Meaningful Use of the EHR – Evaluating the internal and external factors affecting the timeliness of patient referrals

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Meaningful Use of the EHR – Evaluating the internal and external factors affecting the timeliness of patient referrals

Abstract

With increasing numbers of patients seeking healthcare in the ambulatory setting it is necessary to evaluate processes for improving efficiency and access, while controlling costs. Timely access to specialty care is vital to patient satisfaction, preventing duplication of services and providing quality patient care. Referral processes from PCP's to specialists can be flawed as a result of deficits in coordination of services, poor communication between providers, and a lack of standardization of processes and forms.

This project aimed to evaluate specialty referral wait times in a large academic medical center. Internal (organizational) as well as external (patient specific) factors were examined. Additionally, although specific to this QI project, the need to examine the accuracy of EHR data was identified and included. A retrospective review of one month of referral data to five medical specialties was completed (n=752). Logistic regression and multivariable analysis was used to determine whether age, race, insurance, specialty, or days from referral to appointment were associated with delays to timely access. Referrals with significant delays were further reviewed to identify additional factors associated with the delays.

Delays were seen in processing the referral at the referring provider's office as well as in the triage process at the receiving office. Hospital discharge referrals and established patients requiring authorization for a follow up visit were erroneously categorized into the new referral data.

Nurse leaders, as patient advocates with interdisciplinary partnerships, are well positioned to improve the reliability and efficiency of the referral process in the ambulatory

setting. It is important to leverage electronic data to improve quality and safety. This information is used by nurse managers for process improvement at the clinic level, highlighting the importance of defining metrics so inappropriately categorized data is not acted upon.

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Introduction

Background

In the United States there are many forces working to improve quality, outcomes and access to timely health care (Agency for Healthcare Research and Quality, n.d.). The triple aim, set forth by the Institute for Healthcare Improvement (IHI), called for the improvement of health for a defined population, enhanced patient care experience (including quality, access and reliability), and reduced or controlled per capita cost of care (Berwick, Nolan, & Whittington, 2008). Although United States' healthcare expenditures are double that of the next costliest nation higher cost has not translated into improved population health, access or quality (The Patient Protection and Affordable Care Act, 2010). The United States ranks thirty-first among nations on life expectancy, thirty-sixth on infant mortality, twenty-eighth on male healthy life expectancy, and twenty-ninth on female healthy life expectancy (Berwick et al., 2008).

In 2010, the United States Congress enacted the Patient Protection and Affordable Care Act (ACA) (Shaw, Asomugha, Conway, & Rein, 2014). The passage of the ACA was an effort to address high and rising costs of care, inadequate access to health insurance and health services for many Americans, and low health-care efficiency and quality the core issues facing the U.S. healthcare system (Shaw et al., 2014). With implementation of the ACA, more Americans have insurance and are seeking access to health care they previously could not afford. The Healthy People 2020 Campaign, which identifies science-based objectives to improve health care for all Americans, also shares the goal of improving access to comprehensive, quality health care as one of its national 10-year objectives. Due to the changes resulting from the ACA, an additional 14.1 million Americans were covered by health insurance in 2015 (California Benefits Health Care Review Program, 2015). Most industries would be highly receptive to the chance at increasing

their volumes by 14 million. Unfortunately in healthcare there has been a shift in payment models from fee for service to capitation. The addition of new patients will not provide a significant financial windfall but instead will push systems to their limits of capacity without designated funding for staff increases to meet the growing demand. This influx of patients has caused organizations to more closely examine their care delivery systems in order to enhance these processes (Haas & Swan, 2014).

Significance

Recognizing the need to improve access in the ambulatory setting to prepare for the influx of patients, acceptable referral processing times were set with the enactment of the California Department of Managed Care "Timely Access to Non-Emergency Health Care Services Regulation" in January 2010. This regulation defines the "Appointment waiting time" (i.e. referral time) as the time from the initial request for health care services by an enrollee or the enrollee's treating provider to the earliest date offered for the appointment. Compliance with the regulation is measured by whether an enrollee has been offered an appointment that is within ten business days of the request for access to the primary care physician and within fifteen business days for a specialist.

There has been limited data on wait times in the U.S. Although no research studies were found, a telephone survey (n=1399) completed by a national healthcare consulting group which contacted physician offices in large metropolitan areas to determine how long until their next new patient appointment was available (Hawkins, 2014). Merritt Hawkins & Associates (2014) surveyed and found the average wait times were: Cardiology 16.8 days, Dermatology 28.8 days, Obstetrics-Gynecology 17.3 days, and Orthopedic Surgery 9.9 days.

