Administration of Emergency Medicine

AN EMERGENCY DEPARTMENT-INITIATED, WEB-BASED, MULTIDISCIPLINARY APPROACH TO DECREASING EMERGENCY DEPARTMENT VISITS BY THE TOP FREQUENT VISITORS USING PATIENT CARE PLANS

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□ Abstract—Background: Many patients present to the Emergency Department (ED) for multiple visits. Whatever the cause, assuring the highest quality of care is difficult in the ED. Objectives: We sought to implement a web-based, ED-initiated, multidisciplinary program to improve patient care and reduce frequent visits to the ED. Methods: The top 50 ED frequent visitors were identified and care plans were constructed. Care plans consist primarily of a summary of the patient's pertinent history and any psychosocial issues that can contribute to frequent use of the ED, and recommend treatment plans for these patients. Results: During the study period, ED visits by the top 50 chronic frequent visitors ranged from 88 to 98 visits/month and 28 to 31 admissions/month. As of January 2007, the top 50 frequent visitors had 94 ED visits/month (1,129 visits/year) for 2.2% of the total census, and 31 admissions/month (372 admissions per year) for approximately 3.3% of the total admissions. Each frequent visitor has approximately 22.6 visits/year (range from 11 to 41) and 7.3 admissions/year (range from 0 to 20). By May 2008, the top 50 frequent visitors had a decrease to 88 visits/month (1,059 visits/year) and 28 admissions/month (340 admissions/year), with each frequent visitor having 21.2 visits/year and 6.8 admissions/year. Social determinants included psychiatric disease (36%), substance abuse (22%), malingering (20%), medication noncompliance (16%), and unstable housing (10%). Conclusions: There was a trend toward a decrease of monthly ED visits by the top 50 ED frequent visitors, but no effect on the rate of admissions. Based on these preliminary data and the relative ease of integration into the system, this project shows the potential to begin to address the problem of chronic ED use with patient care plans. © 2013 Elsevier Inc.

□ Keywords—care plans; frequent visitors; web-based

INTRODUCTION

Frequent users of Emergency Department (ED) services are a well-studied subset of the ED patient population. These patients are typically socially disadvantaged and can present to the ED for multiple visits, the origins of which can span a myriad of pathologies and psychosocial issues (1–3). Regardless of the motivation to use ED services, their visits represent an undesirable pattern of service use. It has been documented that frequent users high utilization rates of ED services account for a disproportionate amount of the total ED workload and contribute to overcrowding (1,4). There is also the perception that frequent visitors use of ED services can be inappropriate. This patient population can serve as a source of frustration to the ED Physician, as the

ability to provide appropriate care to these patients is limited due to the frequent users' many complex needs, fragmented network of care, and episodic nature of ED visitations.

The exact definition of frequent use of the ED is subject to debate, but identification of these patients can permit the use of targeted interventions to meet their complex health care needs. Several hospital-based comprehensive case management programs designed to target the frequent user have shown varied but promising results by providing patients with more appropriate and consistent medical and social services (5,6). In addition, many hospitals may not have the resources to begin funding such intensive case management programs.

Objectives

The goal of this study was to measure the impact of a novel, web-based, ED-initiated, multidisciplinary program using care plans on chronic ED frequent visitors. We believed this type of model would be easily implemented and sustainable, yet still significantly decrease ED visits and admissions. As a secondary goal, we also aimed to classify our own frequent visitors to possibly identify areas for improvement in our patient care systems.

METHODS

We conducted a retrospective cohort analysis at an inner-city hospital with an annual ED census of 50,000–55,000 per year. This program was started as a quality-improvement and patient flow initiative and the data from this process were analyzed for this study. Based on a review of the available data and the increasing amount of overcrowding in the ED, the program started with one ED-based social worker who devoted 25–33% of his time to this project as its coordinator. A 17-month study period was used for each patient between January 2007 through May 2008, corresponding to the implementation of a statistics tracker on the ED tracking system and the implementation of a new electronic medical records (EMR) system in June 2008. Care plans were implemented on July 7, 2007. At its peak, the team consisted of one lead social worker, two other social workers, one case manager, two attending physicians (one of whom was the medical director), and two resident physicians. Except for the lead coordinator, everyone on the team devoted an unknown amount of their free time to the project.

