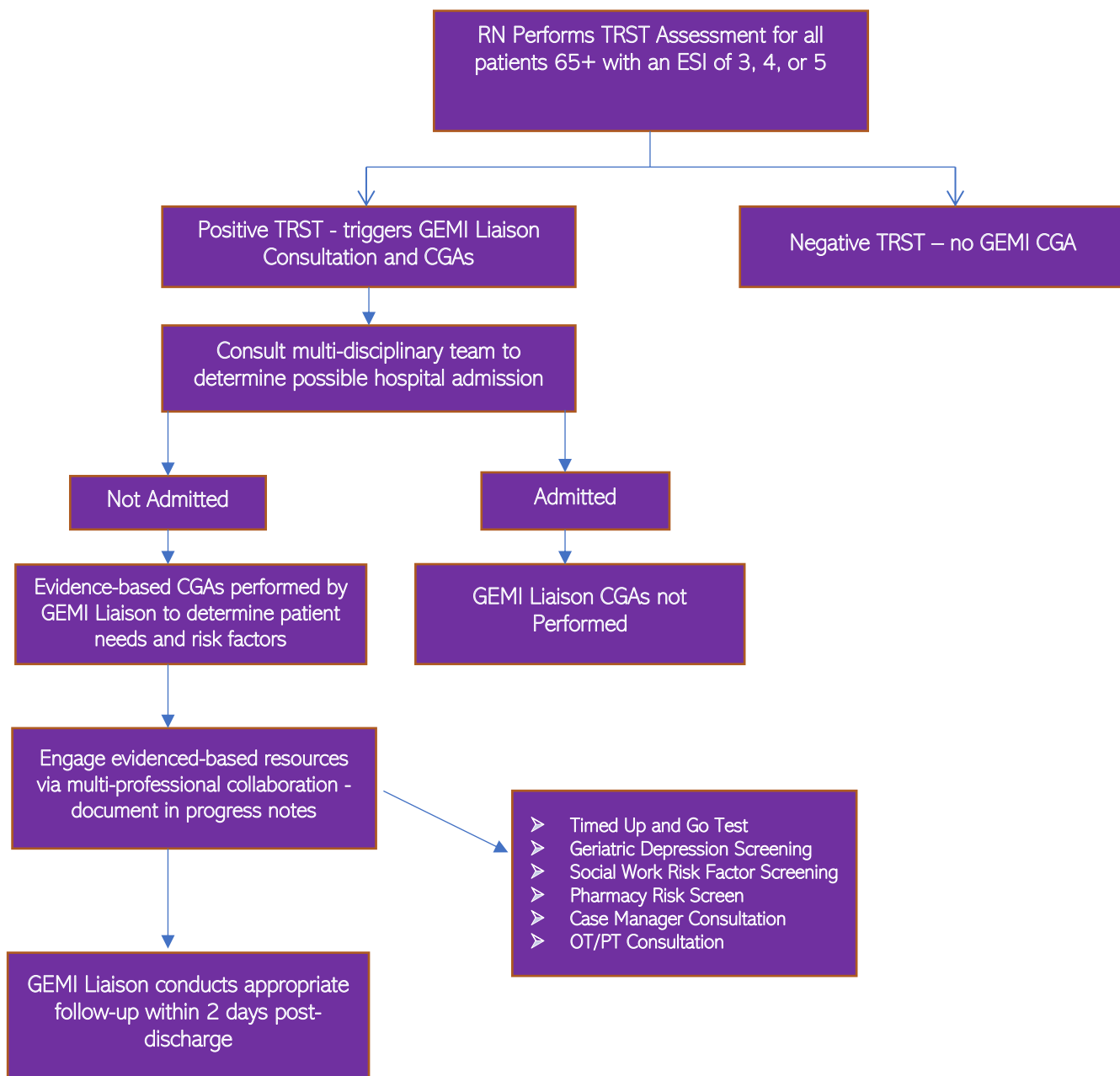
To become a GEMI liaison, experienced RNs complete the ENA's 6-week program on geriatric emergency medicine. The program includes one week at Northwestern Memorial Hospital, where the GED Initiative was first established,³⁵ completing the Geriatric Emergency Nursing Education (GENE) program and two-weeks of geriatric physician shadowing in both the inpatient and outpatient settings. In addition, GEMI liaisons spend time learning about the GEMI guidelines' referral processes via a full day of clinical rotations with Physical Therapy, Case Management, Social Work, Pharmacy and Pain-Palliative staff.

