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Determining Patient Barriers Affecting Emergency Room Overutilization at Northeast Georgia Medical Center

BY

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Executive Master of Public Health,

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2014

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Determining Patient Barriers Affecting Emergency Room Overutilization at Northeast Georgia Medical Center

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An abstract of
A Thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Determining Patient Barriers Affecting Emergency Room Overutilization at Northeast Georgia Medical Center

By
Anna Doris Poirier Oberste

Background: Emergency departments are currently experiencing crowding, long wait times, and significant strain on the staff, and are targeting over utilizers as a way to divert care into more appropriate care settings. Northeast Georgia Hospital System (NGHS) Emergency Department, the busiest in the state has developed extensive community healthcare settings but continues to have returning over utilizers which taxes their already limited resources.

Method: This study used an existing emergency room survey instrument modified to determine the perceived barriers to utilizing community healthcare options. Emergency department patient database was applied to identify the over utilizers, reasons for visits and statistical patterns for emergency department use.

Results: Of those surveyed the most common barriers were associated with perceived cost of community care, and lack of awareness of community options. Fifty-two percent cited appointment barriers, inability to get an appointment which fit their schedule or find an available appointment time in a timely manner. Twenty-nine percent said that transportation was a problem. Other barriers to community care include healthcare urgency perceptions by the patient, medication compliance, health literacy, and cultural norms.

Conclusion: Over utilizers perceived barriers to community healthcare are similar to national trends. Even though patients may have access to primary care, they often feel that their community health care does not meet their health goals. On the other hand, these patients feel the emergency department does provide for their health needs with respect to relief, convenience, cost, and resolution of acute exacerbations.

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Abbreviations

AARP Association of American Retired Persons

AOR Adjusted Overall Risk

CI Confidence Interval

ED Emergency Department

FU Frequent Users

IADL/PSMS Instrumental Activity of Daily Living and Physical Maintenance Scales

NEHI New England Healthcare Institute

NEO-Five Factor Inventory Neuroticism, Extraversion, Openness for experience

NGHS Northeast Georgia Health System

NHIS National Health Interview Survey

OR Overall Risk

PCP Primary Care Physician

REALM Rapid estimate of adult literacy in medicine

RR Relative Risk

SU Super Users

TOFHLA Test of functional health literacy in adults

WRAT Wide range achievement test

Glossary of Terms

Ambulatory setting: Healthcare settings in which individuals are seen and treated outside the hospital setting.

Burden to healthcare: In this paper, the use of burden to care includes the excessive use of the emergency department for non-emergent care, the high cost of using practice settings inappropriately, and the delayed care to truly emergent patients.

Community based coalitions: A community coalition is a group of individuals and organizations from a community who have come together to pursue goals aimed at bettering the health care community.

Community care settings: Health care provided outside of the hospital within local communities.

Community healthcare settings: Interchangeable with community care settings with healthcare focus.

Community based risk factors: In the context of this paper, individuals with more than one chronic illness or mental health illness, with no insurance or limited Medicaid, Medicare insurance, work during normal physician office hours, have poor health literacy, and many perceived barriers to care.

Complex care: Healthcare associated with individuals with complex medical conditions such as diabetes or heart failure, which require the use of several specialists and care coordination.

Emergency Department: A department in an institution, usually in a health care facility such as a hospital, which is staffed and equipped to provide rapid emergency care, especially for those who are stricken with sudden and acute illness or who are the victims of severe trauma

Health literacy: The ability of a patient to understand health information related to their illness and make decisions based on this understanding to improve their healthcare.

Holistic healthcare approaches: Theory which emphasizes the care of the whole person, mind, body, and spirit, and how the individual interacts with their environment. Individuals are encouraged to take responsibility for their health and to make daily decisions on improving health outcomes.

Magnitude of problem: Defines in a comparative sense how large the problem is in our sample population versus the problem in the population at large.

Outpatient management: Describes any medical care or treatment that does not require an overnight stay in a hospital or medical facility. Outpatient care may occur in any medical office or hospital, such as a physician's office or outpatient surgery center.

Perceived barriers to care: These barriers may include language, cost, and availability, lack of transportation, inconvenience, and awareness of options.

Urgent care settings: Community-based setting which can offer immediate or urgent care for non-life-threatening emergencies. These facilities are used for care when the primary care physician is not available, for immediate care for acute episodes of chronic illnesses and injury.

Chapter 1: Introduction

In the United States an estimated 13% to 27% of emergency department (ED) visits can be more appropriately managed in the physician's office, clinics, or urgent care centers, at a cost savings of $4.4 billion annually (Weinick, Burns, & Mehrotra, 2010). One systematic review found patients visiting the ED four or more times per year account for 4.5% to 8% of all ED patients and 28% of all ED visits (LaCalle, Rabin, & Genes, 2013). Another systematic review by Locker identified that many of the studies have a different threshold number of visits and definitions. However, Locker was able to statistically determine that six or more visits per year corresponds to a nonrandom event and patients who visit the ED more than five times per year can be statistically defined as frequent users (Locker, Baston, Mason, & Nicholl, 2007). Furthermore, "super users" have been defined as patients who visit the ED 12 or more times in a 12 month period (Murphy & Neven, 2014; Vinton, Capp, Rooks, Abbott, & Ginde, 2014). ED overuse has been associated with barriers such as lack of a primary care provider (PCP), low health literacy, complex low-income populations with poor physical health, multiple chronic disease states, and lack of health insurance (Brim, 2008; Owens et al., 2010; Pitts, Carrier, Rich, & Kellermann, 2010; van der Linden, van den Brand, van der Linden, Rambach, & Brumsen, 2014; Vinton et al., 2014). The inappropriate use of the ED leads to crowding, long wait times, adverse outcomes and a significant strain on the staff (McCarthy et al., 2009; Pitts et al., 2010; Weinick, Bristol, & DesRoches, 2009).

Problem Statement

Northeast Georgia Health System (NGHS) has one of the busiest EDs in Georgia. It is currently experiencing crowding, long wait times, and significant strain on the staff, and is targeting frequent users as a way to divert care into more appropriate care settings. Existing preliminary data for overutilization of the ED, collected from August 1, 2012 through July 31, 2013, reported that the "most

common 100" (most frequent utilizers) of the ED represented 1.7% of all hospital admissions. These "most common 100" were responsible for 2100 ED visits. This ED treats an average of 300 patients per day with peak treatment volumes in December, and has remained at this level since 2012, with 101,758 visits in 2013. The frequent users identified for present study include 351 super users of the ED with one or more visits per month and provide an adequate representation of individuals who impact hospital admissions, while maintaining a manageable target population to study. These super users represent 1% of all patients who have visited the ED but represent 5.6% of all visits from October 1, 2013 to April 30 2014. In the past, NGHS has worked out referral arrangements with MedLink, a Federally Qualified Health Center in Gainesville, the Good News Clinic, also in Gainesville, the Longstreet and Diagnostic clinics, and with the Northeast Georgia Hospital System physicians group at the primary care clinic co-located with the Hall County Health Department. Many of the patients whose problems are inconsistent with the need for the ED have been referred to these sites for follow up and ongoing management, but with unsatisfactory results as in they continue to visit the ED.

Theoretical Framework

Super users of the ED need to be assessed for attitudes, knowledge, personal preferences, and accessibility to available services within their economic means. This study is well suited to the PRECEDE-PROCEED model. The PRECEDE-PROCEED model is an evaluation framework proposed in 1974 to analyze healthcare situations and design solutions (Green & Kreuter, 1991). **PRECEDE-PROCEED** is an acronym which can be described through its components. **Predisposing** factors include knowledge, attitudes, beliefs, personal preferences, existing skill sets, and self-efficacy of patients and how these factors impact behavior and acceptance of desired behavioral changes. **Reinforcing** factors include reward and reinforcement towards the desired behavioral change, such as social support, economic rewards, and acceptable changing social norms. **Enabling Constructs in**

Education, Diagnosis, and Evaluation are components which address economic or physical factors that support availability and accessibility of resources or services that facilitate the targeted behavior change. The environmental diagnosis is associated with the **PROCEED** part of the acronym, with each letter again representing a different component of the model. Implementation is further supported through **Policy, Regulation,** and **Organizational Constructs in Educational and Environmental Development**. These solutions are informed by the socioeconomic framework and establish a comprehensive structure for assessing health and quality of life needs. This model guides healthcare planners through a process that starts with desired outcomes and then works backwards to identify areas that require improvement, to identify a mix of strategies for achieving the proposed objectives.

The model uses eight phases to determine factors, resources, and evaluation of implementation of interventions toward targeted outcomes. Phase 1 is associated with quality-of-life parameters subjectively defined by the targeted population. Phase 2 identifies specific health goals that may contribute to positive social outcomes defined in Phase 1. Phase 3 identifies the specific health-related behavioral and health factors that may contribute to the targeted health problem. Phase 4 aligns various strategies to three specific groupings: predisposing, enabling, and reinforcing factors. Phase 5 identifies the organization's implementation feasibility, administration capabilities, and resources for the development of intervention programs. The PROCEED aspect is associated with the final three phases of the model. Phase 6 identifies the components for the process evaluation, Phase 7 is the impact evaluation, and Phase 8 is the outcome evaluation. This multilevel approach encompasses the individual level, intrapersonal level within families, community and institutional level resources, and social and economic policies.

Purpose Statement

The overarching questions for this study are "What are the most common barriers for frequent users of the ED to obtaining care in the community setting?" and "How can Northeast Georgia Medical Center better educate staff and patients to increase access to those settings and decrease overutilization of the Emergency Department?"

The Specific Aims of this project:

1. Determine the most common community-based risk factors that contribute to overutilization of the Northeast Georgia Medical Center Emergency Department and lead to readmission.
2. Determine the magnitude of these risk factors.
3. Inform the readmission committee of Northeast Georgia Medical Center of these findings, to facilitate development of community-based coalitions and education programs that will improve access to community healthcare settings.

Research Question

The research question is to determine the community barriers to utilization of community health care settings as perceived by super users of the ED.

Significance

The primary justification is to provide the right care, in the right healthcare setting at the right time. This will decrease the burden on the ED, freeing up their resources to attend to the patients more in need of ED care. It is already one of the busiest EDs in Georgia. Some of these individuals end up as readmissions due to lack of appropriate outpatient management, but many of them are simply not utilizing more effective and efficient healthcare settings, resulting in the need to staff the ER more fully than otherwise necessary. Many of the patients being seen in the ED currently have multiple co-morbidities, and require very complex care, which patients feel is beyond the scope of a single

physician’s appointment. Continuity of care outside the ED often leads to better quality of life and decreased cost-burden on the medical system. Understanding the community barriers to care will provide insight into how to better manage these patients.

Chapter 2: Literature Review

Overview

About 43% of the population with no unmet medical needs visits the ED in the United States each year (Gindi, R.A., & Kirzinger, 2012). Health care reform over the past five years has pushed ED visits to the highest numbers in history, with EDs unable to accommodate the new surge in services. The PubMed and Cochrane databases were searched using the terms "emergency department", "overutilization", "overcrowding non-urgent care", and "frequent users" in combination. Of the 3148 articles that were found for the last five years, 242 articles matched the demographics and rural setting of the NGHS catchment area for frequent users, with statistical support for their conclusions, and evidenced-based interventions for reducing ED overutilization. Twenty-eight articles met specific criteria for ED super users and community barriers to care. Ten of these papers offered evidence-based interventions for resolving and reorienting super user overutilization of the ED.

Characteristics of Frequent ED Users

Population Characteristics

The literature review suggested that frequent ED use was associated with having medical insurance, multiple chronic diseases, chemical dependence, or mental health issues (Bieler et al., 2012; Gindi et al., 2012; van der Linden et al., 2014; Vinton et al., 2014) (Table 1). Frequent users were described in a study by Castillo et al., as having 6 -20 visits over a one-year period and super users as those individuals with greater than 21 visits per year (Castillo, Brennan, Killeen, & Chan, 2014). This parameter varied among the different papers reviewed, with frequent users being identified as having 4 – 7 visits per year and super users having more than 7 visits per year. Several studies mentioned that many patients utilize multiple EDs, potentially confounding findings, as actual ED usage rates may be much higher than what is reported for individual ED usage (Table 1). Furthermore, Castillo noted in the 925,719 ED visits analyzed that 3% of the patients made 16.5% of the documented ED visits in the period of the study

(Castillo et al., 2014). Although super users only accounted for 0.2% of all patients, they were responsible for 4.5% of ED visits. However Castillo failed to statistically determine what number of visits is above the threshold of normal usage.

According to van der Linden, frequent ED users were more likely to die or be admitted, to be sicker than infrequent visitors, to have severe psychosocial and medical vulnerabilities, and to be heavy users of all health and social services (van der Linden et al., 2014) (Table 1). Comparatively, super users were more likely than single-use visitors to come for routine care then urgent care. The study evaluated 71,565 visits at two separate EDs in two different community settings in the Netherlands, an inner-city Level 1 trauma center and a Level 3 ED in a small city. During the year of the study, 256 patients visited the ED at least seven times and as many as 17 times, and12 of these patients were reported as visiting the ED more than 17 times. The mean patient age was 47.5 years, with men and women equally distributed. Forty-two percent of the frequent users were classified as needing standard or non-urgent care, compared to the single-use ED users with 54.9%, indicating that frequent users may be sicker. The night shift had the highest overall risk ratio (1.42; 95% CI 1.24-1.64) with overutilization. Most frequent presentation symptoms were reported as abdominal complaints, shortness of breath, and mental illness. Fifty-three percent of frequent users self-referred, compared to 68.4% of those who came for single use of the ED. Since the Netherlands has a strong primary care network and these frequent visitors did not self-refer, it is assumed that they attempted to contact their physician prior to coming to the ED.

An observational retrospective study which reviewed 96,000 ED visits, represented by 59,000 unique visitors, classified frequent users as those with 4-19 visits per year and super users as 20 or more visits per year (LaCalle et al., 2013) (Table 1). This study was the first study that comprehensively described current factors and trends, such as demographics, payer sources, and most common complaints that are being seen at NGHS. Males and females were equally represented. Fifty-two percent of patients were

within the age range of 30-59 years; those younger and older were each approximately 25% of those who visited the ED. Only 3% were uninsured. The three most frequent complaints were extremity complaints (17.5%), gastrointestinal complaints (15.8%), and shortness of breath (13.4%). Only 31 (0.05%) patients met the super user criterion but they contributed 1% of all ED visits, and frequent users (7.5%) represented 23% of all ED visits. Medicaid was the most frequently used insurance in both groups.