Program Participants

Patients in this program were identified through the use of our Emergency Department tracking board. A program was written to identify the patients who accumulated

the most cumulative ED visits. This list was then sorted by visit history. From this cadre of patients, the top 50 frequent visitors were identified. Our computer program was built so that it summed the total number of ED visits within the past 12 months and reported this list of medical record numbers for each patient to the lead programmer. Patients with five or more visits to the ED in one calendar year were identified and defined as frequent visitors (FVs). Chronic ED FVs were separated from "episodics," or those with multiple visits in a short time period, by using the total number of visits per year calculated each month. This list of patients was then presented to the FV's team for development of care plans. As the program developed and evolved, nurses, social workers, and physicians requested the ability to refer patients they were concerned about to the program, and this functionality was added to the process.

Development of Care Plans/Intervention

The multidisciplinary FV team consisted of social workers, case managers, residents, and attending physicians from the ED, a representative from any key medical specialty routinely involved in the patient's care (e.g., the sickle cell team), and residents and attendings from the Department of Psychiatry. Using the list of patients identified by our tracking system, the FV team met to develop initial patient care plans. Before team meetings, one person was assigned to review patient histories, clinic notes, hospital charts, procedure results, and discharge summaries to develop a comprehensive patient history. This patient summary was presented at the time of development of care plans. Typical summaries focused on patterns of ED presentations, chief complaints, visit history, preliminary psychosocial assessment, diagnostic interventions, and their results. After a summary was presented to the FV team, the patient's case was discussed, adding information as necessary. The team then agreed on a plan, suggesting interventions that were thought would help manage the patient's health care. Suggested interventions included social work assessment, directives to call pain team for development of pain contract, radiologic studies, outpatient referral for specialty clinics, urinary toxicology studies, managed care referral, and psychiatric assessment. The lead coordinator was responsible for ensuring that referrals and assessments were completed as needed. A list of partners and agencies contacted and utilized in the process is noted in Table 1. Care plans were uploaded to the Emergency Department's tracking board for resident and physician use on completion (Figure 1). As this program started as a longitudinal quality-improvement process, the care plans were introduced with only 18–20 plans completed and others in the process of being developed.

Table 1. Institutional and Local Partners

University of Chicago
   Sickle Cell Clinic
   Department of Psychiatry
   Department of Medicine
   Patient advocates
   ED social workers
   ED case managers
Local Chicago resources
   Department of Aging
   Mental health clinics
   Emergency Medical Services
   Substance abuse agencies

ED = Emergency Department.

This team met bimonthly to review and update the care plans. As noted, the program was well received and various staff requested the ability to edit the plans or refer patients to get care plans. A link at the bottom of the care plan page was added to facilitate this process. If additional information was obtained, it was presented at the next FV team meeting and changes were made to the care plans accordingly (Figure 1).

Implementation of Care Plans

On the patient's next visit to the ED, the tracking system automatically identified the patient as an FV and placed a visible yellow icon with the number of visits to the ED in the past 12 months on the main tracking board (Figure 2). If the icon contained an asterisk it was an indicator to the ED staff that the patient had a suggested care plan that was to be reviewed during course of patient assessment. On clicking the icon, the FV care plan page was opened. This provided the user with a detailed patient visit history, a case summary (including behaviors that can influence decision making), the suggested care plan, a figure showing ED utilization history, and an ED encounter history (see Figure 3).

Measurements

We recorded the number of monthly visits by the top 50 FVs, comparing them with the yearly total visits to capture the true chronic ED FVs. There were no deaths during the study period and the ED census remained constant during this time. Data collected by the program were the total number of visits and admissions by the top 50 FVs per month. Although individual visit data were available for each of the FVs, these data were not routinely collected as part of the quality-improvement program, and could not be retrospectively obtained once data analysis began because of the implementation of the new EMR system. We also recorded the occurrence of concomitant social problems diagnosed by the FV team in the top 50 FVs.

