

**ORIGINAL RESEARCH**

Injury Prevention

# The utility of emergency department physical therapy and case management consultation in reducing hospital admissions

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MSB is co-first author having contributed equally with KLG as first author.

**Abstract**

**Background:** A significant number of patients who present to the emergency department (ED) following a fall or with other injuries require evaluation by a physical therapist. Traditionally, once emergent conditions are excluded in the ED, these patients are admitted to the hospital for evaluation by a physical therapist to determine whether they should be transferred to a sub-acute rehabilitation facility, discharged, require services at home, or require further inpatient care. Case management is typically used in conjunction with a physical therapist to determine eligibility for recommended services and to aid in placement.

**Objective:** To evaluate the benefit of using ED-based physical therapist and case management services in lieu of routine hospital admission.

**Methods:** Retrospective, observational study of consecutive patients presenting to an urban, tertiary care academic medical center ED between December 1, 2017, and November 30, 2018, who had a physical therapist consult placed in the ED. We additionally evaluated which of these patients were placed into ED observation for physical therapist consultation, how many required case management, and ED disposition: discharged home from the ED or ED observation with or without services, placed in a rehabilitation facility, or admitted to the hospital.

**Results:** During the 12-month study period, 1296 patients (2.4% of the total seen in the ED) were assessed by a physical therapist. The mean age was  $75.5 \pm 15.2$  and 832 (64.2%) were female. Case management was involved in 91.8% of these cases. The final patient disposition was as follows: admission 24.3% (95% CI = 22.1–26.7%), home

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discharge with or without services 47.8% (95% CI = 45.1–50.5%), rehabilitation (rehab setting 27.9% (95% CI = 25.6%–30.4)). The median (interquartile range) time in observation was 13.1 (6.0–20.3), 9.9 (1.8–15.8), and 18.4 (14.1–24.8) hours for patients admitted, discharged home, or sent to rehabilitation ( $P < 0.001$ ). Among the 979 patients discharged home or sent to rehabilitation, 17 (1.7%) returned to the ED within 72 hours and were ultimately admitted.

**Conclusion:** Given that the standard of care would otherwise be an admission to the hospital for 1 day or more for all patients requiring physical therapist consultation, an ED-based physical therapy and case management system serves as a viable method to substantially decrease hospital admissions and potentially reduce resource use, length of hospital stay, and cost both to patients and the health care system.

#### KEYWORDS

case management, hospital admission reduction, observation units, pathways, physical therapy, rehabilitation placement

## 1 | INTRODUCTION

Given the cost of health care, providing cost-effective high-quality care is increasingly necessary, often by streamlining existing services to decrease expenses. In particular, there is scrutiny on the part of insurers to reduce short-term hospitalizations.<sup>1</sup> Emergency departments are using observation units as efficient modalities for implementing clinical pathways that allow for more rapid evaluation, testing, treatment, and disposition of patients while avoiding inpatient hospital admission.<sup>2–4</sup>

A significant number of patients who present to the ED may be unsafe to return home in their current state—whether it be from a fall, deconditioning, or illness—and could benefit from evaluation by a physical therapist. Traditionally, once emergent conditions requiring inpatient hospitalization and treatment were excluded in the ED, these patients were admitted to the hospital primarily for evaluation by a physical therapist. The physical therapist would then determine whether they would benefit from ongoing rehabilitation services at a rehabilitation facility, rehabilitation with home-based services, or whether they could be safely discharged back to their home. Case management is typically used in conjunction with physical therapy to determine eligibility for recommended services and to aid in placement. We instituted a novel ED-based physical therapist consult service to avoid hospital admission when possible. Because physical therapist evaluation typically occurs as an inpatient, the use of an ED observation unit as a venue for physical therapist evaluation and subsequent placement into rehabilitation or provision of home rehabilitation services is not well described in the current literature.

In this study, we present the results of an assessment of the initial outcomes of patients evaluated by ED-based physical therapists. The goal of this study was to demonstrate that this novel clinical pathway is safe, viable, and reduces hospital admission in this cohort of patients.