Historically, specialty referrals have been a frustrating process for both physicians and patients (Mehrotra, Forrest, & Lin, 2011). Patient care has suffered because of the absence of coordinated services, the lack of communication between providers, and the nonexistence of standardization in processes and forms (Forrest et al., 2000). In addition, referral processes are typically unstructured and complex which leads to inefficiencies and ultimately delays in patient care (Deckard, Borkowski, Diaz, Sanchez, & Boisette, 2010).

The Institute of Medicine has challenged registered nurses to take the lead in bringing health care reform to the outpatient environment (Institute of Medicine Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, 2011). One area of nursing leadership in the outpatient setting is the clinic manager role. Nurse leaders maximize operational efficiencies and customer satisfaction by focusing on clinical quality, service and business operations (L. Cook, 1997). The American Academy of Ambulatory Care Nursing (AAACN) finds that nurses are critical to improving the quality of healthcare, patient outcomes and health care efficiencies in the outpatient setting ("American Academy of Ambulatory Care Nursing position statement: the role of the registered nurse in ambulatory care," 2011).
The shift of care to the outpatient setting requires examination of current referral processes to ensure that the system is poised to process patient referrals in a timely manner. Nurses traditionally have been at the forefront of advocacy for patients at pivotal transitions in care and have the skills necessary to improve the reliability and efficiency of the referral process and thus improving patient access and care.

Another provision of the ACA was the need to increase the use of the electronic health record (EHR) as the EHR is expected to improve the quality of care and decrease the cost (Lanham, Leykum, & McDaniel, 2012). The 2009 Health Information Technology for

Economic and Clinical Health Act (HITECH) supports the Meaningful Use (MU) of electronic health records. MU calls for hospitals to demonstrate the capability to exchange key clinical information among providers of care. This requirement is driving improvements in electronic referral communication in health care. However, the recent transition to electronic health records has added an additional component of complexity. Early adopters of these electronic systems have encountered unexpected challenges and consequences that can lead to further care delays (Esquivel, Sittig, Murphy, & Singh, 2012). While a patient transitioning from provider to provider is accomplished through a multi-disciplinary approach and team cooperation. Referral data has not been examined in relation to the accuracy of electronic health record data.

Statement of the Problem

Optimizing ambulatory referral processes are vital to improving patients' access to care and safety. Long referral processing times can lead to duplication of medical tests, cause over utilization of the health care system through urgent care or emergency department visits, thereby increasing costs associated with care (Gandhi et al., 2000; Murray, 2002). Electronic health records have the potential to improve this process but further research is required to determine if the potential can be realized. Therefore, the purpose of this quality improvement project was to identify factors associated with delays in obtaining an appointment after referral to a specialty clinic.

Review of the Literature

With the recent implementation of the Affordable Care Act there is an increased number of patients seeking care in the ambulatory setting. This shift of care to the ambulatory setting requires examination of the current referral procedures to ensure that the system is poised to process patient referrals in a timely manner. Additionally, there is growing interest in leveraging

EHR data to facilitate improvement of quality and safety since the use of EHRs have become widespread (Weiskopf & Weng, 2013).

Changes in the care delivery model to capitation and managed care has caused a further erosion of communication between providers and specialists who may have depended on relationships in ensuring quality care was provided. This has led to gaps in the referral process (Anthony, 2003). In addition, referral processes are typically unstructured and complex which leads to inefficiencies and ultimately delays in patient care (Deckard et al., 2010). With an expected rise in the U.S. elderly population by 2020, there will be an increased demand for specialty care. Therefore, improvement in the specialty referral process must be a priority (Mehrotra et al., 2011).

Search Strategy

PubMed, CINAHL, and Cochrane Databases were used to retrieve the literature. The key words used to perform the search were: Ambulatory Care Facilities; Efficiency, Organizational; Health Service Accessibility; Referral and Consultation; Electronic Health Record Standards; Reproducibility of Results; Nursing Leadership; Quality Improvement. A total of 23 articles were found to be relevant according to the inclusion criteria of English only articles published within the last 10 years. Several themes emerged in examination of the referral process with internal and external factors that affect timely access to care and the accuracy of using EHR data.

Internal Referral Factors Affecting Timely Access to Care

Essential elements. Five articles discussed the role and importance of essential elements needed in an effective referral communication (Berta et al., 2008; Forrest et al., 2000; Gandhi et al., 2000; Murray, 2002; Reichman, 2007). Berta et al. (2008) describes 24 essential elements to be included in the referral forms, which was developed by an expert panel through a 2-round

modified Delphi consensus process, whereas Reichman (2007) provided an example of a recommended referral request form but it lacked accompanying data regarding validity or reliability of the tool. Essential components to be communicated to the specialist were found to be the patient's name, contact information, PCP's name and contact information, reason for the referral, pertinent medical history/problem, and any laboratory findings (Berta et al., 2008; Forrest et al., 2000; Reichman, 2007). However, Gandhi et al. (2000) found that 90% of PCPs' and specialists agreed that the core information needed was a statement of the problem, current medication, and reason for the referral. Without the essential information needed the referral process can be delayed.