RESULTS

The top 50 chronic FVs were identified between January 2007 and May 2008. The mean age among the top 50 FVs was 42.4 years old, and 64% were men (Table 2). Various social determinants were also prevalent in the group, with the most common being psychiatric disease (36%), substance abuse (22%), sickle cell disease (20%), and possible malingering/factitious disorder (20%). During the study period, ED visits by the top 50 chronic FVs ranged from 88–98 visits per month and 28–31 admissions per month (Figure 4). As of January 2007, the top 50 FVs had 94 ED visits/month (approximately 1,129 visits to the ED/year) for 2.2% of the total census, and 31 admissions/month (approximately 372 admissions/year; Table 3). Each FV has approximately 22.6 visits/year (range from 11 to 41 visits/year) and 7.3 admissions/year (range from 0 to 20 admissions/year). By May 2008, the top 50 FVs had a decrease to 88 visits/month (approximately 1,059 visits to the ED per year) and 28 admissions/month (approximately 340 admissions per year)
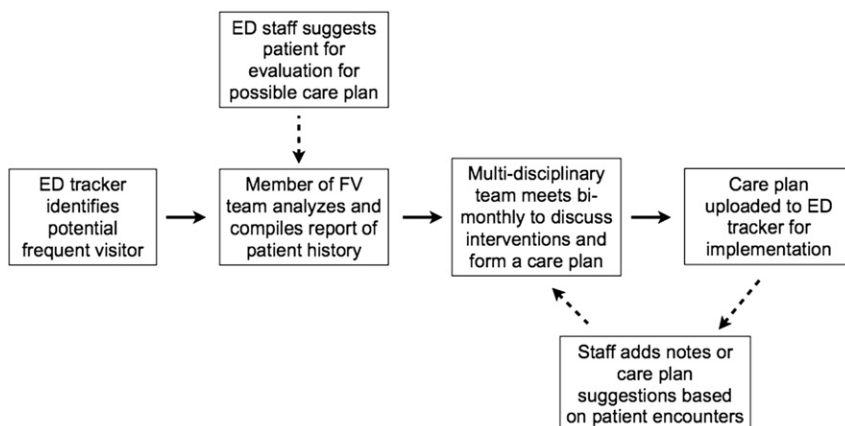

Figure 1. Flow of development of Emergency Department (ED) care plans. FV = frequent visitor.

Figure 2. Emergency Department patient tracker with care plan indicator.

with each FV having approximately 21.2 visits/year and approximately 6.8 admissions/year. At any time during the study period, the top 10 FVs only comprised approximately 29% of the total visits per month.

Several other important data were obtained from the study. Based on the top 50 FVs, we compiled a list of the most frequent sensitive diagnoses in our cohort (see Table 4).

DISCUSSION

The top 50 chronic ED FVs initially comprised approximately 2.2% of the yearly census, with approximately 22.6 visits/year per patient. Underlying social determinants (factors that the team decided were contributing

to repeat visits) were present in every one of the top 50 chronic FVs, with several of these patient having two to three psychosocial issues. All of the social determinants diagnosed in the FV population were made in the setting of the group review, with all patients receiving the appropriate workups before being diagnosed. This finding of multiple social determinants in this population is consistent with previous work done to characterize the ED FVs (1–3).

By May 2008, there was a decrease in the top 50 FV population to 21.2 visits/year per patient. As the graph demonstrates, there was a strong trend downward in visits/year toward the end of the study period. Although the overall reduction of visits/year per patient was only 1.4, it is likely that several patients with full plans in place

Figure 3. Example care plan.

Table 2. Demographics of the Top 50 Frequent Emergency Department Visitors

	n	%
Mean age (years)		42.4
Range		28–88

	n	%
Men	32	64
Factors contributing to repeat visits		
Psychiatric disease	18	36
Substance abuse	11	22
Sickle cell disease	10	20
Malingering/factitious	10	20
Noncompliant	8	16
Unstable housing	5	10
Emergent dialysis	4	8
Poor social support	4	8
HIV/AIDS	2	4

HIV = human immunodeficiency virus.

had more significant decreases, while others did not get a full plan implemented until later in the study. The early effects of the program might have been delayed in part because of the fact that there appeared to be a learning curve after the implementation of the FV plans. In addition, the program started with only approximately 18–20 plans fully in place, with more plans being actively developed during the time period. We, unfortunately, did not monitor which patients had full care plans during the study period, and the project was terminated before all of the FVs received care plans. The ED census for 2007 and 2008 were comparable, so this decrease was not secondary to fewer patients being seen in the ED. Admissions per year did not decrease significantly. There is a possibil-

ity that admissions are more refractory to care plans due to complicated psychosocial situations than FVs present. Another factor was that as the plans developed, the next most frequent visitor without a plan was not always the next one to have a plan implemented. The faculty, residents, and even nurses started utilizing the pathway to create plans for the patients they thought needed them the most. This would sometimes bypass those who were truly more frequent visitors. However, this unanticipated utilization eventually became a strength of the program. Nurses, residents, and faculty from both the ED and the inpatient services felt buy-in into the process once we added the feedback/referral link to the system. In addition, it became a dynamic process that responded to the continuous flow of the ED rather than one picture in time. Anecdotally, the system identified one patient who was the victim of domestic abuse due to her multiple episodic visits and noted staff concerns.