Of importance, and similarly to existing literature, we found that nurse champions, defined as GEMI Liaisons at SH, were pivotal in implementation and continuation of the GEMI program.³⁶ Champions include staff that have a sense of pride about the program and willing to ensure every GEMI assessed patient is provided with appropriate care and follow-up. These champions are experienced staff in the health system, knowledgeable about the community and specific needs and have a history of implementing quality improvement projects for staff re-education or continuing education. At SH, two GEMI Liaisons are currently employed, working Monday-Friday, from 8AM-8PM.

GEMI Liaison Consultations

The SH GEMI workflow can be seen in Figure 2. During the program's hours of operation, all patients 65+ presenting to the ED with an Emergency Severity Index (ESI)³⁷ result of three, four, or five are assessed by a RN using the Triage Risk Screening Tool (TRST),^{38,39} cited in the GED guidelines as an assessment tool with proper reliability and validity.^{17,40-42}

Figure 2: Geriatric Emergency Medicine Initiative ED Process Flow at Stamford Health.



Legend: Geriatric Emergency Medicine Initiative ED Process Flow at Stamford Health. Abbreviations: CGAs: Comprehensive Geriatric Assessments, ED: Emergency Department, ESI: Emergency Severity Index, GEMI: Geriatric Emergency Medicine Initiative, OT: Occupational Therapy, PT: Physical Therapy, TRST: Triage Risk Screening Tool.

The TRST inquires about a history of cognitive impairment (poor recall or not oriented), difficulty walking / transferring or recent falls, number of medications, ED use in the previous 30 days or hospitalization within the last 90 days, as well as living alone and/or no available caregiver. If the TRST indicates the patient has two or more risk factors, a GEMI Liaison consultation is triggered, initiating appropriate assessments, patient-centered care, and follow-up.

Liaisons assess for delirium, depression, fall risk, functional status, high risk medications and a perform a social wellbeing assessment. If the patient is discharged from the ED, GEMI Liaisons follow-up with the patient within two days. In addition, in collaboration with the multi-disciplinary team, professional recommendations are made including whether the patient requires nutrition/weight loss support, or showing signs of failure to cope, sensory deficits, incontinence, medication issues or depression/low mood state. The overarching goal of these assessments and follow-up are to address the patient's specific needs, provide recommendations and discuss future plans of care to improve care coordination and outcomes for at-risk older adults.

DATA COLLECTION & STATISTICAL ANALYSIS

GEMI program metrics and throughput data are captured daily via SH's automated Tableau dashboard to display and track system-level metrics for the GEMI Program. Following Institutional Review Board approval, this data was exported as aggregate population level data, including the reports on all patients who did and did not receive a GEMI assessment from 2019 - 2022. Using this data, patients were grouped into the GEMI cohort if they had a GEMI assessment documented in their health records.

Primary outcomes of interest included comparing ED and inpatient LOS as well as ED re-admission rates. Bivariate chi-square tests of independence were used to compare categorical variables of interest with group t-tests used for continuous level variables. A p-value less than 0.05 indicated statistical significance.

RESULTS

Table 1 displays the throughput metrics of GEMI assessed patients versus non-GEMI assessed patients from 2019-2022. GEMI patients were significantly less likely to be admitted as inpatients (74% vs 78%), with more GEMI assessed patients admitted into the ED observation unit (25% vs 21%, $p < .0001$). Among the GEMI-assessed patients that returned to the ED within 72-hours, 136 (24%) were subsequently admitted to the hospital vs a 72-hour return and admitted rate of 30% for non-assessed patients ($p = 0.05$). GEMI-assessed patients had a longer LOS in the ED compared to non-assessed patients, but those GEMI-assessed patients that were admitted had a shorter hospital LOS (5.8 vs 6.1, $p = .20$).