Barriers. Seven articles were found to be pertinent in evaluating the barriers that inhibit efficient processing of referrals (Ayub et al., 2008; Deckard et al., 2010; Graydon & Thompson, 2008; Hankinson, Faraone, & Blumenfrucht, 2006; Mehrotra et al., 2011; Murray, 2002; Reichman, 2007). A Cochrane review of 17 articles, a prospective case study (n=206), and a quality improvement project identified that incomplete information on the initial referral led to delays of the patient's appointment with the specialist (Ayub et al., 2008; Deckard et al., 2010; Graydon & Thompson, 2008). The Cochrane review found that the four of five studies addressing efficiency agreed that a standardized form for the referral was most effective, while other specialists found that implementing a physician triage process was most helpful in efficiently processing referrals (Ayub et al., 2008; Graydon & Thompson, 2008). A cohort study that surveyed 112 providers about communication and the referral process (Gandhi et al., 2000) recommended use of standardized documentation and referral guidelines. Two additional articles supported this recommendation (Murray, 2002; Reichman, 2007) but a comprehensive narrative review of 125 articles cautioned against the effectiveness of guidelines unless the PCP

and specialist develop them together (Mehrotra et al., 2011). Deckard et al. (2010) were the most detailed in their account of the barriers encountered through their process improvement project, finding incompleteness of referrals, inadequate number of staff to make appointments, lack of staff access to make type of appointment needed, and lack of appointment slots to schedule referrals (Deckard et al., 2010). Graydon (2008) found in a prospective study (n=206), as did Hankinson (2006) in a quality improvement project, that incorrect referral information led to inappropriate triaging of patients that caused prolonged wait times. Although a wide range of barriers were identified there seems to be agreement on the need for a well defined procedure/form to ensure adequate information is provided to the specialist to process the referral.

Wait times. A review of the literature found five articles addressing wait times in the specialty referral process (Deckard et al., 2010; Jaakkimainen et al., 2014; Murray, 2002). A quality improvement project, conducted in a large safety net health system, focused on increasing efficiency and effectiveness of referral processing through the use of Lean Six Sigma principles. Their efforts yielded a reduction of referral processing time from 60.5 days to 37.5 days in a genitourinary clinic, and from 135 days to 34.9 days in the gynecology clinic (Deckard et al., 2010). The true impact is unclear, as the total number of referrals processed was not provided, making it difficult to know if the results would be applicable to other settings. Murray (2002) discussed the importance of wait times to be one week or less for any clinical condition. Although a retrospective review found that the median wait times for specialists ranged from 5 to 11 weeks and that 75% of referrals experienced wait times of 9 to 33 weeks, studies based on physician self report found the wait times to be 2 weeks for an urgent referral and 5 weeks for a

routine referral (Jaakkimainen et al., 2014). These findings were from Canada so it is possible that the results are not generalizable to the United States referral wait times.

Care and cost. Five articles in the literature discuss the implications of duplication in specialty referrals (Anthony, 2003; Gandhi et al., 2000; Mehrotra et al., 2011; Murray, 2002; Reichman, 2007). All four articles, consisting of a narrative literature review of 125 articles (Mehrotra et al., 2011), a case study (n=45) (Anthony, 2003), a cohort study (n=112), and two articles (Murray, 2002; Reichman, 2007) agreed that inefficient and ineffective referral communication leads to potentially compromised quality of care and increased costs. The article by Murray (2002), which was also included in the review done by Mehrotra et al. (2011), describes how the lack of communication during the referral process leads patients to seek additional provider visits, testing or higher levels of care because they are concerned about their clinical condition and are unclear about when they will be seen by the specialist. A cohort study by Gandhi et al. (2000) agreed, citing that a lack of communication leads to delayed diagnoses, poly-pharmacy, unnecessary testing, increased litigation risk, and poor continuity of care. Though many agree that delays in the patient seeing the specialist can result in quality of care issues, little is found in the literature discussing standardization of metrics or benchmarks to measure quality and outcomes in the referral process.