The results of this study were mixed but promising. From the results of the previously published Frequent Users of Health Services Initiative, it is clear that a well-funded, well-supported, large-scale program is a cost-efficient and cost-effective modality that decreases ED recidivism and subsequent inpatient admissions (5). In times that find many hospitals and universities financial strained, it is not feasible for most institutions to launch such a large-scale, intensive program. This type of program can be especially important in the setting of the Affordable Care Act and the national movement toward accountable care organizations. One perspective reviewing the system implemented at Johns Hopkins noted
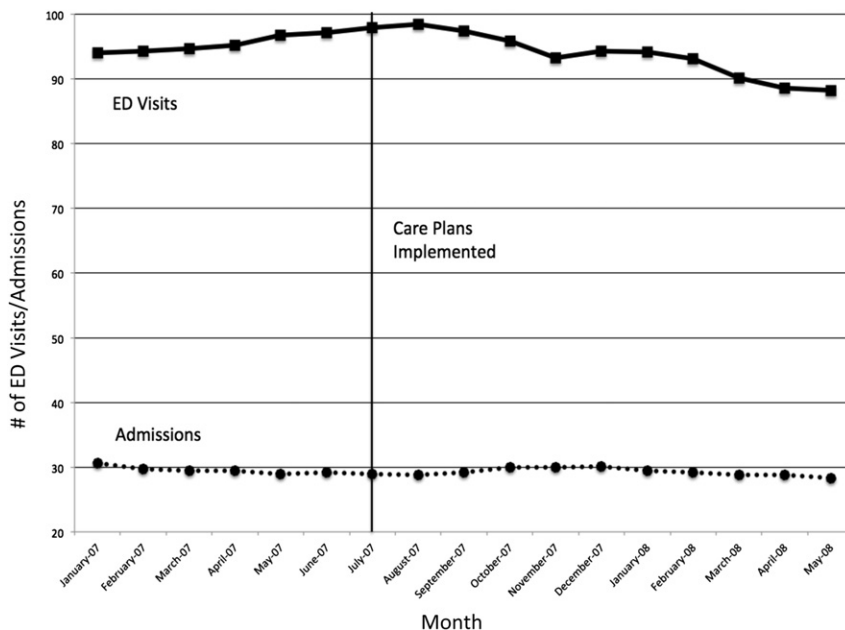

Figure 4. Emergency Department (ED) visits and admissions per month.

Table 3. Descriptive Statistics of Emergency Department Visits and Admissions

	January 2007: Statistical Tracking Started	July 2007: Care Plans Implemented	May 2008: Program Ended
Estimated ED visits per year	1,129	1,175	1,059
Total ED visits/month	94	98	88
ED visits/year per patient	22.6	23.5	21.2
Estimated ED admissions per year	367	348	340
Total admissions per month	31	29	28
Admissions per year per patient	7.3	7.0	6.8

ED = Emergency Department.

the "… creat[ion of] a highly qualified interdisciplinary care team, [and] hiring a well-trained case manager" among the successful components of their system (7). This program could serve as a feasible model to implement similar changes.

We have preliminary data, although limited, that a simple, easy-to-use ED interface, a small team of health care practitioners, and the use of care plans, can possibly reduce the number of yearly ED visits by our top 50 chronic FVs. The program has many strengths to build on (Table 5). We were able to characterize the FVs to our hospital, identify sensitive diagnoses, and help identify social determinants possibly contributing to recurrent visits. Additionally, by integrating an interface on the main ED dashboard, we consolidated key medical and psychosocial information for ED health care providers to use clinically. This interface also provided a means for information to flow from the varied health care providers in the ED to the FV team, helping to end fragmentation of care. Another benefit was streamlining the process of admission to inpatient teams. Providers could reference the care plans for admitting teams and identify the major reasons for admission and suggest continued plans as an inpatient. It had the added benefit of being an "early warning" detection system to identify patients with episodic needs and, in the case of one patient, critical safety intervention. Finally, we developed multiple partnerships both within our hospital and locally that fostered continued working relationships to address patient care needs. We believe that the simplicity of our interface

and program allows the ED practitioner to easily access key health care information, which can expedite, streamline, and facilitate care in a hectic, face-paced, and occasionally overcrowded environment. Furthermore, the aim of our program was not to deter individual patients from using ED services when they felt necessary, but rather to providing a direct intervention that a team of health care providers believed would help the patient. The central goal was to develop a comprehensive, coordinated system of care to address the needs of frequent users.