Doupe and colleagues investigated six adult EDs in Winnipeg, with approximately 200,000 annual visits, to define breakpoints in data to distinguish frequent users from super users (Doupe et al., 2012) (Table 1). They also used the data to determine characteristics that may make each group unique and generalizable. Analysis was conducted on 105,687 patients who used the ED for 200,810 visits. There were no distinguishable differences between the frequent visitors and the super users. Depression was common to both groups: 60.3% in frequent users and 79.4% in super users. Both groups reported more than 7 primary care visits in the last year, had more than 3 specialists and more than 3 specialist visits, with approximately 81% reporting no hospital admissions in the last year. Super users were defined as those with more than 18 ED visits (OR 14.2, b= 0.25) during the year and frequent users as those having 7-17 ED visits (OR 7.8, b=0.86) in the last year compared to the overall ED population ($p<0.05$).

In Switzerland, researchers sought to identify social and medical vulnerability factors associated with frequent users, defined as 4 or more ED visits per year (Bieler et al., 2012). Of the 35,854 individuals who visited the ED, 1,591 (4.4%) were defined as frequent users (Table 1). These patients represented 5,813 (12%) of the 48,817 ED visits studied. Demographics for these patients included a mean age of 45 years, more likely to be divorced or separated, unemployed, dependent on government welfare (OR 2.1; 95% CI, 1.3-3.4) , uninsured (OR 2.5; 95% CI, 1.1-5.8), or under guardianship (OR 15.8; 95%

CI,1.7-147.3) and live within 10 km of the ED (OR 4.6; 95% CI, 2.8-7.6). Medical factors included a history of psychiatric hospitalizations and use of more than 5 clinical specialists annually.

In Marseille, France, a cross-sectional study was performed to determine if non-urgent-care patients could be reoriented to care outside the ED during normal business hours of 8 am-5 pm (Gentile et al., 2010). There were 245 patients evaluated for non-urgent needs, of which 110 patients met criteria (Table 1). Eighty-five of these patients were interviewed and found to have a mean age of 36 years, 60% men, with 80% having medical insurance, and the majority of the patients (71%) reported being followed by a general practitioner. A total of 76% of the patients self-referred without physician guidance; approximately 30% of these patients were unable to contact their physician prior to presenting to the ED. Eighteen percent were referred to the ED by their physicians. The most common reason for referral was pain (66%), or needed a diagnostic evaluation (38%). Only one-third of the patients required evaluations, with only six patients requiring treatment; none were hospitalized. Thirteen percent of the non-urgent patients refused to go a primary care clinic, located outside the hospital; among these patients, 41% agreed to pay an extra fee to be seen in the ED.

McCarthy et al. studied the effects on crowding in four EDs in geographically dispersed cities throughout the United States (McCarthy et al., 2009). Three of the EDs were located in urban areas, with average visit volumes ranging between 50,000 and 62,000 annually. Data were collected in one-year increments from 2005 to 2007. Over 50% of patients seen had a non-urgent acuity of care level of three, four, or five. An acuity level of one or two corresponds to patients who have high urgency and who should be treated first. Forty-six percent of the patients reported to the ED between 8 am and 4 pm, with 20% being seen for non-specific general symptoms. Although frequency of visits was not described for these patients, patients' characteristics could be generalized for the populations who tended to use the EDs in these areas (Table 1).

A systematic review of emergency medicine literature by Durand et al. in France revealed that of the 51 articles reviewed, non-urgent visits to the ED ranged from 5% -90% (Durand et al., 2011). However, there was considerable variability among the articles in the definitions of urgent and non-urgent care. Many of the methods reviewed in the analysis were found to be unreliable and not reproducible. Furthermore, such difficulties in determining what is considered a truly urgent complaint and a non-urgent complaint may not be discernable by the patient and may be tied to education level and experience with the symptoms being evaluated as well as with health literacy.

Personality traits for frequent users were studied by Chapman and colleagues for patients over 65 years (Chapman et al., 2009). They reported that education, gender, age, chronic morbidities, physical daily functioning as defined by activities of daily living, self-maintenance, depression, disagreeable nature, and extroversion were associated with increased ED use, with an adjusted odds ratio of 1.51 (95% CI, 1.0-2.21; z=2.12; N=923 patients; P=0.034) (Table 1). Patients were assessed using the NEO Five-Factor Inventory which is a 60-item personality survey. Other instruments used in the study included the Instrumental Activities of Daily Living and Physical Self-Maintenance Scales (IADL/PSMS), Hamilton's Depression Scale, and Karnofsky Performance Status Scale, as well as the Cumulative Illness Scale (Chapman et al., 2009). When patients' health transitioned from no or little health burden to major burden there was a 64% increase in the odds ratio for ED visits (AOR 1.64; 95% CI, 1.12-2.35; z=2.70; p=0.007).

Health Literacy

An observational cross-sectional study by Schmacher et al. assessed health literacy and use of primary and community health services with respect to ED overutilization (Schumacher et al., 2013). This study reviewed 75,000 patients with a demographically diverse population, with 38% African Americans. All other factors were similar to NGHS with payer source, self-reported health status, and chronic co-

morbidities (Table 1). Patients self-reported health status and the number of chronic conditions they were experiencing. There were 492 frequent users evaluated; 56% reported having a personal physician, and 72% having been seen in the previous 6 months prior to their visit to the ED. This study found that patients with limited health literacy were significantly more likely to visit the ED than those with adequate health literacy (60% vs 40%; P<0.001). While this study assessed health literacy and ED utilization, they did not distinguish between frequent users and super users and their health literacy.

Berkman and colleagues performed a systematic review on the impact of low health literacy and health outcomes from 2003 to May 2010 (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). Ninety-six studies were found to have results rated as good or fair in quality, with nine of these studies examining the risk of ED use. Moderate evidence was found that illustrated increased ED use for those patients with lower health literacy. Dominant subgroups in four studies included the elderly, clinic and inner city hospital patients, and patients with chronic conditions of asthma and congestive heart failure. These low literacy individuals were also found to have lower levels of preventative services such as influenza immunizations and mammography screening. Six studies found that low health literacy was associated with poor skills in taking medications. When evaluating the studies for disease prevalence, low literacy was associated with higher incidence of depression but the strength of the evidence was evaluated as low. The combination of these factors was associated with poorer health-related knowledge and comprehension and was also associated with differential use of certain health care services, including increased ED usage, and poorer health status and higher mortality.

In another systematic review of health literacy and ED overutilization, Herndon et al. reviewed 31 articles which utilized highly reliable surveys to determine health literacy, such as Test of Functional Health Literacy in Adults (TOFHLA), Rapid Estimate of Adult Literacy in Medicine (REALM), or the Wide Range Achievement Test (WRAT) (Herndon, Chaney, & Carden, 2011). Seven of the studies

specifically examined the relationship between health literacy and ED outcomes. Three of the seven studies specifically studied individuals 65 years and older and found an increased risk of ED visits for those with marginal health literacy, with marginal statistical significance RR 1.44 (95% CI, 1.01-2.02), and RR 1.34 (95% CI= 1.00-1.79) when compared with those of adequate literacy. Three of the seven studies examined children (3-12 years, 1-12 years, and 3-10 years). None of the pediatric studies showed a statistically significant correlation of ED visits to parents' health literacy (Table 1). The last study of these seven evaluated patients 18- 62 years of age and also found no statistical significance to correlate low health literacy to increased ED visits. These studies suggest that there are many other factors in addition to health literacy that play a role for patients who are frequent visitors of the ED.

Perceived Barriers to Community Care

After-hours ED visits were analyzed in Belgium for 968 patients and compared to physicians with after-hours appointment availability (Philips, Remmen, De Paepe, Buylaert, & Van Royen, 2010). Patients who visited the physician's office were approximately 36 years old, 92% were registered with a physician, 57% were employed, and 57% used the ED in the previous 12 months. Patients who went to the ED were about 32 years old, 78% were registered with a physician, 51% were employed, and 40% had used the ED in the previous 12 months. When asked why patients chose to visit the ED instead of their primary care physician, the three most common reasons were accessibility, competence of personnel, and proximity (Table 1). Of the 971 patients who had visited the ED, 39% had used the ED at least once, and 5% had used the ED more than 3 times in the previous 12 months. The three most frequently reported reasons for visiting the ED were musculoskeletal problems, skin problems, or digestive tract problems.

Behavioral descriptions based on the Theory of Reasoned Action for frequent users of the ED were defined by Philips et al. in a study in Belgium (Philips, Mahr, et al., 2010). Patients were interviewed

with respect to attitudes towards service choices: comprehensible explanation by staff, availability of technical equipment, waiting time, access, and payment system. Subjective norms with respect to family and friend recommendations to care were also measured (Table 1). In this adult population, the mean age was 31 years, 43% were married or living together, 48% had higher than secondary education, and 95% had compulsory health insurance. Approximately 18% of the 350 respondents were not aware of general practitioners, but only 1.4% of the surveyed population had never heard of an ED. During the previous 12 months, 62% of the respondents had used the ED at least once, with 35% seeing their general practitioner at least once. Perceived performance and healthcare disease explanations were ranked highest for the ED. Scores were rated as 7 fully agree, 6 rather agree, and 5 slightly agree. The aggregate scores for these was >6 (95% CI, 6.06-6.96, with F value 8.698, p=0.00, and homogeneity of variance value as 0.230). This study concluded that if doctors take time, listen well, and give good explanations, patients will be more willing to stay loyal to their healthcare providers and decrease visits to the ED.

Rust et al. used the 2005 National Health Interview Survey (NHIS) database to investigate the practical barriers to timely primary care access and subsequent impact on ED visits, among individuals who had a usual source of primary care (Rust et al., 2008). The study found that 20% of these individuals visited the ED at least once over a 12-month period. For those individuals who reported at least one barrier, the incidence of ED visits increased to 33%. The five most common barriers identified included "couldn't get through to the doctor" (OR 1.27; 95% CI, 1.02-1.59), lack of availability for timely appointment (OR 1.45; (95% CI, 1.21-1.75), long waits in physician's office (OR 1.2, 95% CI, 1.02-1.41), not open when needed (OR 1.24; 95% CI, 0.99-1.55), and lack of transportation (OR 1.88; 95% CI, 1.50-2.35). A significant limitation of the study was that there was no differentiation between urgent and non-urgent use of the ED.

Vieth and Rhodes studied non-price barriers to ambulatory care after ED visits (Vieth & Rhodes, 2008). Study sites in nine geographically diverse US cities were chosen and a convenience sample of the local EDs was selected by the site directors. Each ED supplied a list of condition-specific clinics used to refer patients for follow-up. Uninsured and Medicaid patients were referred to those facilities that would work with patients for out of pocket expenses. Secondary data analysis was used to randomly sample 603 ambulatory clinics for patients newly referred from the ED. Several trends for barriers to care were defined. Only 23% of total calls to healthcare providers that ED patients were referred to resulted in an appointment within one week of the ED visit. Forty-three percent of the 603 initial referral calls were unsuccessful, with barriers that included clinic closures, busy signals, voicemail, personnel unavailable to take calls, wrong numbers, disconnected or extended hold times, and referrals that were assigned for complaints that were out of the practice setting scope of care.

The place of urgent care centers in non-urgent healthcare in the United States was evaluated by Weinick and colleagues (Weinick et al., 2010). Urgent care centers have often been cited as alternatives to ED visits. These types of facilities often have extended and weekend hours. Most urgent care centers (74%) are staffed by family practice physicians. Most urgent care centers provide onsite laboratory services. Many urgent care centers offer services for fractures, pain management, primary care, immunizations, and routine school and sports physicals. Seventy percent of urgent care facilities can provide intravenous fluids, and prescription pharmaceuticals that are pre-packed for immediate dispensing. Almost 51% of payers to urgent care facilities are private insurance, and 12% are reported as self-pay, reflecting payment similarities to physician offices but they may not be suited to the poorly insured or uninsured patient.

Evidence-Based Interventions for Frequent and Super Users of the ED

Several interventions have been used to decrease ED visits and to improve access to community healthcare alternatives. Georgia has specifically analyzed community health centers and their impact in rural areas (Rust et al., 2009). Rust and colleagues reported 33% higher rates of uninsured all-cause ED visits per 10,000 uninsured population when community health centers were not available (RR=1.33; 95% CI, 1.11-1.59). However, Enard and Ganelin found that regardless of insurance status, if an individual did not have a usual healthcare provider service or if they were dissatisfied with the service they received from their health care provider, they were more likely to seek care in the ED environment (Enard & Ganelin, 2013). This study assessed the effectiveness of community health workers as patient navigators to care in the ED for 13,642 patients in the Houston, Texas area. Only 1,905 patients were navigated while the remainders were used as comparison. Although most of the patients (79%) in the navigated group were uninsured, the remainder had Medicaid, which were characteristics reflective of older studies. The comparison group also had a large proportion of uninsured (60%). Both arms of the study analyzed patients who had 2-5 visits in the previous 12 months. The more frequent visits to the ED, the less of an impact the patient navigators had on decreasing visits to the ED. Visitors with one to four visits reported a 46% reduction in ED visits, whereas those with five or more visits had only a 10% reduction in visits. In an analysis by Locker et al., the less frequent users (≤5) would fall into statistically random occurrence for visits to the ED. However frequent visitors with more than 5 visits would be considered non-random events. Frequent ED users as defined by Locker et al. had the least success with patient care navigators in this study.

Murphy and Neven analyzed the cost-effectiveness of a multidisciplinary ED-care coordination program at a regional hospital (Murphy & Neven, 2014). Both frequent and super users of the ED were studied. Frequent users (n=65) were defined as those who visited the ED 3-11 times the previous year, and super users (n=76) were defined as those who visited the ED ≥ 12 times in the previous year. The intervention

was reported to have significantly reduced ED visits for both frequent users and super users, by 5 and 15 visits, respectively (95% CI, FU 2-13 and SU 5-17). The three most frequent complaints for both of these groups were reported as abdominal, back/neck, and extremity problems. Both groups had Medicaid as the predominant payer source at similar frequency, most were women, and the average age was 35 years.

Washington State has created through state-mandated legislation a seven-step best-practices program to reduce preventable emergency room visits in 2012 (Washington State Health Care Authority, 2014). These steps include tracking ED visits throughout the state for each patient, implementation of reorientation to community healthcare services, institution of extensive case management programs, use of collaborative primary care physician prompts to see patients within 72-96 hours after an ED visit, implementation of narcotic use guidelines to discourage narcotic-seeking behavior, tracking patients with prescribed controlled substances statewide, and a tracking process for evaluating the program's success for each of these steps.

The New England Healthcare Institute (NEHI) published findings in 2010 which identified five barriers to care that led to ED overutilization (New England Healthcare Institute, 2010). These barriers included limited timely access to primary care services, inconvenient after-hours and weekend care, primary care provider referrals to the ED, and that the ED is still financially and legally obligated to treat ED patients if the patient is unable to pay. NEHI identified 15 types of strategies that have proven or promising outcomes in reducing ED overutilization. One such program is the Neighborhood Health Plan (NHP) which is a Managed Care Organization that specifically caters to Medicaid members in Massachusetts. NHP targets Medicaid patients who have recently visited the ED and sends them educational materials which inform them about alternative care options. Medicaid patients received books, websites, and a 24/7 triage hotline number. NHP also monitors the differences in care among providers, which is

reported online and can be downloaded by physician practices. This report analyzes variations in clinical practices, how well physicians are meeting benchmarks in care, and their patients' rate of ED visits. NEHI also recommends redesigning primary care services to improve access to care, such as telephone access to after-hours consultations, extended practice hours, open-access scheduling, group visits or shared medical appointments, improved chronic disease care and management, primary care coordinators and reform of payment systems for primary care services. In addition to these primary care recommendations, new urgent care services are also recommended which can include ED fast tracks, hospital-run urgent care clinics, retail clinics, worksite clinics, and telemedicine. NEHI recommends investing in health information technology, increasing the primary care workforce, understanding the specific needs of the patient population, and establishing collaborative relationships among EDs, primary care providers, and community services.