## 2 | METHODS

We examined patients presenting to our ED between December 1, 2017 and November 30, 2018, who had a physical therapist consult placed in the ED, in an urban, tertiary care academic medical center ED with an annual volume of ~55,000 patients. We established an ED-based physical therapist consult service in 2012. This, coupled with pre-existing ED case management, enables rapid evaluation and disposition of patients who otherwise would have required inpatient observation or admission for their management.

At the conclusion of a patient's ED evaluation, once acute medical conditions have been addressed or excluded and the patient is deemed medically cleared for discharge, a bedside ambulation trial is performed. If the patient is unable to satisfactorily complete this, a physical therapist and case management consult is placed. Consults were placed at the discretion of the emergency physician team that often consisted of a primary resident, senior resident, and attending physician. Patients with an anticipated prolonged ED length of stay were placed in observation status and were clinically re-evaluated by an attending physician every 24 hours. If a medical issue evolved during the patient's ED stay and if they were deemed no longer safe for discharge, or if on re-evaluation the patient was felt to no longer require a physical therapy evaluation, they were removed from observation and their disposition was adjusted accordingly.

The physical therapist makes recommendations regarding patient suitability for rehabilitation placement or home rehabilitation services. Case management facilitates these recommendations by submitting clinical information to patients' insurance providers to facilitate placement and identifies which patients will require inpatient admission for insurance to reimburse rehabilitation placement. Case management also works with patients and their family members to determine eligibility for services and arrange for the best

options for families based on insurance coverage and their financial resources.

Patients were excluded if the physical therapist consult was not completed. Reasons for incomplete consults included changes in disposition such as identification of a medical problem warranting admission, clinical re-evaluation determining that a consult was no longer needed, the patient refusing to work with the physical therapist, and leaving against medical advice or eloping (Figure 1).

We extracted de-identified patient data from the electronic medical record, including patient demographics, Emergency Severity Index, chief complaint, consults placed, length of stay in the ED and inpatient settings, time spent in ED observation, and ED disposition. ED dispositions included discharges to home with home physical therapy or visiting nurse association (VNA) services, discharges to home without services, transfers to rehabilitation facilities, or admissions to the hospital. Patient disposition was coded using the preliminary recommendations left by physical therapist and case management as recorded in the electronic medical record. In cases where a physical therapist recommended a course of action that a patient did not comply with, we retained the original recommendation. Chief complaints were selected by the triage nurse from a list of pre-selected categories. For the purposes of this study, these were sub-categorized into the following groupings: Fall, Musculoskeletal, Back pain, Neurologic, Cardiopulmonary, Gastrointestinal, Generalized Weakness, and Other (Supporting Information Table S1).

To assess the safety of our intervention, we additionally identified patients that re-presented to the ED within 72 hours and examined their disposition during their re-presentation to ascertain whether these patients had been properly assessed and dispositioned during their initial presentation.

A physical therapist was available as a consult service in the ED from 8 am–5 pm 7 days a week. Depending on daily staffing availability, a dedicated physical therapist was assigned to the ED or the ED assignment was split between multiple floor physical therapists. ED consults were prioritized over inpatient evaluations, because ED physical therapist evaluations constitute possible barriers to discharge. Consults were placed electronically via the ED electronic medical record with a time stamp as well as a posted forum for physical therapist to communicate their recommendations to the team in real time (Figure 2). Case management services were available 7 am–10 pm Monday through Friday and 7 am–7 pm on weekends and holidays. When consults for physical therapist and case management were placed off-hours, this was noted on a shared electronic medical record space so that when these services returned, they were immediately able to see those patients waiting in the ED for their recommendations and professional services.

Data were summarized overall and by disposition category. Statistical comparisons across disposition category were performed with a  $\chi^2$  test for categorical variables. ED length of stay was not normally distributed, so a Kruskal-Wallis test was performed to compare ED length of stay across disposition categories.