Limitations

There were several important factors that affected the results of our study and limit our ability to draw conclusions on the effectiveness of this intervention. First, the study design was based on the available data from a quality-improvement project. The ED tracker algorithm was not a randomized, controlled prospective design. Due to this limitation, we are limited to a descriptive study of our efforts and findings. Second, due to the implementation of a new ED tracking system in June 2008, we have limited data to analyze. Although a majority of plans were in place before introduction of the care plans, not all plans were completed and fully implemented. This limited time frame might have also affected our ability to detect seasonal variations in the ED flow. Based on the initial implementation of the project, we did not monitor individual visits and admissions for each patient in the database, only total visits and admissions. This problem could not be rectified before the end of the project in June 2008. We also did not control for or measure

Table 4. Sensitive Diagnoses

Asthma
Chronic obstructive pulmonary disease
Congestive heart failure
Dementia
Diabetes with gastroparesis
End-stage renal disease on hemodialysis
HIV/AIDS
Hypertension
Psychiatric disease
Seizure disorder
Sickle cell disease

HIV = human immunodeficiency virus.

Table 5. Benefits of the Care Plans

Emergency Department–based
Integrated with EMR system
Characterize the frequent visitor population
Build institutional partnerships
Build local partnerships
End fragmentation of care
Dynamic process
Staff buy-in
Early warning of patient need

EMR = electronic medical record.

adherence to patient care plans or attitudes toward using the plans. It is reasonable to assume that there was a significant learning curve for the care plans, and that later data also reflect better use of the care plans. The data are also limited in that they do not measure length of stay or cost analysis of the care plans, or other indicators of clinical significance. It can be argued that the major benefit of a program such as this would be to streamline ED care rather than decrease ED visits. However, this would depend on the amount of buy-in from outpatient providers, which, except in the case of the sickle cell team, was not monitored. As far as the work hours put into the program, the lead coordinator was familiar with programming and created the algorithms himself. Although he had time dedicated to this endeavor, the other members of the team were largely voluntary and no analysis of time spent was done. Cost analysis and work hours versus cost savings from fewer admissions and ED visits would be the next step in further research into this or any other similar program.

CONCLUSIONS

Frequent users are a small group of individuals with complex needs not always effectively addressed in the high-cost acute-care settings of EDs. These individuals face barriers to accessing medical care, mental health and social services, and substance abuse treatment, all of which can contribute to frequent ED visits. The implementation of a novel, ED-based, multidisciplinary team approach to frequent ED visitors resulted in a trend toward decreasing the number of ED visits, but had no affect on the rate of admissions. As noted in previous studies, underlying social determinants were prevalent in the top ED FVs and these issues must also be rectified when addressing chronic ED usage. Despite the study's limitations, this program shows potential in addressing the issue of chronic ED FVs and recidivism. The next step would be to implement a similar system in a randomized, controlled setting, while also measuring length of stay, costs, and ED staff attitudes. This study represents an important step in addressing these chronic patients.

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ARTICLE SUMMARY

1. Why is this topic important?

Frequent Emergency Department (ED) visitors contribute to an increased cost of care in the ED, and it is difficult to ensure high-quality care in a longitudinal fashion for these patients.

2. What does this study attempt to show?

This study attempts to show that a web-based, ED-initiated, multidisciplinary team can use care plans to address the specific needs of the frequent visitor population to decrease visit and admission rate and coordinate care efforts.

3. What are the key findings?

The key findings are a trend toward decreasing ED visits, although there was no statistically significant effect on admission rate. We also identified several important social determinants that contribute to the frequent visits.

4. How is patient care impacted?

Patient care is improved by having a centralized care plan for frequent visitors who might have various psychosocial determinants affecting their care. In addition, care is also enhanced by having a multidisciplinary team regularly review the care received and outline a plan of care for these patients.