An ED decision-support program was evaluated by Navratil-Strawn et al. to determine the return on investment in reducing frequent users of the ED, defined as more than 3 visits per 12-month period (Navratil-Strawn et al., 2014). AARP Medicare supplemental insurance plan users (n=7070) were enrolled and an equal number of matched nonparticipants were compared for decreases in ED visits and cost savings. The enrolled individuals were assigned nurses who assisted with making appointments to high-quality providers and with care coordination programs that offered holistic treatment approaches. Enrolled participants had greater reductions in ED visits (-1299 per 1000 members, P=0.033) and hospital admissions (-234 per 1000 members, p=0.002) vs non-enrolled participants' ED visits (-1121 per 1000 members), and hospital visits (-181 per 1000 members) with return on investment of $1.24 for every dollar spent. The defined populations of 3 visits per 12-month period did not meet the already established statistical findings by Locker and Berkman (Berkman et al., 2011; Locker et al., 2007). This

low number of visit was also found to self-resolve without intervention and using a population with higher ED utilization may have been more insightful.

Grover et al. evaluated a pilot program which used intensive case management to reduce ED visits for 96 patients at a community hospital in California (Grover, Close, Villarreal, & Goldman, 2010). The results were reported for frequent users as having an average of 2.3 ED visits per patient per month in the six months prior to the intervention. After enrollment into the intervention, these same patients averaged 0.6 ED visits per patient per month ($p<0.001$). Of concern for this study is the use of 2.3 visits per six month period which is well below the more than 3 visits statistical threshold established. The multidisciplinary case management team consisted of physicians, nurses, social services workers, and pain management specialists. This team was effective in reducing ED usage by 83%. The most frequent payer source was Medi-Cal/Medicaid and the most common complaints were similar before and after enrollment: headache, back pain, abdominal pain, extremity pain, and chest pain. Interestingly, only 32% of patients attended referrals that were made on their behalf. The reasons for these failed attendances were not discussed. Nearly 90% of patients had insurance and a primary care physician but were not being adequately treated for their chronic conditions.

A randomized cost-effectiveness trial of clinical case management for ED frequent users was reported by Shumway and colleagues (Shumway, Boccellari, O'Brien, & Okin, 2008). A comparison of case management (n=167) versus usual care (n=85) for 252 frequent users of the ED was followed for a 24-month period. Case management was associated with statistically significant reductions in ED visits ($\chi^2=9.57$, $p<0.01$). However, there was no reduction in hospital services, ($\chi^2=2.97$, $p=0.08$). The study population was mostly male (75%) and mostly white (54%), with an average age of 43 years and mean education level of high school. Eighty-one percent of these patients were homeless and 67% had no medical insurance or social security income. In the year prior to the study, patients were diagnosed with

a mean of 14 co-morbidities, and the number of unique diagnoses ranged from 1 to 70. The most frequent diagnoses were mental disorders, injury, skin diseases, endocrine disorders, digestive system disorders, and respiratory illnesses.

In 2011 Althaus et al. performed a systematic literature review of interventions and compared the statistical significance of outcomes, for articles from 1985 to 2008 (Althaus et al., 2011). Many of the interventions used case managers from different disciplines, such as social workers, hospital case managers, and multi-discipline case management groups. Multi-disciplinary case management groups had the most significant impact on reducing ED visits by frequent users ($p<0.005$). Education and reorientation was the second most impactful intervention ($p<0.01$). Frequent users of the ED tended to respond best to holistic approaches to their care. These individuals also tended to be the sickest patients, who live outside of managed care settings and any acute exacerbations of their illness has a significant negative effect on their ability to perform activities of daily life.

Conclusion

It is evident from the literature that frequent users of the ED are usually insured, are mostly in their late-thirties to mid-forties, have multiple chronic co-morbidities, and tend to be dissatisfied with their community healthcare. None of the studies demonstrated a significant difference in male-female ratio of frequent users compared to non-frequent users. In 2013 76% of ED visits were made for non-urgent care by commercially insured patients (van der Linden et al., 2014). Frequent users and super users tended to be Medicaid or self-pay patients, come late in the day or after work, and according to the Centers for Disease Control and Prevention, need to be seen within an hour (Gindi et al., 2012). The three most common complaints across the board were extremities problems, gastrointestinal complaints, and chest pain or shortness of breath. Evidence-based interventions that have met success include multi-discipline care coordination teams, after-hours consultations, open-access appointments, reformed payment

schedules that more closely reflect ED payment schedules, telemedicine, and improved use and coordination with health information systems for tracking and care monitoring of physicians.

Table 1. Characteristics of ED Frequent Users and Super Users

Study location and reference	Study design	Type of outcome measured	Period	Frequent user threshold	Super user threshold	Characteristics
California **(Castillo et al., 2014)**	Retrospective, multicenter, cohort	925,719 patients 2,016,513 ED visits	2008-2010	6-20 visits/12 months 2699 (95% CI=1762-3635)	>20 visits/ 12 months 505 (95%CI 334-674)	Utilize many community care settings not just one particular ED
Netherlands **(van der Linden et al., 2014)**	Retrospective, descriptive correlational study of 2 ED	51,272 patients 71,565 ED visits Non urgent: FU 42% SU 33% Single visits 55% (P<0.001)	2012	7-17 visits /12 months 2.1% patients made 10% of ED visits	>17 visits/ 12 months 0.2% patients made 3.6% of ED visits	Mean age 48 years, males (57%), utilized night shift more, complaints of shortness of breath, abdominal pain, UTI, psychiatric disorders
Southeastern USA **(Schumacher et al., 2013)**	Observational, cross-sectional study design of adults >18 yo presenting to ED	Health literacy evaluations via interview tools 492 ED users OR 1.51 (95% CI 1.03-2.20), not able to see doctor OR1.7 (95% CI 1.09-2.66)	June 1, 2010 – August 31, 2010			Mean age 41 y, 38% AA or other race, 62% White, 45% male, 34% limited health literacy. Limited health literacy had public insurance (43%) or uninsured (38%)
USA **(LaCalle et al., 2013)**	Retrospective observational study	59,172 patients with 96,000 ED visits	Dec 1,2009 – Nov 30, 2010	4-19 visits/ 12 months 4045 patients (7.3%) made 23,217 ED visits (23%)	20 or more visits/ 12 months 31 patients 1059 visits (1.1%)	52% were in the age range of 30-59 years, 48% male, 81% insured, and 65% with at least one psychosocial cofactor. Most common complaints extremity problems, GI complaints, SOB, back and neck pain
Switzerland **(Bieler et al., 2012)**	Retrospective case-controlled randomized study	35,854 patients for 48,117 visits	April 1, 2008-March 31, 2009	4 or more visits within previous 12 months 1,591 (4.4%) patients made (12.1%) 5813 visits	Not defined	Mean age of 45years, 48% males, 20% separated or divorced (p<0.001), 32% unemployed (P<0.001), live less than 10 km from ED (87%, p<0.001)
Canada **(Doupe et al., 2012)**	Retrospective observational study	105,687 patients/ 200,810 visits	April 1 2004 – March 31, 2005	7-17 visits/ 12 months	>17 visits/ 12 months	Mean age 32y for FU, 47 for SU. Female FU 51%, SU 46%, predominately lowest income bracket 47%, 58% respectively. Most common complaints arthritis, asthma, diabetes, ischemic heart disease, and stroke. Most used more three physicians (OR2.1, 95% CI 1.9-2.3) and had more than 7 physician visits in the prior year or1.7, (95% CI 1.5-1.9) (p=0.001).
Multiple locations **((Berkman et al., 2011)**	Systematic Review on 41 cross-sectional studies	Impact of health literacy on ED visits and healthcare	2003-2011			Lower the health literacy less access to insurance, screenings all types, diabetes self-management, asthma control and increase disease burden and morbidity in the elderly. Increase utilization of ED for care needs.
Belguim **(Philips, Mahr, et al., 2010)**	Prospective survey design	Attitudes towards preference for ED usage 184 adults and 166 child	Feb-June 2006			Mean age 31y, married or living together (43%), choose ED for easy access (f= 16.251 p=0.000), good explanation (F=27.6 P=0.00) by doctor, late due time of payment (F=43.336 P=0.00)
Marseille, France **(Gentile et al., 2010)**	Prospective cross-sectional study	Complete questionnaire for patients considered non-	1 week from 9am-8pm			Mean age 36 years, 59% male, 76% self-referred to the ED. Most common reasons for going to the ED: difficulty getting appt (22%), pain (68.5%), needed ED services imaging, lab

		urgent users of the ED		tests, or prescription (38%). 68% willing to be reoriented OR 4.5 (95% CI 1.6-12.9) if perceived true emergency OR 0.9 (95%Cl 0.8-0.9). Most had primary care (62%), 38% had been to ED one or more times in the last year
USA **(McCarthy et al., 2009)**	Retrospective cohort study with 4 ED	ED volume ranged from 51,000- 61,000 patients per year	October 1, 2006-Sept 30, 2007	Mean age range from 34-43 years, 53% female, Acuity level of 3. Most common complaints, general symptoms, injury, and digestive, Most seen between 8am- 4pm, most with commercial payment.
USA **(Herndon et al., 2011)**	Retrospective systematic literature review on 31 health literacy articles and ED outcomes	Correlation of health literacy and ED usage	1995-2009	Increased risk for those over 65years and marginal literacy RR 1.45 (95% CI 1.01- 2.02), inadequate literacy RR 1.34 (95% CI 1.00-1.79)
Belgium **(Philips, Remmen, et al., 2010)**	Prospective cross-sectional study of 4 ED	1611 patient contacts, 971 used ED, 640 used GP	Two weekends Jan 2005	ED characteristics 51% men, mean age 32 years, registered with Physician 78%, Used ED in the last 12 months 40%, employed 51%, first language Dutch 77%. Most common reasons general and unspecific, digestive, musculoskeletal, respiratory complaints
Marseille, France **(Durand et al., 2011)**	Systematic Review of non-urgent users of the ED(n=34) 17 Prospective studies 34 Retrospective studies	Evaluate methods for categorizing non urgent ED patients with urgent ED patients	1980-2008	Categorization most frequently based on delay of care ranging from 3-72 hours, and duration of symptoms. Considerable variation ranging from 4.8% to 90% determined as non-urgent.
Rochester, NY **(Chapman et al., 2009)**	Prospective cohort study of those patients 65 and older visiting ED	749 patients	Not noted	Bivariate predictors of ED visits have increased OR(95% CI) Neuroticism 1.54 (1.09-2.19), Openness 1.13(0.78-1.64), female 1.18(0.62-2.28) >65 years 1.51 (1.03-2.21), impairment in activities in daily living OR 1.27 (1.10- 1.49) ($p<0.05$)
Georgia, USA **(Rust et al., 2009)**	Retrospective cohort study of 117 rural Georgia counties	695,690 patients made 2,070,778 ED visits of counties with and without community health centers	2003-2005	Characteristics of ED visitors have 50% female, 60% white with mean age 34 years. 14.5% considered non-emergent ED service RR 1.31 (1.06-1.62) most common complaints Asthma (RR 1.06: 0.86-1.30), diabetes (RR 0.95: 0.78-1.17), hypertension RR 1.01(0.81-1.26) Counties with and without community health centers used the ED similarly.
USA **(Rust et al., 2008)**	Retrospective study of 2005 National Health Interview Survey	ED users 34.168,828 from 2005barriers to primary care	2004-2005	62% female in the age range of 18-44 years, non-Hispanic black OR 1.21 (1.08-1.36), < High school 1.25 (1.10-1.41), income <20,000 1.32(1.21-1.45), Health status fair to poor 2.75 (2.50-3), Barriers to primary care access no appt on phone 1.27(1.02-1.59), no timely appt 1.45 (1.21-1.75), wait in office too long 1.20 (1.02-1.41), afterhours 1.24 (0.99-1.55), no transportation 1.88 (1.50-2.35)
USA **(Vieth & Rhodes, 2008)**	Retrospective study on 9 US cities 603 EDs	Barriers to follow-up care for ED users	May 2002-Feb 2003	43% (95% CI 40.9-45) of calls for follow-up care at a primary care setting were unsuccessful. 17% of calls for pneumonia, hypertension, ectopic pregnancy were un successful (95% CI 13-18.8), 54% (95% CI 52-56.4) of appt that required after hours care
USA **(Weinick et al., 2009)**	Prospective study	Determine the organization and function of urgent care centers	Sept – Nov 2007	Urgent care centers predominately open between 8-9am(48%), close between 7-9p(50%) or later 41% and are open on weekends for at least 9a-7p 41%, run mostly by family practice doctors and accept commercial insurance 51% or self-pay 12%.