Variable	Category	GEMI Count (%)	NON-GEMI Count (%)	p-value
Patient Admitted	Inpatient	2,168 (74.81%)	14,979 (78.28%)	<.0001
	ED Observation	730 (25.19%)	4,156 (21.72%)	
Patient Discharged	Home	5,589 (96.26%)	21,976 (95.44%)	0.02
	SNF	41 (0.71%)	176 (0.76%)	
	Others	176 (3.03%)	873 (3.79%)	
Return ED Visit Within 72 Hours	Discharged	417 (75.41%)	1,711 (71.26%)	0.05
	Admitted	136 (24.59%)	690 (28.74%)	
Average ED LOS (days), Mean (SD)	Inpatient & ED Observation	0.28 (0.03)	0.24 (0.02)	0.09
	ED Observation - Discharged Home	0.20 (0.01)	0.17 (0.02)	0.08

	ED Observation - Discharged to SNF	0.43 (0.30)	0.26 (0.04)	0.34
Average Hospital LOS (days), Mean (SD)	Inpatient	5.8 (0.40)	6.1 (0.20)	0.21
	ED Observation	1.8 (0.22)	1.5 (0.11)	0.07
	ED Observation - Discharged Home	1.2 (0.33)	0.9 (0.10)	0.11
Legend: Metrics and Outcomes for FY 2019, 2020, 2021 and 2022. Abbreviations: ED: Emergency Department, GEMI: Geriatric Emergency Medicine Initiative, LOS: Length of Stay, SNF: Skilled Nursing Facility, SD: Standard Deviation.				

Regarding all-cause re-admissions between groups, there were significant differences between GEMI assessed patients and non-assessed; overall, those previously admitted to the hospital without a GEMI assessment were more likely to have a re-admission within 30 days of their index visit (GEMI cohort = 4.3% vs non-GEMI cohort = 4.6%) (Table 2). In fiscal year (FY) 2022, only 2% of GEMI-assessed patients were readmitted compared to almost 5% in non-GEMI assessed patients. However, in FY 2020, more GEMI patients were readmitted compared to non-assessed, potentially due to the pandemic’s impact on older adults’ healthcare utilization.⁴³

Table 2. GEMI vs Non-GEMI Assessed Patients – 30-day All-Cause Re-admissions by Fiscal Year			
Fiscal Year	GEMI Count/total n (%)	NON-GEMI Count/total n (%)	% Absolute Difference (95% CI)
FY 2019 (n=587)	84/1,934 (4.3%)	503/10,851(4.6%)	0.29 (-0.7 – 1.3)
FY 2020 (n=561)	142/2,490 (5.7%)	419/9,151 (4.6%)	1.1 (0.1 – 2.1)
FY 2021 (n=653)	66/2,235 (2.9%)	587/10,261(5.7%)	2.8 (1.9 – 3.6)
FY 2022 (n=621)	40/1,986 (2.0%)	581/11,896 (4.9%)	2.9 (2.1 - 3.6)
P-values			
FY 2019 vs FY 2020 = <0.0001			
FY 2019 vs FY 2021 = 0.02			
FY 2019 vs FY 2022 = <.0001			
FY 2020 vs FY 2021 = <0.0001			
FY 2020 vs FY 2022 = <.0001			
FY 2021 vs FY 2022 = 0.02			
Legend: GEMI vs Non-GEMI Assessed Patients - 30-day All-Cause Re-admissions. Abbreviations: CI: Confidence Interval, GEMI: Geriatric Emergency Medicine Initiative, FY: Fiscal Year.			

ED primary diagnoses frequencies for GEMI assessed patients are displayed in Table 3. The most common diagnosis was for falls, with 1,467 or almost 50% of patients having this primary diagnosis. Gastrointestinal issues, urinary tract infections, and pain were the other top diagnoses for GEMI-assessed patients.