### The Bottom Line

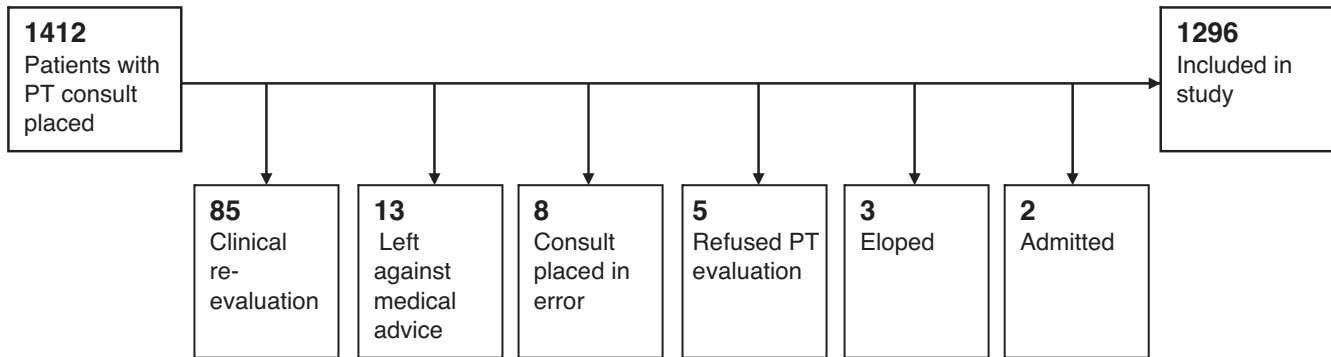
Physical therapy in the emergency department is a unique concept that may result in improved and expedited patient care, reduction in hospital admissions, and costs to patients and the health care system. In this study of 1296 ED patients receiving physical therapy consultation, 979 (76%) were able to be discharged home or sent to rehabilitation. Only 17 (1.7%) returned to the ED within 72 hours.

## 3 | RESULTS

In total, 1412 patient encounters were identified where a physical therapist consult was placed in the ED over the study period. Of these, 108 physical therapist consults were not completed, and 8 consults were placed in error, leaving 1296 patients (2.4% of the total seen in the ED during the study period) to be included in the study (Figure 1). A total of 359 patients were discharged to rehabilitation (27.7%), 389 were discharged home with additional services (30.0%), 231 were discharged home without services (17.8%), and 317 (24.5%) were admitted. The most common chief complaints were Fall (40.0%) and Musculoskeletal (19.4%), followed by Neurologic (12.2%), Back Pain (11.7%), Other (5.3%), Weakness (3.9%), Cardiopulmonary (3.7%), and Gastrointestinal (3.7%). 64.2% of patients were female, the average age was 74, 91.8% had a case management consult placed, and 81.0% spent time in ED observation status (Table 1).

The ED length of stay varied significantly by disposition group (Figure 3,  $P < 0.0001$ ). Among patients admitted to the hospital the median ED length of stay was 24.3 hours. For those discharged home without services the median ED length of stay was 16.8 hours, for those discharged home with services the median ED length of stay was 19.1 hours, and for those discharged to a rehabilitation facility the median ED length of stay was 28.6 hours. Case management consultation varied significantly by disposition category ( $P < 0.0001$ ). Case management was consulted for 100% of patients transferred to rehab, 97.7% of patients discharged home with services, 87.1% of patients that were admitted, and in 75.8% of patients discharged home without services (Figure 3).

Data were further analyzed by chief complaint category subgroups (Table 2). Emergency Severity Index level, sex, case management consult, and final disposition were compared. Approximately 85% of patients with a fall-related chief complaint or those categorized as "other" spent time in observation status, compared to about 75% of patients with a chief complaint that was cardiopulmonary or back pain. Patients with a chief complaint of gastrointestinal illness or "other" had the highest rate of being admitted (33% and 42%, respectively). Patients with cardiopulmonary concerns, gastrointestinal illness, and neurologic chief complaints had the highest proportion of discharges home with services (42%, 38%, and 36%, respectively). Patients with back pain-related chief complaints had the highest proportion of


**FIGURE 1** Exclusion criteria

### Physical Therapy Consult: Completed 13:43

PT evaluation completed, formal assessment can be found in online medical record.  
 Recommending rehab as pt is high fall risk at home when performing ADLs and ambulating

### Case Management Consult: Completed 16:25

Pt may d/c to \_\_\_\_ Rehab.  
 RN to RN report: (XXX)-XXX-XXXX  
 Script for analgesics to go with pt. If applicable please medicate prior to d/c as medications are not ordered until patient gets to rehab, then takes 4-6 hours for delivery