Table 2 Interventions for Frequent Users of the ED

Study location	Study Design	Period	Targeted Characteristics	Intervention	Outcomes
Georgia, USA **(Rust et al., 2009)**	Retrospective cohort study of 117 rural Georgia counties	2003-2005	Decrease overutilization of ED for rural counties that have limited community healthcare options	Community health centers for rural Georgia counties regardless of patients ability to pay	**Without FQHC**: Population density 62.7 per square mile, Counties with at least one hospital 81%, primary care physicians/ 100,000= 45.7 RR for ED visits 1.33 95% CI 1.11-1.59 **With FQHC**: Population density 40 per square mile Counties with at least one hospital 54%, primary care physicians/ 100,000= 47.9.
Texas, USA **(Enard & Ganelin, 2013)**	Retrospective, observational, nonequivalent comparison study using quasi-experimental study design which includes pre and posttests, and non-randomized control group	Nov 2008-April 2011	Decrease overutilization of the ED for non-urgent complaints acuity levels of 3,4 or 5 indicating minimum urgency acuity.	Medicaid, uninsured and patients with state sponsored insurance assigned patient navigator to advocate for the patient and to schedule with community based healthcare	Characteristics of navigated population: N= 13,642 58% white, 60% age range of 18-34 years, 60% female, uninsured 79%. Impact was the greatest for those who visited the ED 2 or fewer times with 42% and 29% reductions in ED use. OR 0.83 95% CI=0.71-.98, p<0.05. Those that visited the ED 3, 4 or 5 times had the least impact from patient navigators with 22-10% reduction in visits, none being significant. This was true for 12 month and 24 month follow-up. INCONCLUSIVE
Washington State, USA **(Murphy & Neven, 2014)**	Two year retrospective pre-post analysis	Jan 1 ,2008-Dec 31, 2010	Decrease frequent (3-11 visits/12 months) n= 65 and super user (>11 visits/ 12 months) n= 76 ED utilization	Frequent users and super users enrolled in multidiscipline ED-care coordination program	Characteristics of enrolled population/12 months: Super users averaged 19 visit pre enrollment with 4 visits post enrollment difference of -15 (95% CI (-17 to -13) p=0.0. Frequent users average 7 visits pre enrollment and 2 visits post enrollment difference -5 (95% CI -5 to -2) p=0.0
USA **Washington State Best Practice Implementation, 2014**	One year retrospective pre and post analysis	June 2012-June 2013	Decrease visits by frequent users all patients with > 5 visits/12 months	Patient Review and Coordination Program, improved coordination with ED and Primary care physicians with electronic notifications, community based paramedic programs and improved services with mental health clinics	Rate of ED visits declined 9.9% since 2012, Rate of frequent visitors declined by 10.7%, Rate of resulting in a scheduled drug prescription decreased by 24%, Rate of low acuity ED visits decreased by 14%
USA **New England Healthcare Institute 2010**	10 year retrospective study of reasons for ED visits	1995-2005	Patient have limited access to timely primary care services ED provides convenient after hours and weekend care ED offers immediate assurances about patients medical conditions Primary care providers refer patients to the ED ED have financial and legal obligations to treat ED patients	Right care in the right place at the right time	Physicians provide extended practice hours reduced ED visits by 8% over 18 month period Group visits or shared medical visits decreased ED visits by 17% for those who were enrolled in the program. Coordinating care for vulnerable patients to appropriate services can decrease ED care by 6%-20%. Hospital run urgent care clinics decrease ED visits by 48% Telemedicine decrease pediatric visits by 28% Improved chronic disease management can drop number of ED visits for these patient from 26 to 6 visits/ year.
USA **(Navratil-Strawn et al.,**	Prospective 6 month cohort study	June 1, 2011-Nov 30 2011	AARP Medigap insured individual who were identified as using the ED 3 or more times/ 12	ERDS involves a nurse assisting patient make appts with high quality	59% were 65-74 years old 60% women, 40% high income, 65% minority, 36% from the South, 40% with 4-5 ED visits in previous 12 months. Outcome

2014)			month period (n=7070) to enroll in emergency dept decision support program	providers who offer holistic approach for managing individuals with multiple chronic conditions	incremental difference (-)178 from baseline, P=0.033.
California **(Grover et al., 2010)**	Observational retrospective study in a single community hospital	May 2006 – April 2008	96 patients enrolled in case management for frequent users of ED > 5 visits in the previous month	case management program with multi- disciplinary team (physicians, nurses, social services, pain management specialist and behavioral health)	Baseline characteristics of the frequent users 67% female, 67% white, average age 42 years, 94% with limited or no narcotic use, 34% with Medicaid, Most common complaints headache, back pain, abdominal pain, extremity pain, chest pain. Results drop from 2.3 visits/ 6 months to 0.6 visits per 6 months (P<0.0001)
California **(Shumway et al., 2008)**	Prospective randomized 24 month study	March 1997- Feb 1999	Cost-effectiveness of clinical case management to usual care among frequent users of ED, and does cost-effectiveness vary with level of prior ED use.	Study includes individuals over age 18 who visited the ED five or more times over 12 months. N= 252 patients	Characteristics 75% male, 54% African American, mean age of 43years, education of high school graduate, highest ED users lacked health insurance, lack of social security, unmet financial needs and alcohol abuse. Most common complaints mental disorders (22%), injury (16%), skin diseases (8%) endocrine disorders (5%), digestive disorders (5%). Respiratory illness (5%). Decreased ED visits X2= 9.57 Pb=0.1) However ED users with more than 12 visits/12 months were unaffected by the intervention. X2= 58.25 P b=0.01). And no decrease in other hospital services.
(Althaus et al., 2011)	Systematic Review of healthcare interventions 3 randomized, 2 controlled before and after, 6 non-controlled before and after studies.	From inception to 2009	Interventions with good study design	Case management using various scenarios from social workers, to hospital case managers, to multi-discipline groups	Most successful interventions had p values of<0.05, 1. Counseling on use of healthcare and social system by a social worker. (1985)(p<0.01) 2. Evaluation of the needs choice by the patient of a coordination group with care plan 53% reduction (p<0..005) (2004)

Chapter 3: Methodology

Introduction

The objective of this community barriers assessment was to determine reasons for frequent ED utilization in spite of the extensive alternatives for this population. Current NGHS activities for reorientation of frequent users include the assignment of a clinic for follow-up with the patient, and for the super users, and assignment of care coordinators to assist with managing appointments. Three questions will be assessed:

- Are patients able to utilize the clinics or doctor referrals assigned to them?
- What healthcare alternatives for acute exacerbations of illness do patients try to utilize prior to coming to the ED?
- What possible perceptions, awareness, and barriers are the patients experiencing for which they feel the ED is the only available care?

Population and Sample

The population included all ED visitors from October 1, 2013 to April 30, 2014. The study sample included all super users, defined as those who presented six or more times in a seven-month period to the Northeast Georgia Medical Center Emergency Department in Gainesville, Georgia, with no further restrictions. Vulnerable populations were included in this study, including pregnant women and interviews of a parent who accompanied their children. All data analyzed were delinked from patient identifiers.

Research Design

This is a mixed method retrospective observational study of ED super users (Appendix A). The most common 351 super users of the ED were identified based purely on frequency of visits; no other criteria were assigned to search parameters. The setting for this study was at the Northeast Georgia Medical

Center Emergency Department or by telephone. Primary data with respect to patient demographics, visit reasons, time of day and day of week for visits, and number of visits were provided by the hospital via an Excel spreadsheet. The study also included both phone interviews and face-to-face interviews, and data collection via the hospital database for patients identified as having more than six visits in the last seven months and defined by the hospital as frequent utilizers of the ED. Data was collected with a standardized hospital interview tool that was updated to focus on compliance and visit reasons, and from data acquired from the ED database (Appendix B).

This study included contact with patients. However, once the data were collected all subjects were assigned an arbitrary number and data analysis involved only delinked data. HIPAA and student access education have been completed and criteria successfully met to allow the student to participate in the quality improvement project. Subjects were self-recruiting, based solely on ED utilization.

Instruments

Interviews were selected by frequency of use, using a questionnaire with standardized questions from various sources to address the concerns of interest to the hospital admission committee. The "Most common 351" super users were identified via frequency of visits to the ED as reported in an Excel spreadsheet provided by the hospital and contact attempted either by phone or by face-to-face interview to identify possible barriers via an existing interview tool. The quantitative information extracted from the hospital database included demographic data; ED visit times, ICD-9 code for complaints, payer sources and visit frequency for the most common 351 frequent users of the ED. These data were further supplemented qualitatively with a survey tool initiated by the hospital and further revised to determine attitudes, barriers to community healthcare and perceptions of the ED. The respondent burden was minimal and did not require more than 20 minutes. The instrument assessed a patient's overall ED experience (subjectively positive or negative), reason for the visit to the ED, and prior contact with

primary care providers or specialists prior to the ED visit. Other components assessed were the number of physicians seen within 90 days and the patient's perceived barriers to going to urgent care or clinics, or obtaining medication for therapy compliance. Identification of community risk factors such as a patient's social support, socioeconomic status, knowledge of community healthcare settings, transportation or demographic profile, and environment were also collected, to assess their contribution to ED readmission risk.

Data Analysis

Records for all ED visits during the study period were extracted and imported into Excel. Unique patient identifiers were used to count patients who had attended the ED ≥6 times and demographic data for these 351 patients was extracted to a separate Excel worksheet. This Excel sheet was used to extract data such as number of visits, high frequency visit day of week, high frequency hours, most common payer, and chief complaint. Excel formulas and figure results are reported in appendix C. Survey information was uploaded into Epi-Info and statistical analysis was performed. The hospital requested the final data in an Excel file which was sent to the physician leading the study. All hospital data were analyzed using Excel formulas. All survey information was analyzed using Epi-Info 3.5.4 Statistical Program. Survey data provided the following information:

- Verbatim comments on what the ED does well to serve super users and what they do not do well
- Overall rating of the ED experience
- Number of doctor visits
- Number of doctors seen
- Clinics utilized
- Reasons why they came to the ED instead of going to the doctors' office
- Medication compliance and reasons why patients cannot get needed medications

- Reasons for not visiting the urgent care facility
- Comments on how the community can help these patients get community care
- Comments on how NGHS can assist the community to decrease ED visits

The Epi-Info code book and formulas for statistical analysis were added in the addendum and discussed in the results.

Limitation and Delimitations

There were several weaknesses in the sampling of the super user group. These included incorrect contact numbers, several individuals declined, with a few Spanish speakers declining because of lack of an interpreter, and several patients were not reachable between 8 am to 5 pm, the time when the calls were performed. This study was conducted in only one ED setting and during regular hours, so the responses to the interviews may not be generalizable to the wider population of ED patients in other communities. Health literacy was not assessed during these interviews and may be an important factor in ED utilization. Severity of medical conditions was not assessed in the study, only the ICD 9 code assigned to each visit. Multiple sites of care such as visits to other EDs or clinic visits outside this ED environment were not assessed.

Delimitations included those frequent super users of the ED from October 1, 2013 through April 30, 2014. Contact was attempted for all individuals identified as using the ED on a monthly basis.

Emory University Institutional Review Board Clearance

The Emory Institutional Review Board approved this proposal and gave the data and report for study exempt status. The IRB ruled that there was no risk to study participants since there would be no patient interventions. Consents were signed during the ED visit and specifically included surveys. The recommendations derived from the analyses will be given to the hospital readmission board to improve patient access and education about community healthcare settings. There were no immediate benefits to

study participants since recommendations will need to have an action plan created by Northeast Georgia Medical Center and education to change ED overutilization behaviors as a quality improvement measure.

Summary

This study should define the characteristics of the frequent users of the ED. The study should assist the healthcare providers in determining interventions which should benefit the specific characteristics of their ED population. Results were reported to the hospital readmission board in an effort to delineate where resources will most effectively benefit the hospital's objectives and improve patient care.

Chapter 4: Results

Introduction

Two data sets were used to determine the barriers to community care for frequent users of the NGHS ED. An Excel spreadsheet provided by the hospital was delinked from patient identifiers once frequent users were identified and patients were interviewed for their perceptions of care and community barriers to care. The second data set was created based on a modified version of an existing survey for patients coming to the ED. This data was used to assess patients' perceptions and the magnitude of perceived barriers to community care for frequent visitors to the ED. The most common barriers identified in the literature related to cost of community care, appointment barriers, and healthcare urgency perceptions by the patient, medication compliance, health literacy, cultural norms, and transportation.

Demographics

From October 1, 2013 through April 30, 2014, 35,299 patients visited the NGHS Emergency Department, with a total of 49,087 visits. Frequent users were defined as those who visited the ED six or more times during the study period, as defined by Locker (Locker et al., 2007). The characteristics of the 351 frequent ED users were compared to those of the 34,948 patients who visited fewer than six times (Figure 1). The frequent visitors represented 0.99% of the ED patient population but they accounted for 5.6% of all visits.

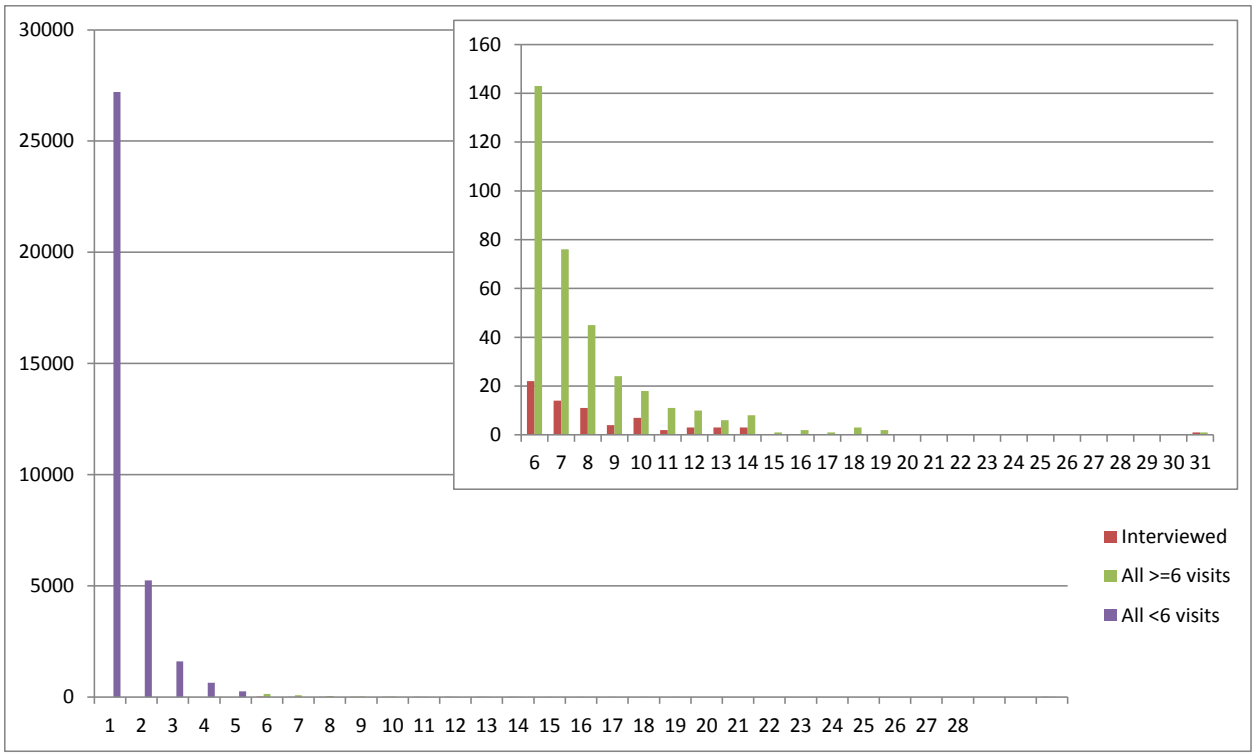


Figure 1. Frequency of NGHS ED visits, October 1, 2013 to April 30, 2014, per individual patient. Inset: expanded scale for patients with ≥6 visits.

Table 3 summarizes the demographic characteristics of the study population, stratified by ED usage (frequent vs. non-frequent); the frequent users were further subdivided into those who were interviewed and those who were not interviewed. The median age of all visitors was 31 (±23.8) years and they were predominantly white (64.9%). Frequent users were more likely to be female than non-frequent users (70% vs 55.5%, respectively). Self-pay, Medicare, and Medicaid were the predominant payer sources for the frequent users group (combined total of 83.3%), with only 16.8% having private insurance. The less than six visit group had a combined total of self-pay, Medicare, and Medicaid payer source of 56.6% and private insurance payer source of 43.4%.