Table 3. Top 15 Primary Diagnoses for GEMI-assessed patients

Primary Diagnosis	Count (%)
Falls	1467 (49.3%)
C-Diff, Stomach Issues, Vomiting, Nausea	273 (9.2%)
Urinary Tract Infection	230 (7.7%)
Pain	173 (5.8%)
Difficulty breathing, COPD, Respiratory	170 (5.7%)
Urinary Incontinence (Urinary/Kidney)	134 (4.5%)
Headache, Migraine, Fever	118 (4.0%)
Psychological Health Concerns	104 (3.5%)
Altered Mental Status / Dementia	85 (2.9%)
Sepsis	66 (2.2%)
Weakness, Frailty	46 (1.5%)
Poisoning, Infection, AEs	43 (1.4%)
Anemia	27 (0.9%)
Cardiology	21 (0.7%)
NEC	16 (0.5%)
Legend: Top 15 Primary Diagnoses for GEMI-assessed patients. Abbreviations: AEs: Adverse Events, COPD: Chronic Obstructive Pulmonary Disease, GI: Gastrointestinal, NEC: Necrotizing Enterocolitis.	

DISCUSSION

The SH GEMI program recently received accreditation from ACEP as a Level 3 GED in 2020. Findings reveal that focused assessments for complex geriatric patient needs improved outcomes, including reduced 72 hour and 30-day re-admission rates. These results are promising as one of the main goals of the GED is to decrease hospital admissions for older adults to prevent common adverse effects from hospitalization, such as delirium and infections.¹⁷ ED LOS was longer for GEMI patients as robust assessments and discharge protocols are provided to facilitate the communication of relevant social and medical information to the appropriate individuals or caregivers, such as outpatient PCPs and specialists to prevent misinformation and dissatisfaction.^{17,44–46} Similarly, these findings are in line with previous evaluations including reducing hospital re-admissions, subsequent ED visits, and functional decline.⁴⁷⁻⁴⁹ The programs further success is highlighted through receipt of the Silver Source Award for dedication to improving outcomes for geriatrics in the Stamford community. Increases in the Geriatric ED Patient Experience Score increased from 87.7 to 91.2 (a 3.5-point improvement) since the implementation in 2018, with Liaisons seeing over 5,000 patients since implementation.

SH's team-based care program includes collaboration between medical professionals including community physicians and local short and long-term living facilities, arranging for follow-up, and improved discharge summaries all of which led to reduced hospital re-admissions and improved gaps in communication, also found in other studies of similar nature.⁵⁰ Importantly, a national survey of select GED programs found the requirement for additional personnel and staff was one of the major resources that was both lacking but also necessary to improve patient- and family-centered outcomes for this population.⁵¹

Comparable accomplishments have also been reported with a similarly-sized community hospital in our state developing a Geriatric Emergency Medicine System (GEMS) to meet the needs of geriatric patients in their ED.³⁰ The GEMS program involves comprehensive care for the geriatric patient by a GEMS nurse educated on geriatric care, who assesses the needs of the patient, regularly checks on them, and works to improve patient comfort throughout their ED stay. Over the course of the first year of this program, satisfaction for those ED patients older than 65 increased by 12.25%. There were also self-reported improvements in communication and efficiency among physicians and other ED staff.

A recently published systematic review evaluating interventions aimed to improve geriatric patients' experience in the ED reported department-wide interventions, including GED and comprehensive geriatric assessment units, focused care coordination with discharge planning and referral for community services, were associated with improved patient experiences, medication knowledge and short-term outcomes.²⁹ Our study reports overlapping results, with re-admissions being significantly lower for those in the GEMI assessed cohort when compared to those not in the GEMI assessed cohort.

It is important to note that barriers to initiating this program include intensive staff educational programs and specific, evidence-based protocols for geriatric patients have been recommended by accrediting agencies,^{14,52-54} as well as infrastructure changes and evidence-based suggestions for redesign efforts to further improve satisfaction and health outcomes for these patients.^{23,24,31} To overcome these challenges, hospitals need a dedicated team of healthcare professionals trained in geriatric medicine, protocols tailored for elderly patients, and a patient-centered approach that includes their families and caregivers in the decision-making process.