**FIGURE 2** Example of physical therapist and case management recommendations from the electronic medical record. ADL, activities of daily life

discharges to home without services at 27%. Patients with chief complaints categorized as fall and general weakness had the highest proportion of discharge to rehabilitation (35% and 37%, respectively). Case management was consulted most frequently in patients with falls (95%), weakness (94%), and cardiopulmonary (94%) chief complaints. Patients with a fall-related chief complaint had the highest mean age (79), whereas patients with back pain and musculoskeletal chief complaints had the youngest mean age (70). Patients with neurologic and musculoskeletal chief complaints had the highest number of Emergency Severity Index 1 acuity, constituting 7.0% and 4.4% within each category. Back pain-related chief complaints had the highest proportion of Emergency Severity Index 4 acuity, at 9.3%. Patients with cardiopulmonary chief complaints were the most likely to be female (72.9%).

Four patients who were discharged home without additional services re-presented to the ED within 72 hours and among them, 3 were admitted. Among those discharged home with services, 33 re-presented and 13 were admitted. Of those discharged to rehabilitation facilities, 6 re-presented and 1 was admitted (Table 3). In total, 1.3% of patients discharged home without services re-presented and were admitted, 3.3% of patients discharged home with services re-presented and were admitted, and 0.3% of patients discharged to rehabilitation re-presented and were admitted.

Chart review was performed on the 17 patients who re-presented within 72 hours and were ultimately admitted following discharge home, home with services, or to rehab. Six of the 17 (35%) were recommended for rehabilitation placement on their initial presentation but

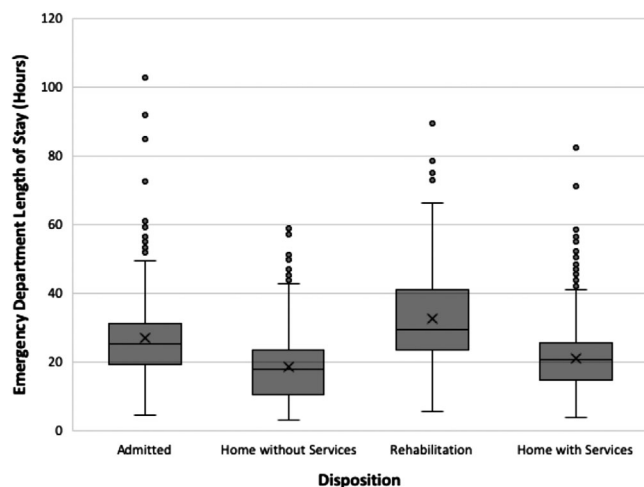
they refused placement at that time. Chief complaints in this cohort at the time of re-presentation included fall, chest pain, constipation, and respiratory illness. Seven patients (41%) returned for a seemingly unrelated chief complaint. These included seizures, melena, agitation, depression, change in goals of care, diarrhea, and called back for positive blood cultures. The remaining 4 patients (24%) returned with chief complaints of delirium, fall, dizziness, and syncope. These 4 patients had been discharged home with services and may represent a category where there is room for improvement in their original disposition.

## 4 | LIMITATIONS

There are a number of limitations to this study. The practice patterns in this single center may not be generalizable. Individual charts in their entirety were only reviewed in select cases and it is possible that misclassified data may not have been identified. The ease of access of physical therapist consults in the ED may have resulted in more physical therapist consults than would be obtained if a consult required inpatient admission. Although this study evaluates disposition as is dictated by the physical therapist evaluation, there are a number of instances where an inpatient hospital admission or discharge home are driven by factors external to the physical therapist evaluation which we were unable to account for. Whereas this study was intended to define a clinical pathway to minimize hospital admissions, a significant number of patients were ultimately admitted to the hospital. Further study will be required to ascertain how often this stemmed from physical therapist

**TABLE 1** Descriptive summary of visits with a physical therapy consult placed in the emergency department, December 1, 2017–November 30, 2018

Visit characteristic	Number (n = 1296)	Percent
Emergency Severity Index level		
1	40	3.1
2	433	33.4
3	785	60.6
4	38	2.9
Sex		
Female	832	64.2
Male	464	35.8
Case management consult	1190	91.8
Time spent in ED observation	1050	81.0
Disposition		
Admitted	317	24.5
Home without services	231	17.8
Home with services	389	30.0
Rehabilitation	359	27.7
Chief complaint		
Fall	519	40.0
Musculoskeletal	252	19.4
Neurologic	158	12.2
Back pain	151	11.7
Other	69	5.3
Weakness	51	3.9
Cardiopulmonary	48	3.7
Gastrointestinal	48	3.7
Age (mean, SD)	74	15.2