Table 3: Patient characteristics, October 1, 2013 through April 30, 2014

	Patients Interviewed N=70 (std dev)	Patients Not interviewed N=281(std dev)	All Patients ≥6 Visits N=351(std dev)	All Patients <6 Visits N=35,299 (std dev)
Age				
Median age	35.0 (±19.8)	31.0 (±17.2)	32.0 (± 17.8)	31.0 (± 23.8)
<18 yo	12.9%	17.1%	16.2%	25.3%
18-24 yo	18.6%	11.4%	12.8%	11.3%
25-34 yo	15.7%	26.3%	24.2%	15.2%
35-44 yo	18.6%	21.7%	21.1%	12.5%
45-64 yo	25.7%	20.3%	21.4%	19.6%
>64 yo	8.6%	3.2%	1.7%	13.4%
Gender				
Male	21.4%	31.7%	29.9%	44.4%
Female	78.6%	68.3%	70.4%	55.5%
Ethnicity				
American Indian	0.0%	0.0%	0.0%	0.1%
Asian	0.0%	0.4%	0.3%	0.5%
Black	7.1%	13.9%	12.5%	8.6%
White	81.4%	77.6%	78.3%	64.9%
Other	11.4%	8.2%	8.8%	16.7%
Payor Source				
Self-pay	30.0%	33.1%	32.5%	23.7%
Medicaid	12.9%	18.5%	17.4%	5.6%
Wellcare	11.4%	11.7%	11.7%	8.7%
Medicare hospital	17.1%	10.0%	11.4%	10.9%
Amerigroup	5.7%	11.4%	10.3%	7.7%
Private insurance	22.9%	15.3%	16.8%	43.4%

The most common admission complaints for all three groups were abdominal pain or discomfort, chest pain, and generalized pain (Table 4). The three most frequent principal discharge diagnosis groups in all three patient groups were reported as abdominal complaints, chest pain, and bronchitis. For the frequent users, gastrointestinal symptoms such as nausea, vomiting, and diabetes were the next most frequent complaints at presentation, whereas generalized pain and hypertension were next for the non-frequent

users. Seven percent of 35,299 patients reported coming back to the ED for the same or a similar complaint (Figure 2). Sunday and Monday were the peak days for ED visits, and peak visiting hours were between 4:00 pm and 9:00 pm (Figure 3).

Table 4: Most common diagnoses codes for all ED visits

Admission Diagnoses								
Interviewed			All >=6 Visits			All <6 Visits		
Count	**ICD**		**Count**	**ICD**		**Count**	**ICD**	
102	789	Abdominal	470	789	Abdominal	5911	789	Abdominal
97	786	Chest pain	430	786	Chest pain	5719	786	Chest pain
43	780	Generalized pain	181	780	Generalized pain	4637	780	Generalized pain
38	787	GI symptoms	167	724	Back pain	2265	719	Joint pain
3	401	Hypertension	17	345	Epilepsy	248	599	UTI
Principal Discharge Diagnoses								
50	789	Abdominal	222	789	Abdominal	2481	789	Abdominal
46	786	Chest pain	183	786	Chest pain	1979	786	Chest pain
27	466	Bronchitis	129	466	Bronchitis	1775	466	Bronchitis
27	787	GI symptoms	109	787	GI symptoms	1606	780	Generalized pain
7	465	URI	29	250	Diabetes	417	401	Hypertension

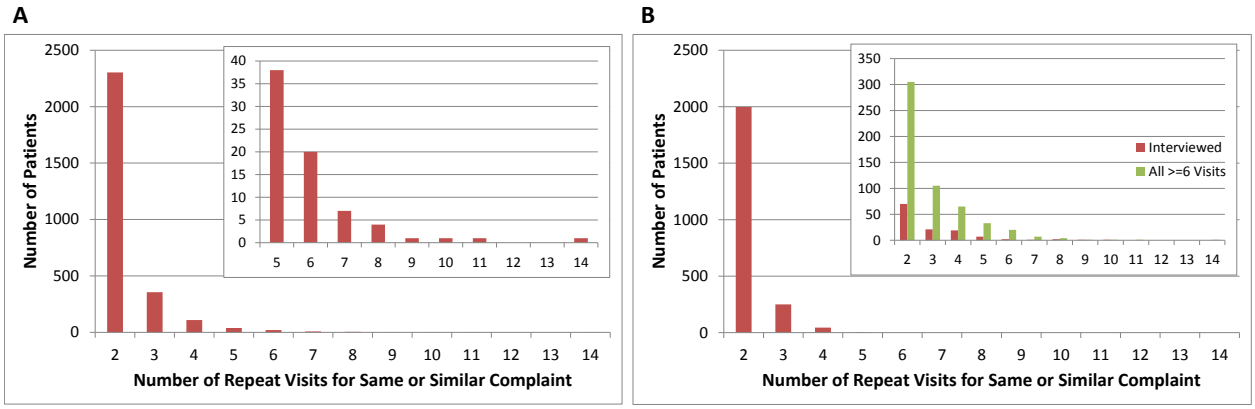


Figure 2 Frequency of return visits for the same or a similar complaint, derived from admission diagnosis ICD-9 codes. A. All patients. B. Patients who visited ≥6 times.

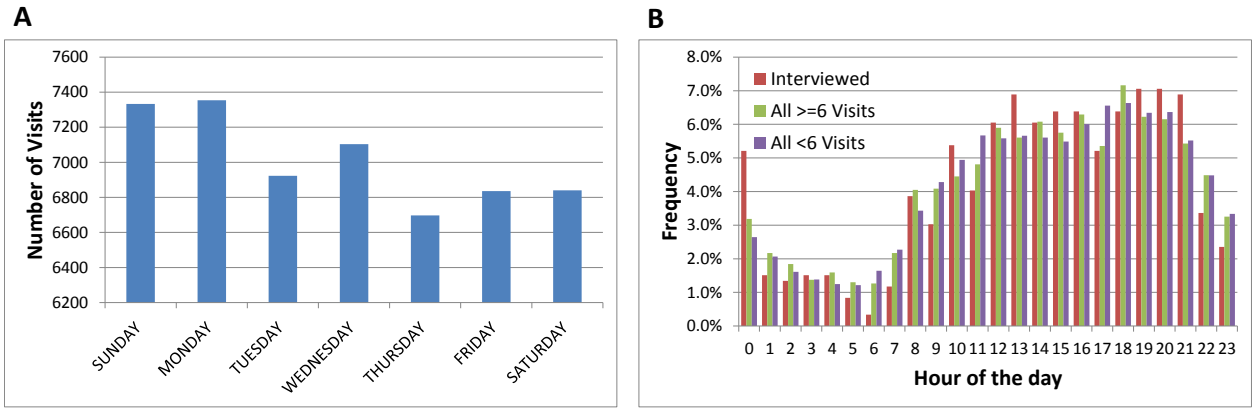


Figure 3 Temporal trends in NGHS ED visits, for all patients. A. Count by day of week. B. Frequency by hour of day

Interview Findings

Interview findings were calculated using EPI-Info (for command library, see Appendix D). Seventy of the 351 patients identified as frequent users of the ED were interviewed. Contact results indicate that most individuals were not reachable during the study hours of 8:00 am to 5:00 pm (Figure 4). Seventy percent of those interviewed stated that the ED staff worked well together and that the overall experience was positive. Twenty-one percent of patients admitted to visiting the ED at least three times in the previous 90 days, with 34% stating that it was for the same or similar complaint. Seventy-one percent of frequent visitors did not have family members visit the ED in the previous 90 days. Thirty-three percent called their doctor prior to coming to the ED; of these, 28.5% were referred to the ED by the office staff or the doctor. Although 51.4% of patients denied any barriers to seeing their physician, with the exception of appointment availability or after-hours needs, they all went to the ED. Only 28.6% of patients felt that they could go to an urgent care or alternate clinic; the remainder stated that their insurance did not cover the visit, or that the copay was more than they could afford.

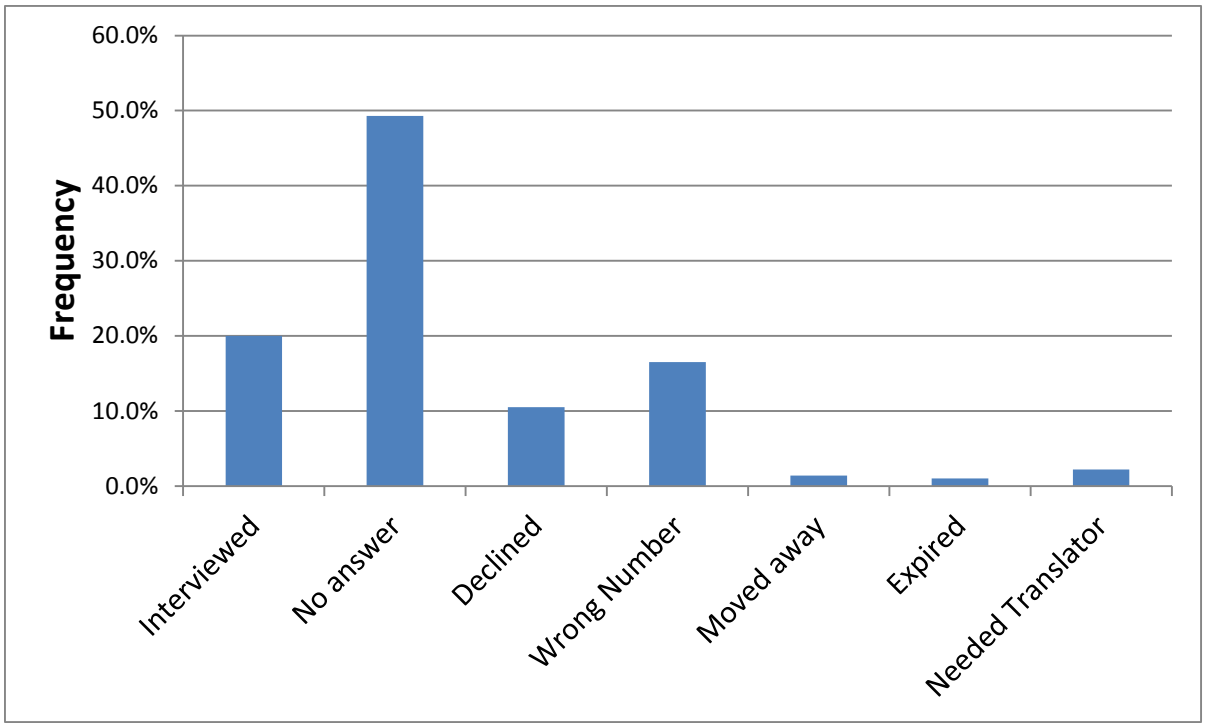


Figure 4 Results for attempts to contact frequent NGHS ED users

Seventy percent of those interviewed admitted to having had two or more doctor visits in the previous 90-day period prior to their ED visit. Fifty-eight percent of the patients interviewed admitted to seeing two or more doctors in the previous 90 days, many of them specialists (Figure 5). The number of doctor visits and number of doctors was significantly correlated with increased incidence related to similar complaints for visiting the ED ($p=0.047$). Conversely, for those patients returning to the ED for unrelated complaints, there was no correlation ($p=0.12$). The median number of days between visits was 14 days and median number of days to the next doctor visit after the ED visit was reported as 7 days. Forty-one percent of patients have physicians at the Longstreet clinic, 29% were seen at the Northeast Georgia Physicians Group, and 19% were being seen at clinics off campus. For the patients who did not see a doctor prior to visiting the ED, 52% reported there were no available or no convenient appointments, 29% reported having transportation issues, and 27% cited the cost (Figure 6).

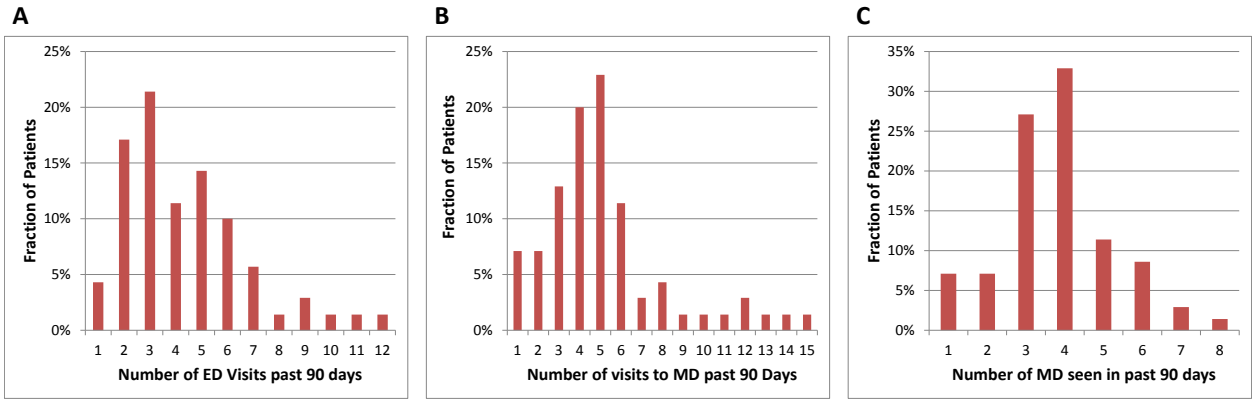


Figure 5 Patient-reported frequency of ED (A) and doctor visits (B), and number of doctors seen (C) in the 90 days prior to their latest ED visit

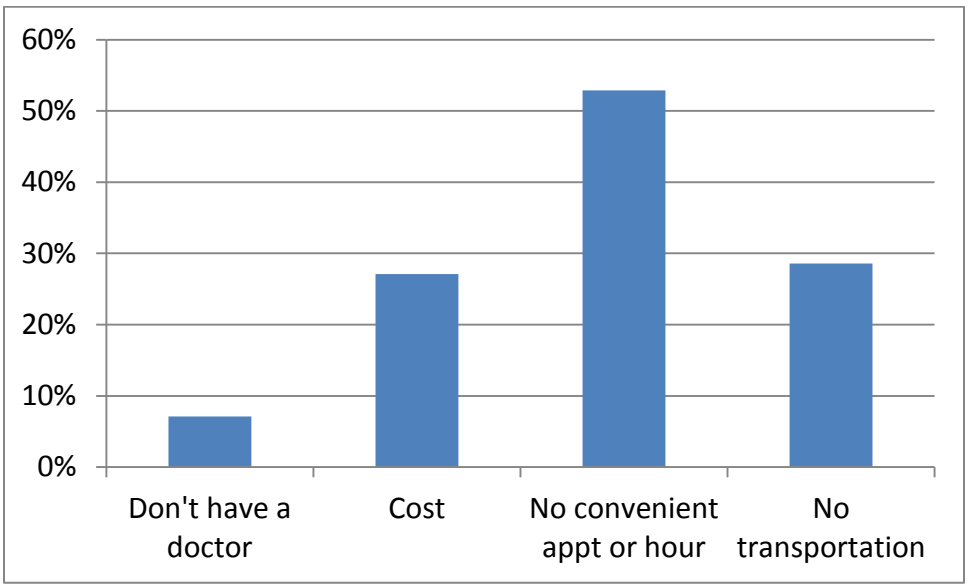


Figure 6. Reasons doctor was not seen

Forty-eight percent of patients reported using one-to-five medications per day, with 19% reporting six-to-nine medications, and 19% using more than nine medications per day. Of the 23% of patients who reported not being able to take their medications as directed, cost, transportation, and side effects were the most common barriers. Only 33% of patients claimed to carry their health history or list of medications.