Regular staff training, interdisciplinary collaboration, and continuous evaluation of the initiative's effectiveness are also essential components of successful geriatric emergency medicine programs. Indeed, a cornerstone of SH's and any GED is the multi-disciplinary care team consisting of trained ED staff, inpatient care staff, and outpatient follow-up staff. This approach is intended to increase efficiency in the ED by identifying patients that require in-patient versus outpatient care as well as coordinating care with both caregivers and the appropriate community organizations for the continuation of care. An ongoing programmatic barrier is that the GEMI team at SH does not include weekend coverage, indicating a lapse in coverage for an average of 104 days per year.

The gap in geriatric specific care on the weekends is noteworthy, as cited by other studies on the cost-benefits and outcomes of programs such as the GEMI program. One study found the risk of delirium during hospitalization was significantly higher for patients with a prolonged ED LOS, suggesting specialized geriatric preventive care practices for reducing delirium incidence should begin in the ED.⁵⁵ Rogers et al. assessed operational, staffing, and financial structures; and identified challenges and perceived successes of implementing geriatric-orthopedic systems of care.⁵⁶ Overcrowding in the ED with longer waiting times and postponed admissions is cited to affect not only the health of at-risk older adults but also the department workflow at the ED, potentially reducing the resources older adult patients require.^{15,21,57,58} Although the preliminary success of SH's program is apparent, increased coverage is needed to fully address our geriatric population's needs.

Limitations

Limitations of this study include the descriptive and aggregate nature of the study design at a single institution. Comparisons were not conducted for those who were and were not assessed on

individual level outcomes. Causality cannot be established, although data was compared across the four years of program existence. In addition, these results are dependent on the successful implementation of department wide geriatric intervention as well as availability of trained geriatric nurses, optimizing system changes and innovating hospital resources for older adults.

CONCLUSION

This study investigated the differences in outcomes between older adults who visited the ED and received a GEMI assessment on the association with pivotal program metrics. Those receiving a GEMI assessment had a significantly lower risk for re-admission to the hospital with a longer ED observation unit stay. The time liaisons and multi-professional care teams take to ensure proper assessment and follow-up may impact ED LOS. GEMI assessments, identifying at risk patients for future decline adds substantial benefits when patients visit the ED and are at risk for admission or negative outcomes. Additionally, patient level outcomes research and randomized controlled trials should be conducted to investigate the impact of system wide innovations for older adults on specific disease states. This study adds to the gap in literature regarding the pivotal need for ED augmentation to support the rising geriatric patient population and respective complex healthcare needs.

DECLARATIONS

Ethics Approval and Consent to Participate

The requirement for informed consent was waived by the Stamford Hospital's Institutional Review Board of record as the study collected and analyzed scope of practice metrics retrospectively. All data analyzed was aggregate population level data without any patient level data extraction; therefore, the researchers cannot identify any individuals.

Consent for Publication

This research was reviewed and approved as exempt in nature by Stamford Hospital's Institutional Review Board of record in the United States of America (reference number: WCG IRB Work Order #1-1513393-1). All data provided for this study are treated confidentially and the results are presented in aggregate; no protected health information was collected, nor can any individuals be identified through this research.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are not publicly available and can be found following this link: <https://www.openicpsr.org/openicpsr/project/192022/version/V1/view>, Hartnett, Josette. Evaluation of Stamford Hospital's Geriatric Emergency Medicine Initiative. Ann Arbor, MI: Inter-university Consortium for Political and Social Research OPENICPSR, 2023-05-29. <https://doi.org/10.3886/E192022V1>

KEYWORDS

Geriatric emergency department, quality improvement, emergency department innovation, patient-centered care, outcomes research

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

AUTHOR CONTRIBUTIONS

JH is a major contributor to writing the manuscript. JH and SJR interpreted the statistical analyses. SJR and IMB supported writing the manuscript. JH was responsible for data collection. All authors read and approved the final manuscript and provided final approval for the article to be published.

ACKNOWLEDGMENTS

The authors would like to acknowledge Dr. Tzivia Moreen and the multi-disciplinary GEMI Program staff, who work tirelessly to care for our older adult patient population. The program would not be a success without your expertise and compassion. The authors would also like to acknowledge Shweta Karki, MPH, and the Stamford Hospital Business Analytics Department for their data collection and analysis efforts.

Sponsor Role: There were no sponsors for this work.

Funding: Funding was not used for any aspect of this research or published article.

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