**FIGURE 3** Comparison of patients with a physical therapy consult placed in the ED across disposition categories

recommendations, inability to place patients in a timely manner, or as was necessitated by concurrent medical management. This study was performed in a state with comprehensive insurance coverage provided to a significant majority of patients, which may limit generalizability. Last, our follow-up data that helps demonstrate safety of this pathway is limited to return visits to our institution. It is possible that some patients went to other hospitals following discharge from our ED, but we believe that given the limited adverse outcomes found in the sampling of bounce-back patients who returned to our hospital, we should expect similar outcome in patients who may have sought subsequent care elsewhere.

## 5 | DISCUSSION

A significant percentage of patients presenting to this ED (2.4%) ultimately received a physical therapist consult in the ED. These were patients deemed medically stable for discharge by an emergency physician but felt to be unsafe for discharge in their current functional state and were thought to require increased services. These patients were predominantly elderly with the most common chief complaints categorized as falls, musculoskeletal, back pain, or neurologic in nature. In total, 748 patients were discharged either to a rehabilitation facility or home with additional services. We identified a total of 979 patients who avoided hospital admission using this clinical pathway. Assuming that the patients included in this study would otherwise be admitted solely for physical therapist and case management evaluation and placement if following traditional protocol, this constitutes a significant proportion of saved inpatient hospital admissions. Moreover, by examining patients re-presenting to the ED within 72 hours of discharge we found relatively low bounce-back rates, indicating that these patients are being safely and properly dispositioned from the ED.

Eighty-one percent of the study population was designated as having spent time in ED observation status. Observation units are a burgeoning setting for high-quality and cost-effective care. They are less expensive compared to inpatient hospitalization in treatment of specific conditions.<sup>5,6</sup> Observation units are increasingly used, with over one-third of U.S. EDs housing an observation unit and ~2% of hospital visits involving admission to an observation unit.<sup>7,8</sup> Although few studies reference the provision of physical therapist services in an observation unit setting, the use of physical therapist in an observation unit as a means of rapidly and safely dispositioning patients who require rehabilitation services is not well described in the literature.<sup>9,10</sup> The specific intervention of physical therapist evaluation and rehabilitation placement is one that is well-suited to an observation unit setting; it can be accomplished in a time-sensitive fashion and uses the framework of case management and physical therapist services that often already exist in or are accessible by the ED.

The benefits of a rapid disposition and avoidance of the harms of prolonged hospital stays are both self-evident and well-described with prior studies demonstrating that prolonged wait times to transfer to rehabilitation facilities can result in prolonged rehabilitation stays, increased odds of in-hospital complications such as development of urinary tract infections, pneumonia, or delirium.<sup>11–14</sup>

**TABLE 2** Descriptive summary of visits with a physical therapy consult placed in the ED, stratified by chief complaint December 1, 2017–November 30, 2018