Other Findings

Several common themes emerged from the survey's free text (comment) fields. As illustrated in the overall rating of the ED, individuals who were happy with their visits considered the ED to be quick, caring, efficient, and competent. On the other hand, patients who were dissatisfied with their experience included comments such as lack of respect for the patient's needs, failure to resolve healthcare issue, failure to listen to the patient's concerns, and failure to provide empathy or compassion. These two opposing perceptions were often associated with those patients who visited the ED for pain issues versus those who visited the ED for non-pain symptoms. Several of the dissatisfied patients commented that they felt they were being profiled with drug seeking behavior, yet ICD-9 codes suggested that their pain complaints were legitimate

Many patients stated that they had tried to utilize the urgent care clinic in the past but were referred back to the ED. Other reasons for not visiting the urgent care center included distance, unaware of the option, or the patient felt that the urgent care facility could not handle the seriousness of their illness, e.g. kidney stones, congestive heart failure, or Crohn's disease.

Comments associated with doctor care improvement included longer hours, clinics that stayed open 24/7 and accepted the same kind of insurance and billing options as the hospital ED, and "better" doctors who will have a better impact on disease management and quality of life, with fewer appointments. Doctors need to be sensitive to patients with mobility barriers, and to those who need assistance with referral to specialists and physicians that will accept payment options that are acceptable to the patient. Community health care will need to provide different options for very fragile patients such as those with advanced congestive heart failure and end of life diagnosis.

Comments associated with the ED were very positive as they are handling complaints for which the primary care setting and specialist are not. However, these solutions are short-lived and require patients returning to the ED frequently to solve problems that they feel that their physician cannot.

Limitations

There were several limitations to the interview aspect of this study. Patients were only contacted between 8:00 am and 5:00 pm, Monday through Friday, which may have missed patients who were at work during the time and who may be the highest utilizers of after-hours ED visits. The number of patients contacted was small and the demographics were slightly different when compared to the demographics of those of designated frequent users who were not interviewed. Many of the patients admitted to using several different ED to get their care, possibly skewing the number of ED visits downward and underreporting the magnitude of ED overutilization. Eight patients who were contacted spoke only Spanish, and a Spanish interpreter was not available. This subpopulation may have given a different list of barriers for community care, including language barriers.

Summary

The demographic analysis of the frequent visitors to the NGHS ED indicated that patients who are relatively young and poor may have multiple co-morbidities and have difficulty managing their disease states in the traditional medical format. They are drawn to the ED because it gives them flexibility, relief, and accessibility which they do not perceive is available in the community. Many of these patients visit multiple physicians and take a number of medications in an effort to stabilize their illness, but are failing to decrease the number of acute episodes. Many patients feel they are not getting the care they need to get better. Although not statistically significant in this study, the four major themes with respect to barriers were failure of the physician to provide care that positively impacts their disease, cost, appointment availability, and transportation.

Chapter 5: Discussion

Introduction

Effective health maintenance requires an understanding of how interventions impact the patient's privacy, personal preferences, and autonomous decision-making skills. Financial constraints, medical insurance status, transportation, and functional status of the patient all contribute to the success of healthcare outcomes (New England Healthcare Institute, 2010). Differences in expectations from the patient and the healthcare provider may create unexpected disparities. Goal setting and a firm understanding of the patient's cultural norms and functional status may improve understanding of expectations with respect to the healthcare provider and the patient.

Summary of Study

NGHS continues to have one of the busiest EDs in Georgia. However, over 10% of the population that visit the ED are excessive users, with 6-12 visits per year, and 0.99% are considered super users, with 13 or more visits per year. As healthcare costs become more of a burden on the country's gross national product, these frequent users need to be redirected into community care settings. Determining the perceived barriers to community care for this subpopulation of ED visitors has been the focus of this study.

This was an observational study which identified frequent users of the ED solely by number of visits to the ED between October 1, 2013 and April 30, 2014. An Excel spreadsheet was provided by the hospital, containing data on patient demographics, reasons for ED visits, time of day and day of the week, and ICD-9 codes for primary diagnosis and admission diagnosis for each visit during the study period. Patients who visited six or more times were identified and a subset were surveyed using a hospital survey form, either in person or via telephone, within 30 days of their last visit, for which they signed consent. Most of the 70 patients interviewed had been seen in the ED within a two-week period

of the interview. This survey established their perceptions of the ED, reasons why they came to the ED instead of community healthcare alternatives, their perceived number of visits and reasons, and the assessment of possible barriers to community-based care with respect to medications, cost, transportation, physician availability and healthcare expectations.

Results from the survey and hospital Excel sheet identified frequent ED visitor at NGHS as younger (31 years), poor (70% self-pay or Medicaid), women (70%) who are predominately white (78%), with common complaints of abdomen, chest, and generalized pain. This demographic profile has several differences when compared to the literature search findings. Although the median age of 31 years fell within the range of 30-59 years, most literature reported an older median age of 36-48 years, and an equal representation of males and females (Castillo et al., 2014; LaCalle et al., 2013; van der Linden et al., 2014). Another significant difference with respect to NGHS and the literature is that the most frequent common complaints in the literature are extremity complaints, GI symptoms, and shortness of breath. Commonalities between the literature findings and this group included poor socioeconomic status, chronic illnesses which were poorly controlled, and heavily utilized many community care settings (Gentile et al., 2010; Gindi et al., 2012).

Perceived barriers to care included cost, appointment convenience, lack of transportation, and failure to find a physician who would improve their symptomology. Most of these patients stated that they saw at least two physicians per 90-day period, had at least two appointments in that time frame, and averaged having at least one office visit every 30 days. NGHS ED frequent visitors preferred physicians who would take time and get to the root of the problem, listen to what the patient is trying to communicate, and give good explanations in a way they can understand. Many comments relating to perceptions of care by these patients included a perceived lack of compassion and empathy by the healthcare profession overall, the inability of specialists to resolve healthcare issues that were important to the patient, the lack

of availability after-hours and on weekends, the high number of office visits, and the associated costs. These findings were similar to those reported in the literature, in which frequent ED users had an average of seven primary care provider visits per year, at least three specialist visits per year, and were seen for non-emergent care (Doupe et al., 2012; Philips, Mahr, et al., 2010). Philips also identified accessibility, competency, and proximity as reasons not to go to the physician's office. Rust determined five most common barriers, four of which also were reflected in interviewee comments: lack of appointment availability, long wait times in physician's office, no available after-hours appointment, and lack of transportation (Rust et al., 2008).

Although health literacy was not specifically addressed, the "disconnect" between compliance and perception in the question related to physician availability and medication compliance indicates that this will need to be explored more fully. The literature suggests mixed association between health literacy and compliance with respect to medication and health recommendation behavior changes. It also reported a lower incidence of preventative vaccinations, health screenings, understanding of disease-related knowledge, and inappropriate healthcare service utilization (Berkman et al., 2011).

Most ED visits were for the same or similar complaints and involved an exacerbation of their illness. ED visits peaked on Sunday and Monday and between the hours of 4 pm to 9 pm. The literature supports the perception that many frequent ED visitors return for same or similar complaints (Doupe et al., 2012; Durand et al., 2011). However, the NGHS population data did not match published after-hours patterns that reported that heaviest ED use occurred from 8am-4 pm and only 20% of the population visited the ED after hours (McCarthy et al., 2009; Philips, Remmen, et al., 2010). Many interviewees in this study would not utilize urgent care facilities even though their insurance was accepted, largely because copay was required prior to service. Urgent care centers should be considered a feasible option for the NGHS frequent ED user populations if they can be reoriented to the available alternative payment options.

Study conclusions illustrate a "disconnect" between the healthcare systems' perceptions and those of patients who live with chronic illness. NGHS trends in ED visits do not follow those reported in the literature with respect to age, doctor visit compliance, or medication compliance, as the NGHS patients tended to be younger, poorer, and with a higher percentage of women than what has been reported (Doupe et al., 2012; LaCalle et al., 2013; van der Linden et al., 2014). Cost appears to be a major driver in community care availability and outcome for NGHS ED patients. Patient behaviors have been formed around the shortcomings and negative experiences in getting the care they need. The ED provides a competent, caring environment that has the capacity to serve their perceived health care needs without a direct price tag attached to it. Patients in this setting cannot be turned away and patients who feel that the price of healthcare is too expensive or inconvenient in the community setting will continue to come to the ED for their needs.

Conclusion

The results from the 2011 National Health Interview Survey (NHIS) described frequent ED users perceived barriers similar with what is seen at NGHS (Gindi et al., 2012).The magnitude of these barriers is also in line with those found in the literature at the national level. Even though patients may have access to primary care, they often feel that their community health care does not meet their health goals. On the other hand, these patients feel the ED does provide for their health needs with respect to relief, convenience, cost, and resolution of acute exacerbations.

Fifty-seven percent of NGHS patients felt they had nowhere else to go, compared to 46.3% from the NHIS, and 51.4% NGHS patients were referred to the ED by the doctor's office, compared to 48% from the NHIS. Although not quantitatively collected for the NGHS survey, general themes communicated in patients' comments were in line with the NHIS, such as the perception that "only the hospital could help," the physician's office was not open when needed, and a belief that they could get the most

appropriate care in the ED. All of the NGHS ED interviewees felt they had unmet medical needs, even when they had community healthcare.

Implications

Washington State has developed "seven keys to preventable ED visits (Washington State Health Care Authority, 2014)." These recommendations include tracking all emergency room visits, to reduce ED shopping, and to better establish the magnitude of the problem, implementing patient education efforts to reorient these individuals to appropriate care settings, institution of extensive case management programs to reduce inappropriate ED use, collaborating with physicians to see patients within 72-96 hours after an ED visit, implementing strict narcotic dispensing guidelines, tracking narcotic usage via tracking databases, and program tracking processes to monitor the success of the interventions. Of these recommendations, NGHS uses patient education, case management, and physician collaboration, and they have implemented strict narcotic guidelines. However, few if any of these interventions meet the unmet medical needs of the patients. Many of the patients who have participated in these interventions are still returning to the ED. In addition, care coordinators, individuals who help the patient manage appointments between multiple healthcare providers, are now being introduced in an effort to manage these patients but have met with limited success.

Recommendations

The PRECEED-PROCEED model (Green & Kreuter, 1991) is the recommended intervention model in this type of healthcare setting, but there continues to be a gap in the knowledge, beliefs, and attitudes between the healthcare team and the patients they are trying to serve. Healthcare providers will need to consider patient perceptions and negotiate expectations towards outcomes that are manageable for the patient. Goal setting which addresses economic or physical factors that support availability and accessibility of resources for services that facilitate the targeted behavior change will be paramount in

changing the behavior of these frequent ED users. These patients may need assistance in managing the many appointments with which they are burdened, but then convenience and compliance can become an issue. Such patients seek illness management options that are meaningful in their day-to-day lives and tailored to their specific health needs.

Evidence-based interventions in the literature suggest that Georgia's population is more likely to be uninsured, have an increased probability of visiting the ED, and have frequent users of ED who are more resistant to changes in healthcare-seeking behaviors (Rust et al., 2009) . Four patients who had been previously identified as super users of the ED were matched with care coordinators at NGHS and followed; they all continued to visit the ED on a regular basis and denied their frequent usage when questioned on the telephone survey. These patients may have already missed the opportunity for changing behavior, as their continued visits to the ED continue to positively enforce their belief that the ED provides competent, quick, and accessible care for their healthcare needs.

The literature reports several interventions that have met with great success since 2005. The use of multi-disciplinary teams with ED care coordinators appears to be the most successful across all populations in the ED for decreasing overutilization (Grover et al., 2010; Murphy & Neven, 2014). These multidisciplinary teams included physicians, nurses, social workers, and pain management specialists, and were found to decrease ED visits by 83%. The Washington State intervention is meeting with some success but is limited to states that have sufficient tracking modalities in place for all the aspects of the programs that need to be assessed. Georgia does not—it lacks a statewide care tracking service and only recently has activated a controlled substances tracking program.

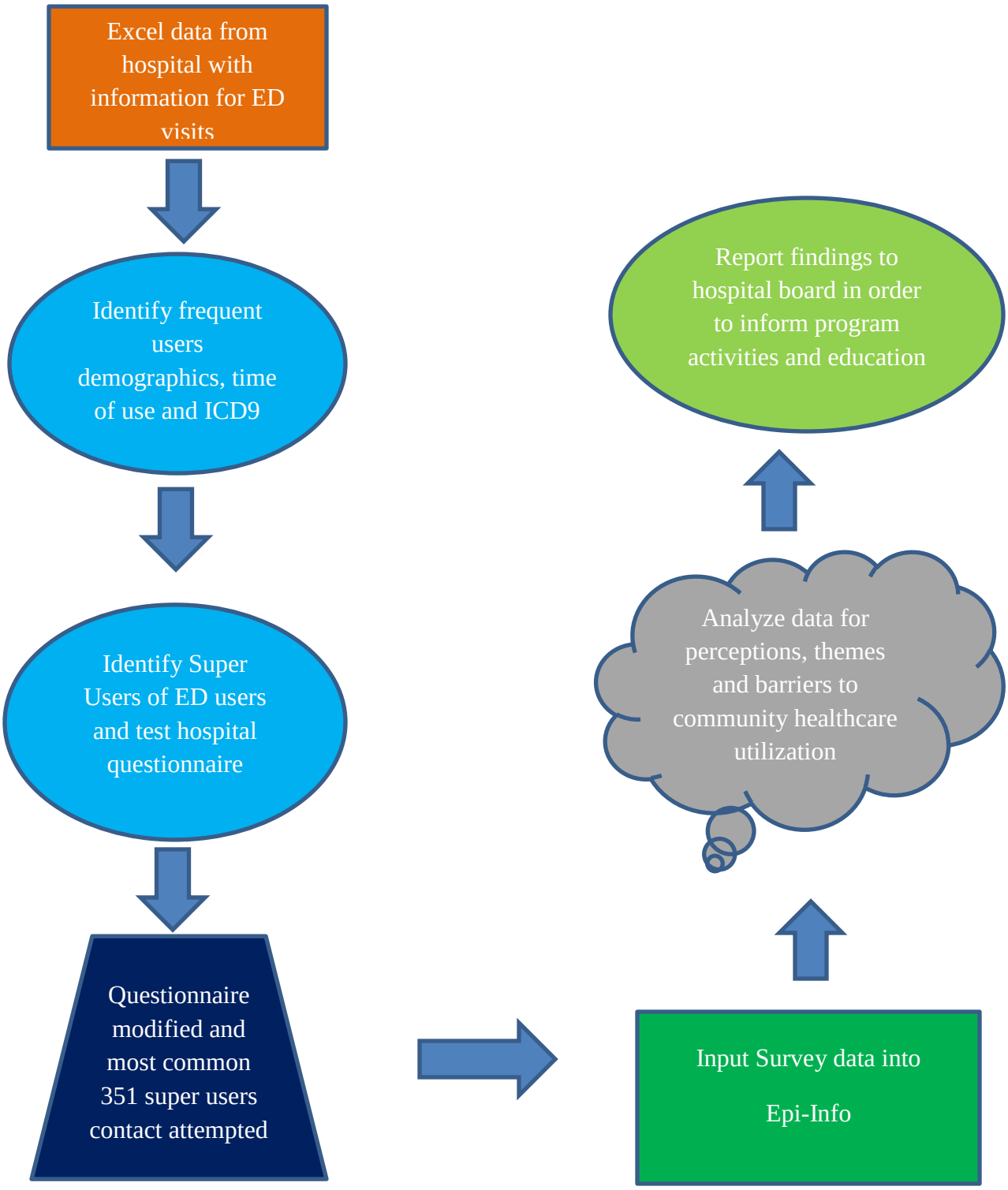
The New England Healthcare Institute has identified several intervention programs focused on decreasing visits to the ED. The Neighborhood Health Plan (NHP) uses a multi-prong approach which in

many instances overlaps programs that NGHS is in the process of implementing or already uses. However, the NHP program is very well integrated and streamlined, serving as a modality in continuity of care, which many of these patients require to improve their chronic illness. Aspects of the program include education, printed and website material, referral coordinators, 24/7 hotline, extended office hours with long weekend hours, work site clinics, telemedicine, and program-integrated physicians who are monitored regularly for meeting benchmarks in care criteria and improved outcomes for their patients.

Frequent users of the ED are a persistent healthcare problem and reflect where we are failing our patients in care outcomes. If the patient is doing well in the community healthcare setting and they have not experienced a lifetime of positive reinforcement for emergency care use, then the likelihood of visiting the ED can be significantly impacted as the continuity, availability, and outcomes improve. Physicians must apply general guidelines in ways that are attainable for each unique patient. Goal setting, socioeconomic factors, and patient perceptions, and expectations need to be addressed to make real progress in this setting. Providing access to physicians is only part of the solution; physicians need to be successful in improving patients' health outcomes and must be held accountable for lack of success. Patients need to be active members in the decision process, and have an understanding of what is expected of them and what behaviors need to be targeted towards these intended outcomes.

Appendices

Appendix A: Mixed Method Analysis of ED Frequent Users at Northeast Georgia Hospital System



Appendix B: Northeast Georgia Medical Center Emergency Room Follow-up Survey

Northeast Georgia Medical Center
Emergency Room Follow-up Survey

Code Book

EPI-Info column titles
[Survey Num].____
[Age]: ___
Gender [sex]: 1-Male, 2-Female
[Race/ethnicity]: 1-Black, 2-White, 3-Other
[Payer Source]: 1-Wellcare, 2-Amerigrp, 3-Selfpay, 4-Medicaid, 5-MCAREHOS, 6-Other (PPO-HMO)

I. Patient Satisfaction: **Likert Scale 1=Poor, 2=Needs Improvement,3=Good, 4=Very Good, 5=Excellent [Likert scale]**

1. How well did the staff work together to meet your medical needs**.[Staffworkwell]**

2. Overall rating of the care received**.[OverallEDrating]**

3. On your last visit, what did the ER do well in treating your medical needs?[**positivecarecomments] text multiline**

4. On your last visit, what do you feel needs to be improved during an ER visit**?[improvementcomments] text multiline**

5. How many times have you been to the Emergency Room in the last 3 months? **_____[NumEDvisits] number**

For the same or different problems? Explain:

[EDSameComplaints] yes/no [EDDifferentComplaints] yes/no [ED90dayvisitReasons] multiline

6. How many times have you visited your doctor in the last 3 months? _____If none, proceed to question 12**.[MDvisitnumber90D]**

7. How many of your family members were seen in the ED in the last 90 days._____

[NumfamilyseenED90D]

8. How many doctors did you see in the last 3 months**? [NumberMDseen90D]**

9. Doctor Information: **Grouping MD visits**

Name of PCP doctor**_[NameofPCP**]_ Date of last visit**:_[MDlastvisitindays]_**

Date of next visit: **[Nextdoctorvisitindays]_**

10. Are your doctors part of any of the following clinics: **Grouping MD clinics [Doctorsclinics]**

A. The **[LongstreetClinic]**
B. **[NGPGclinic]**
C. The **[Diagnosticclinic]**

D. **[HealthDepartmentclinic]**

E. **[Noneofclinics]**

11. Did you call your doctor prior to this recent visit to the ER? Y/N If no proceed to question 16. **[callMDpriortoEDvisit] yes/no**

12. Who did you speak to at the doctor's office? **Grouping;** [**doctorsofficereferral] checkbox**

[Office staff]_____
[Office nurse]_____
[Care manager]_____
[Doctor] _____
Other/Explain**__[otherEDreferralexplain]**___multiline comment_____

13. How did the doctor's office respond to your call? **[MDofficecontact]Grouping; Doctorofficeresponse; checkbox**

Scheduled an apt **[Officeschedappt]_____**
Instructed you to go to the ER **[OfficegotoED]_____**
Called in medication without seeing the doctor**_[Officecallinmed]_____**
Other/ Explain; _[**OtherOfficeresponse]_multiline comment_**

14. Are you able to see your doctor when you need to? **[Seedoctorasneeded]** If so why did you have to come to the ED, **[NobarriersED**]**Grouping[nobarriersEDanyway]**

15. Do you feel you are able to visit urgent care center or the health department instead of the ED?**_[Urgentcare]Y/NGrouping [Urgent care alternatives]**if no alternatives**[Ifnourgentcarespecify]**

16. If you can't see your doctor when you need to, explain why? **Grouping [Reasonnotseedoctor] check box**

Don't have a doctor **__[Nodoctor]_____**
Cost **__[DoctorCost]_____**
Convenience **____[NoConvenienceMDhours]_____**
Transportation **____[NotransportationtoMD]_____**
Other/Explain **____[otherreasonsnoMD**]_____

17. Are you able to get your medications when you need them? Y/N **[Getmedsasneeded]**

18. How many medications are you currently on**?__[Numberofmeds]_____**

19. If you are not able to get your medications, explain why? **[Reasonsnomeds]; Grouping;[Reasons for not taking medications] checkbox**

Cost **_[medcost]_____**
Transportation **_[MednoTransportation]_____**

Side effects **__[MedSE]**_____
Inconvenience for dosing times **__[Medconvenience]**_____
Forget **__[MedForget]**_____
Other/Explain: **___[Medother]___multiline comment**_____

20. Do you use your medications as directed by your doctor? Y/N If no please explain: **____[UseMedUD]**_____
_____

21. Do you carry your health history and list of medications with you? Y/N **[CarryhealthlistMedlist]**

22. What does your doctor need to do to assist you with your health and decrease your visits to the ED? Explain. [**MDimprovecarecomment]** _____

23. How can NGHS improve your healthcare experience in the community so that you can be seen outside of the ED and decrease your visits to the ED? **[NGHSimprovecarecomment]**
_____
_____

Appendix C Formulas for Excel Statistics

Database organization

Calculate number of visits (below). Sort database by number of visits (highest to lowest), then by MR, then by visit date. Patients with ≥6 visits are in rows 2 – 2765; patients with <6 visits are in rows 2766 – 49088. Arbitrarily assign each patient a unique subject ID, then delink personally identifiable information.

Patient-level data

Fields (per patient)

SurveyNumber: Arbitrarily assigned unique subject ID

NumVisits: Number of ED visits during study period

Age: Age in years, extracted from ED database

Sex: Sex (M/F), extracted from ED database

Ethnicity: Coded 1-6, extracted from ED database

Payor Name: Extracted from ED database

Interviewed: 1, ≥6 visits and interviewed; 0, ≥6 visits and not interviewed; blank, <6 visits and not interviewed

Patient-level analyses

Number of visits

For each patient, count how many times SurveyNumber appears in database.

=COUNTIF($C$2:$C$49088,C2)

Mean calculated for Interviewed, all ≥6 visits, and all <6 visits. Example, for Interviewed:

=AVERAGE('Delinked-Pt'!B2:B71)

Standard deviation calculated for Interviewed, all ≥6 visits, and all <6 visits. Example, for Interviewed:

=STDEV('Delinked-Pt'!B2:B71)

Median calculated for Interviewed, all ≥6 visits, and all <6 visits. Example, for Interviewed:

=MEDIAN('Delinked-Pt'!B2:B71)

Age:

Prior to delink, lookup MR in demographics database and return value in column 41 (age).

=VLOOKUP($C2,'[Demographics.xlsx]EDFY14'!$C$8:$AS$49083,41,FALSE)

Sex

Prior to delink, lookup MR in demographics database and return value in column 42 (sex).

=VLOOKUP($C2,'[Demographics.xlsx]EDFY14'!$C$8:$AS$49083,42,FALSE)

Ethnicity

Prior to delink, lookup MR in demographics database and return value in column 43 (ethnic origin).

=VLOOKUP($C2,'[Demographics.xlsx]EDFY14'!$C$8:$AS$49083,43,FALSE)

1 = American Indian
2 = Asian
3 = Black
4 = White
5 = Other
6 = Native Hawaiian

To analyze patient-level data, create Pivot Table on SurveyNumber and 'Count of SurveyNumber, sorted by frequency (number of visits), from highest to lowest. Then extract demographic characteristics: mean and median age, frequencies in age strata (<18 y, 18-24 y, 25-34 y, 35-44 y, 45-64 y, >64 y), sex frequencies, ethnicity frequencies Calculate separately for Interviewed, all patients with ≥6 visits, patients with <6 visits, and all patients.

Analyze frequencies of each payor separately for Interviewed, all patients with ≥6 visits, patients with <6 visits, and all patients.

Visit-level data

Fields (per patient)

SurveyNumber: Arbitrarily assigned unique subject ID

Interviewed: 1, ≥6 visits and interviewed; 0, ≥6 visits and not interviewed; blank, <6 visits and not interviewed

NumVisits: Number of ED visits during study period

Age: Age in years, extracted from ED database

Sex: Sex (M/F), extracted from ED database

Ethnicity: Coded 1-6, extracted from ED database

Adm Dt: Admission date, extracted from ED database

Adm Day of Week: Admission day of week (SUNDAY-SATURDAY), extracted from ED database

Adm Time: Admission time, extracted from ED database

Adm Hour: Admission hour (0-23), calculated from Adm Time using HOUR() function

Adm Dx: Admission diagnosis (ICD-9), extracted from ED database

ICD(Adm): Base of Adm Dx (ICD-9 left of decimal), calculated using INT() function

DRG Name:

Princ Dx Code: Principal complaint (ICD-9), extracted from ED database

ICD(PRDx): Base of Princ Dx (ICD-9 left of decimal), calculated using INT() function

2nd ICD-9 Dx Code

2nd ICD-9 Dx

3rd ICD-9 Dx Code

3rd ICD-9 Dx

Payor Name: Extracted from ED database

Charges : Total charges

Total Pymt: Total payment received

Mcare Pymt: Total Medicare payment received

Visit-level analyses

Day of week

Create table with days of week in column A, starting at cell A2. Count how many times each day appears in database, counting separately patients with ≥6 visits and patients with <6 visits. Example counts frequency of 'SUNDAY' (row 2), for patient with ≥6 visits.

=COUNTIF(EDFY!$AM$2:$AM$2765,$A2)

Hour of day

Create table with hour of day in column A, starting at cell A21. Count how many times each hour appears in database, counting separately patients with ≥6 visits and patients with <6 visits. Example counts frequency of '0:00' (12:00 am to 12:59 am; row 21), for patient with ≥6 visits.

= COUNTIF(EDFY!$AL$2:$AL$2765,HOUR($A21))

ICD-9 codes

Extract list of all base ICD-9 codes that appear in 'Princ Dx' fields. For each code, calculate frequency, count separately patients with ≥6 visits and patients with <6 visits. Example counts frequency of '5' (row 2), for patient with ≥6 visits. Codes are in cells B2 – B548.

=COUNTIF(Original!$AR$2:$AR$2765,$A2)

Then identify the five most frequently occurring base ICD-9 codes.

=MAX(B2:B548) [most frequent ICD-9 code]
=LARGE(B$2:B$548,2) [second most frequent ICD-9 code]
…
=LARGE(B$2:B$548,5) [fifth most frequent ICD-9 code]

Calculate separately for Interviewed, patients with ≥6 visits, patients with <6 visits, and all patients.

To analyze repeat visits for same ICD-9 code, create Pivot Table on MR and 'Count of ICD', then count how many of each ICD repeat for each patient. Calculate separately for Interviewed, all patients with ≥6 visits, patients with <6 visits, and all patients.