Visit characteristic	Number (%) within each chief complaint							
	Fall (n = 519)	Back pain (n = 151)	Cardiopulmonary (n = 48)	Gastrointestinal (n = 48)	Musculoskeletal (n = 252)	Neurologic (n = 158)	Weakness (n = 51)	Other (n = 69)
Emergency Severity Index Level								
1	17 (3.3%)	0 (0%)	1 (2.1%)	0 (0%)	11 (4.4%)	11 (7%)	0 (0%)	0 (0%)
2	208 (40.1%)	38 (25.2%)	25 (52.1%)	10 (20.8%)	38 (15.1%)	82 (51.9%)	17 (33.3%)	15 (21.7%)
3	291 (56.1%)	99 (65.6%)	22 (45.8%)	37 (77.1%)	190 (75.4%)	64 (40.5%)	33 (64.7%)	49 (71%)
4	3 (0.6%)	14 (9.3%)	0 (0%)	1 (2.1%)	13 (5.2%)	1 (0.6%)	1 (2%)	5 (7.2%)
Male sex	169 (32.6%)	52 (34.4%)	13 (27.1%)	21 (43.8%)	97 (38.5%)	60 (38%)	23 (45.1%)	29 (42%)
Case management consult	491 (94.6%)	132 (87.4%)	45 (93.8%)	44 (91.7%)	223 (88.5%)	144 (91.1%)	48 (94.1%)	63 (91.3%)
Time spent in ED observation	440 (84.8%)	114 (75.5%)	36 (75%)	37 (77.1%)	199 (79%)	123 (77.8%)	42 (82.4%)	59 (85.5%)
Disposition								
Admitted	115 (22%)	40 (26.5%)	12 (25%)	16 (33.3%)	50 (19.8%)	41 (25.9%)	14 (27.5%)	29 (42%)
Home without services	69 (13.3%)	41 (27.2%)	9 (18.8%)	8 (16.7%)	58 (23%)	30 (19%)	8 (15.7%)	8 (11.6%)
Home with services	153 (29.5%)	36 (23.8%)	20 (41.7%)	18 (37.5%)	74 (29.4%)	57 (36.1%)	10 (19.6%)	21 (30.4%)
Rehabilitation	182 (35.1%)	34 (22.5%)	7 (14.6%)	6 (12.5%)	70 (27.8%)	30 (19%)	19 (37.3%)	11 (15.9%)
72-h bounce-back resulting in hospital admission	19 (8.6%)	3 (3.9%)	3 (10.3%)	3 (11.5%)	2 (1.5%)	7 (8.0%)	4 (22.2%)	2 (6.9%)
Age, mean (SD)	79 (13)	70 (17)	76 (14)	73 (16)	70 (16)	72 (16)	73 (13)	73 (13)

**TABLE 3** Descriptive summary of visits in which the patient returned within 72 h

Original disposition	Number (%) returned within 72 h	Number (%) resulting in admission
Home without services (n = 231)	4 (1.7%)	3 (1.3%)
Home with services (n = 389)	33 (8.5%)	13 (3.3%)
Rehabilitation (n = 359)	6 (1.7%)	1 (0.3%)

A significant proportion of our study population involved older adults who have fallen. Falls are the leading cause of fatal and non-fatal injuries among adults aged  $\geq 65$  years.<sup>15</sup> Thirty-five percent of community-dwelling individuals over age 65 will fall every year and up to 10% of falls in community-dwelling older persons result in significant injury.<sup>16</sup> Recurrent falls are associated with increased mortality.<sup>16</sup> Physical therapist evaluation and intervention has been shown to decrease the number of falls and fall-related ED visits.<sup>16,17</sup>

Physical therapist evaluation in the ED has been previously described in a variety of contexts.<sup>9,18–26</sup> physical therapists are often able to provide more specific diagnoses to patients, spend more time on patient education, streamline outpatient follow-up by performing an initial evaluation, and provide patients with expected symptom trajectory, instructions on activity modification and home exercise techniques.<sup>19,22</sup> In particular, ED-based physical therapists can aid in safety evaluation and disposition or discharge planning.<sup>18,19,23,24</sup>

In some instances, evaluation in the ED by physical therapists has been associated with decreased wait times and decreased lengths of stay.<sup>19,21,22</sup> The addition of physical therapists to the ED has been associated with increased patient satisfaction.<sup>18,19,22,27</sup> physical therapist inclusion in the ED is also associated with high levels of satisfaction among emergency physicians and staff.<sup>19,21,25</sup> To our knowledge, this study is the first of its kind to describe a robust clinical pathway where physical therapist evaluation in an observation unit can be used to expedite rehabilitation placement and avoid hospital admissions.

## 6 | CONCLUSIONS

Given that the standard of care in many institutions would be an admission to the hospital for all patients requiring physical therapist and case management consultation, we believe that an ED-based physical therapy and case management system serves as a viable method to substantially decrease hospital admissions and potentially reduce cost both to patients and the health care system.

## AUTHOR CONTRIBUTIONS

KLG and MSB wrote the first draft. All authors reviewed and edited multiple revisions. KLG and MSB take responsibility for the paper as a whole.

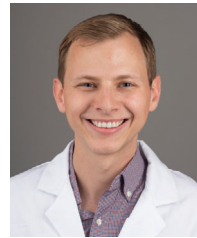
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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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