Appendix D: EPI-Info Statistical Analysis of Survey

Folder: C:\Users\Oberste\Documents_Anna\Emory MPH\Thesis

Date, Time	Command	File
8/15/2014 2:35 pm	FREQ Didyoucalldoctorpriortocomingto	OUT65.htm
8/15/2014 2:36 pm	FREQ Whatwastheoverallratingofthecare	OUT65.htm
8/16/2014 2:33 pm	FREQ aSamecomplaintYESNO	OUT66.htm
8/16/2014 2:49 pm	FREQ CarryhealthhxandMedlist	OUT66.htm
8/16/2014 2:49 pm	FREQ ConvenienceMDhours	OUT66.htm
8/16/2014 2:51 pm	FREQ MDclinics	OUT66.htm
8/16/2014 2:52 pm	FREQ Didyoucalldoctorpriortocomingto	OUT66.htm
8/16/2014 2:53 pm	FREQ ConvenienceMDhours	OUT66.htm
8/16/2014 2:53 pm	FREQ Doctor	OUT66.htm
8/16/2014 2:56 pm	FREQ MDlastvisitindays	OUT66.htm
8/16/2014 2:57 pm	FREQ Didyoucalldoctorpriortocomingto	OUT66.htm
8/16/2014 2:57 pm	FREQ Doctor	OUT66.htm
8/16/2014 2:57 pm	FREQ Casemanager	OUT66.htm
8/16/2014 2:58 pm	FREQ Doctorofficeresponse	OUT66.htm
8/16/2014 2:59 pm	FREQ ED90dayvisitdifferent	OUT66.htm
8/16/2014 2:59 pm	FREQ ED90dayvisits	OUT66.htm
8/16/2014 3:00 pm	FREQ MDvisitnumber90days	OUT66.htm
8/16/2014 3:01 pm	FREQ Medconvenience	OUT66.htm
8/16/2014 3:01 pm	FREQ Medcost	OUT66.htm
8/16/2014 3:01 pm	FREQ MedForget	OUT66.htm
8/16/2014 3:02 pm	FREQ Medicationsasdirected	OUT66.htm
8/16/2014 3:03 pm	FREQ Medcost MednoTransportation MedSideeffects	OUT66.htm
8/16/2014 3:04 pm	FREQ nobarriersEDanyway	OUT66.htm
8/16/2014 3:04 pm	FREQ NumberfamilymembersEDvistits90days	OUT66.htm
8/16/2014 3:05 pm	FREQ Numberofmeds	OUT66.htm
8/16/2014 3:05 pm	FREQ Payersource	OUT66.htm
8/16/2014 3:06 pm	FREQ raceethinicity	OUT66.htm
8/16/2014 3:06 pm	FREQ Reasonsfornottakingmedications	OUT66.htm
8/16/2014 3:07 pm	FREQ Seedoctorasneeded	OUT66.htm
8/16/2014 3:07 pm	FREQ sex	OUT66.htm
8/16/2014 3:07 pm	FREQ Staffworkwell	OUT66.htm

8/16/2014 3:08 pm	FREQ Urgentcarealternativeposs	OUT66.htm
8/16/2014 3:08 pm	FREQ Whatwastheoverallratingofthecare	OUT66.htm
8/16/2014 3:09 pm	FREQ Reasonnotseedoctor	OUT66.htm
8/18/2014 7:35 am	FREQ aSamecomplaintYESNO	OUT67.htm
8/18/2014 7:36 am	FREQ CarryhealthhxandMedlist	OUT67.htm
8/18/2014 7:36 am	FREQ ConvenienceMDhours	OUT67.htm
8/18/2014 7:36 am	FREQ DiagnosticClinic	OUT67.htm
8/18/2014 7:36 am	FREQ Doctor	OUT67.htm
8/18/2014 7:42 am	FREQ Staffworkwell	OUT68.htm
8/18/2014 7:43 am	FREQ Whatwastheoverallratingofthecare	OUT68.htm
8/18/2014 7:44 am	FREQ ED90dayvisits	OUT68.htm
8/18/2014 7:44 am	FREQ ED90dayvisitdifferent	OUT68.htm
8/18/2014 7:45 am	FREQ aSamecomplaintYESNO	OUT68.htm
8/18/2014 7:46 am	FREQ MDvisitnumber90days	OUT68.htm
8/18/2014 7:46 am	FREQ NoEDvisits90days	OUT68.htm
8/18/2014 7:46 am	FREQ NumberfamilymembersEDvistits90days	OUT68.htm
8/18/2014 7:47 am	FREQ MDclinics	OUT68.htm
8/18/2014 7:47 am	FREQ MDvisits	OUT68.htm
8/18/2014 7:51 am	FREQ Didyoucalldoctorpriortocomingto	OUT68.htm
8/18/2014 7:51 am	FREQ doctorsofficereferral	OUT68.htm
8/18/2014 7:51 am	FREQ Doctorofficeresponse	OUT68.htm
8/18/2014 7:52 am	FREQ nobarriersEDanyway	OUT68.htm
8/18/2014 7:53 am	FREQ Urgentcarealternatives	OUT68.htm
8/18/2014 7:53 am	FREQ Reasonnotseedoctor	OUT68.htm
8/18/2014 7:54 am	FREQ Numberofmeds	OUT68.htm
8/18/2014 7:54 am	FREQ Reasonsfornottakingmedications	OUT68.htm
8/18/2014 7:55 am	FREQ Medicationsasdirected	OUT68.htm
8/18/2014 7:55 am	FREQ CarryhealthhxandMedlist	OUT68.htm
8/24/2014 7:18 am	TABLES aSamecomplaintYESNO Didyoucalldoctorpriortocomingto	OUT69.htm
8/24/2014 7:20 am	TABLES Didyoucalldoctorpriortocomingto aSamecomplaintYESNO	OUT69.htm
8/24/2014 7:21 am	TABLES DoctorCost aSamecomplaintYESNO	OUT69.htm
8/24/2014 8:06 am	TABLES aSamecomplaintYESNO doctorsofficereferral	OUT69.htm
8/24/2014 8:19 am	TABLES aSamecomplaintYESNO Reasonnotseedoctor	OUT70.htm
8/24/2014 8:20 am	TABLES aSamecomplaintYESNO Reasonsfornottakingmedications	OUT70.htm
8/24/2014 8:27 am	TABLES ED90dayvisits MDvisitnumber90days	OUT70.htm
8/24/2014 8:34 am	TABLES aSamecomplaintYESNO MDvisitnumber90days	OUT70.htm
8/24/2014 10:41 am	FREQ NumberMDseen90days	OUT71.htm
8/24/2014 10:58 am	MEANS MDclinics	OUT71.htm

8/24/2014 11:07 am	MEANS MDlastvisitindays	OUT71.htm
8/24/2014 11:09 am	MEANS Nextdoctorvisitindays	OUT71.htm
8/24/2014 11:24 am	MEANS Nextdoctorvisitindays	OUT72.htm
8/24/2014 11:26 am	MEANS MDlastvisitindays	OUT73.htm
8/24/2014 11:27 am	FREQ NumberMDseen90days	OUT74.htm
8/24/2014 11:27 am	MEANS MDclinics	OUT74.htm
8/24/2014 11:27 am	MEANS MDlastvisitindays	OUT74.htm
8/24/2014 11:27 am	MEANS Nextdoctorvisitindays	OUT74.htm
8/24/2014 11:27 am	MEANS Nextdoctorvisitindays	OUT75.htm
8/24/2014 11:27 am	MEANS MDlastvisitindays	OUT76.htm
8/24/2014 12:04 pm	FREQ Numberofmeds	

References

Althaus, F., Paroz, S., Hugli, O., Ghali, W. A., Daeppen, J. B., Peytremann-Bridevaux, I., & Bodenmann, P. (2011). Effectiveness of interventions targeting frequent users of emergency departments: a systematic review. *Annals of Emergency Medicine, 58*(1), 41-52 e42. doi: 10.1016/j.annemergmed.2011.03.007

Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: an updated systematic review. *Annals of Internal Medicine, 155*(2), 97-107. doi: 10.7326/0003-4819-155-2-201107190-00005

Bieler, G., Paroz, S., Faouzi, M., Trueb, L., Vaucher, P., Althaus, F., . . . Bodenmann, P. (2012). Social and medical vulnerability factors of emergency department frequent users in a universal health insurance system. *Academic Emergency Medicine, 19*(1), 63-68. doi: 10.1111/j.1553-2712.2011.01246.x

Brim, C. (2008). A descriptive analysis of the non-urgent use of emergency departments. *Nurse Researcher, 15*(3), 72-88. doi: 10.7748/nr2008.04.15.3.72.c6458

Castillo, E. M., Brennan, J. J., Killeen, J. P., & Chan, T. C. (2014). Identifying Frequent Users of Emergency Department Resources. *Journal of Emergency Medicine*. doi: 10.1016/j.jemermed.2014.03.014

Chapman, B. P., Shah, M., Friedman, B., Drayer, R., Duberstein, P. R., & Lyness, J. M. (2009). Personality traits predict emergency department utilization over 3 years in older patients. *American Journal of Geriatric Psychiatry, 17*(6), 526-535. doi: 10.1097/JGP.0b013e3181a2fbb1

Doupe, M. B., Palatnick, W., Day, S., Chateau, D., Soodeen, R. A., Burchill, C., & Derksen, S. (2012). Frequent users of emergency departments: developing standard definitions and defining prominent risk factors. *Annals of Emergency Medicine, 60*(1), 24-32. doi: 10.1016/j.annemergmed.2011.11.036

Durand, A. C., Gentile, S., Devictor, B., Palazzolo, S., Vignally, P., Gerbeaux, P., & Sambuc, R. (2011). ED patients: how nonurgent are they? Systematic review of the emergency medicine literature. *American Journal of Emergency Medicine, 29*(3), 333-345. doi: 10.1016/j.ajem.2010.01.003

Enard, K. R., & Ganelin, D. M. (2013). Reducing preventable emergency department utilization and costs by using community health workers as patient navigators. *Journal of Healthcare Management, 58*(6), 412-427; discussion 428.

Gentile, S., Vignally, P., Durand, A. C., Gainotti, S., Sambuc, R., & Gerbeaux, P. (2010). Nonurgent patients in the emergency department? A French formula to prevent misuse. *BMC Health Services Research, 10*, 66. doi: 10.1186/1472-6963-10-66

Gindi, R., R.A., C., & Kirzinger, W. K. (2012). *Emergency Room Use Among Adults Aged 18-64: Early Release Estimates From the National Health Interview Survey, January- June 2011*. National Center for Health Statistics Retrieved from http://www.cdc.gov/nchs/data/nhis/earlyrelease/emergency_room_use_january-june_2011.pdf.

Green, L. W., & Kreuter, M. W. (1991). *Health Promotion Planning: an educational and environmental approach* (2nd ed.). Montain View, CA: Mayfield Publishing Company.

Grover, C. A., Close, R. J., Villarreal, K., & Goldman, L. M. (2010). Emergency department frequent user: pilot study of intensive case management to reduce visits and computed tomography. *Western Journal of Emergency Medicine, 11*(4), 336-343.

Herndon, J. B., Chaney, M., & Carden, D. (2011). Health literacy and emergency department outcomes: a systematic review. *Annals of Emergency Medicine, 57*(4), 334-345. doi: 10.1016/j.annemergmed.2010.08.035

LaCalle, E. J., Rabin, E. J., & Genes, N. G. (2013). High-frequency users of emergency department care. *Journal of Emergency Medicine, 44*(6), 1167-1173. doi: 10.1016/j.jemermed.2012.11.042

Locker, T. E., Baston, S., Mason, S. M., & Nicholl, J. (2007). Defining frequent use of an urban emergency department. *Emergency Medicine Journal, 24*(6), 398-401. doi: 10.1136/emj.2006.043844

McCarthy, M. L., Zeger, S. L., Ding, R., Levin, S. R., Desmond, J. S., Lee, J., & Aronsky, D. (2009). Crowding Delays Treatment and Lengthens Emergency Department Length of Stay, Even Among High-Acuity Patients. *Annals of Emergency Medicine, 54*(4), 492-503.e494. doi: http://dx.doi.org/10.1016/j.annemergmed.2009.03.006

Murphy, S. M., & Neven, D. (2014). Cost-effective: emergency department care coordination with a regional hospital information system. *Journal of Emergency Medicine, 47*(2), 223-231. doi: 10.1016/j.jemermed.2013.11.073

Navratil-Strawn, J. L., Hawkins, K., Wells, T. S., Ozminkowski, R. J., Hartley, S. K., Migliori, R. J., & Yeh, C. S. (2014). An Emergency Room Decision-Support Program That Increased Physician Office Visits, Decreased Emergency Room Visits, and Saved Money. *Popul Health Manag*. doi: 10.1089/pop.2013.0117

New England Healthcare Institute. (2010). A Matter of Urgency: Reducing Emergency Department Overuse.

Owens, P. L., Barrett, M. L., Gibson, T. B., Andrews, R. M., Weinick, R. M., & Mutter, R. L. (2010). Emergency department care in the United States: a profile of national data sources. *Annals of Emergency Medicine, 56*(2), 150-165. doi: 10.1016/j.annemergmed.2009.11.022

Philips, H., Mahr, D., Remmen, R., Weverbergh, M., De Graeve, D., & Van Royen, P. (2010). Experience: the most critical factor in choosing after-hours medical care. *Quality & Safety in Health Care, 19*(6), e3. doi: 10.1136/qshc.2007.024299

Philips, H., Remmen, R., De Paepe, P., Buylaert, W., & Van Royen, P. (2010). Out of hours care: a profile analysis of patients attending the emergency department and the general practitioner on call. *BMC Family Practice, 11*, 88. doi: 10.1186/1471-2296-11-88

Pitts, S. R., Carrier, E. R., Rich, E. C., & Kellermann, A. L. (2010). Where Americans get acute care: increasingly, it's not at their doctor's office. *Health Affairs, 29*(9), 1620-1629. doi: 10.1377/hlthaff.2009.1026

Rust, G., Baltrus, P., Ye, J., Daniels, E., Quarshie, A., Boumbulian, P., & Strothers, H. (2009). Presence of a community health center and uninsured emergency department visit rates in rural counties. *Journal of Rural Health, 25*(1), 8-16. doi: 10.1111/j.1748-0361.2009.00193.x

Rust, G., Ye, J., Blatrus, P., Daniesl, E., Adesunloye, B., & Fryer, G. E. (2008). Practical Barriers to Timely Primary Care Access. *Archives of Internal Medicine, 168*(15), 1705-1710.

Schumacher, J. R., Hall, A. G., Davis, T. C., Arnold, C. L., Bennett, R. D., Wolf, M. S., & Carden, D. L. (2013). Potentially preventable use of emergency services: the role of low health literacy. *Medical Care, 51*(8), 654-658. doi: 10.1097/MLR.0b013e3182992c5a

Shumway, M., Boccellari, A., O'Brien, K., & Okin, R. L. (2008). Cost-effectiveness of clinical case management for ED frequent users: results of a randomized trial. *American Journal of Emergency Medicine, 26*(2), 155-164. doi: 10.1016/j.ajem.2007.04.021

van der Linden, M., van den Brand, C., van der Linden, N., Rambach, A., & Brumsen, C. (2014). Rate, characteristics, and factors associated with high emergency department utilization. *International Journal of Emergency Medicine, 7*(1), 9.

Vieth, T. L., & Rhodes, K. V. (2008). Nonprice barriers to ambulatory care after an emergency department visit. *Annals of Emergency Medicine, 51*(5), 607-613. doi: 10.1016/j.annemergmed.2007.10.027

Vinton, D. T., Capp, R., Rooks, S. P., Abbott, J. T., & Ginde, A. A. (2014). Frequent users of US emergency departments: characteristics and opportunities for intervention. *Emergency Medicine Journal*. doi: 10.1136/emermed-2013-202407

Washington State Health Care Authority. (2014). Emergency Room Utilization: Update on Assumed Savings from Best Practices Implementation (O. o. t. C. M. Officer, Trans.). Olympia Washington: Washington State Health Care Authority.

Weinick, R. M., Bristol, S. J., & DesRoches, C. M. (2009). Urgent care centers in the U.S.: findings from a national survey. *BMC Health Services Research, 9*, 79. doi: 10.1186/1472-6963-9-79

Weinick, R. M., Burns, R. M., & Mehrotra, A. (2010). Many emergency department visits could be managed at urgent care centers and retail clinics. *Health Affairs, 29*(9), 1630-1636. doi: 10.1377/hlthaff.2009.0748