External Referral Factors Affecting Timely Access to Care

Patient Characteristics. Six articles addressed how access to specialty care can be affected for patients because of their insurance, socioeconomic status, or location (N. L. Cook et al., 2007; Dunlop, Coyte, & McIsaac, 2000; Hansen, Olesen, Sorensen, Sokolowski, & Sondergaard, 2008; Harrington, Wilson, Rosenberg, & Bell, 2013; Navaneethan, Aloudat, & Singh, 2008; Winkelmayer, Glynn, Levin, Owen, & Avorn, 2001). A survey of U.S. medical

directors for federally qualified health centers (n=439) presented that access to specialty care is more difficult for Medicaid and uninsured patients(N. L. Cook et al., 2007). In a Canadian National Population Health Survey (n=17,626), it was found that patients with lower incomes and fewer years of schooling had less access to care even though they had insurance through the universal health care system; the thought was that a poor or less educated patient may not be able to express their need for care as compared to a more well-off and well educated person (Dunlop et al., 2000). However, this finding conflicted with a Canadian Community Health Survey (n=21526 respondents) by Harrington et al. (2013) who reported that those who had difficulty accessing care were more likely to have higher education. Harrington et al. (2013) also found that immigrants without insurance had greater difficulty in accessing specialty care, which is consistent with the findings of Dunlop et al. (2000) that underinsured patients were more likely to experience delays in care.

Delays in referrals and in diagnosis have also been examined but focus on cancer and renal patients (Hansen et al., 2008; Navaneethan et al., 2008; Winkelmayer et al., 2001). Similarly, lower socioeconomic status was found to be associated with delayed referrals in chronic kidney disease in a systematic review of 18 studies (Navaneethan et al., 2008) and in a retrospective review of patients undergoing renal replacement therapy (n=3,014) (Winkelmayer et al., 2001). Similarly, a cohort study (n=1,252) examining socioeconomic characteristics that predict delays in women receiving a cancer diagnosis found an association with lower economic status and referral delay (Hansen et al., 2008).

Metrics. The review of the literature for metrics to measure efficiency and outcomes in referral processing yielded one systematic review of 214 articles that were assessed by a panel of 10 content experts (Guevara, Hsu, & Forrest, 2011). The systematic review revealed metrics to

evaluate specialty accessibility, timeliness, communication and satisfaction; though assessments of validity were present, few metrics had data to support reliability (Guevara et al., 2011). Deckard et al. (2010) offered three metrics for measurement of success: total process time, consult request to time appointment made, and appointment made to day of appointment, all based on the appointment request date, made date, and appointment date. It is difficult to compare wait time data across organizations, as there is no standardization of metrics or what is being measured.

Accuracy of EHR data

Data quality. The emerging field of data extraction from the EHR has uncovered the need to define terms and evaluate quality. It is evident that there is lack of agreement as to what constitutes data quality (Benin et al., 2011; Chan, Fowles, & Weiner, 2010; Weiskopf & Weng, 2013). Studies and scientific examination have been limited, as this is a fairly new field. Two systematic reviews evaluated the issue of quality of EHR data (n=34, n=95) (Chan et al., 2010; Weiskopf & Weng, 2013). There was a single center study done by Benin et al. (2011) that focused on quality metrics in terms of classifying errors. Improving quality was obtained by decreasing entry-errors (improper entry of original data by the provider), categorizing-error (when an encounter is wrongly attributed to a target population due to an inclusion or exclusion criteria that cannot be separated electronically), or a query-error (from an incorrect query based on how data are configured or how fields are populated). The sample size was small (n=30) although the study was included in the systematic review done by Chan et al. (2010). The systematic reviews found that properties of data quality are found in data correctness, data completeness but Chan et al. (2010) also found concordance, plausibility and currency of data essential, whereas Weiskopf & Weng (2013) discussed the importance of data accuracy, data

comparability, and validity. All three articles discussed limitations related to the current body of research containing weak study designs and limited models to guide analysis of the field (Benin et al., 2011; Chan et al., 2010; Weiskopf & Weng, 2013).

Conclusion

While there is extensive data available on the referral process, with the widespread implementation of EHRs, little work has been done to validate the accuracy of the data. The literature discusses standardization of metrics and benchmarks but there is no consensus on how to measure quality and outcomes in the referral process**.** Gaps in the literature present needs for further evaluating the timeliness and accuracy of data obtained from the EHR, factors associated with access to care, as well as identification of metrics for measuring the quality of care and patient outcomes.

Methods

Design

The purpose of this quality improvement project was to examine internal and external factors with the potential to affect timely access to a medical specialty clinic. Internal factors were defined as workflows, appointment history, and processes identified within the EHR through analysis of the medical record and referral history data. External factors included were gender, race, and insurance status.

Medical specialties in this study were defined as Internal Medicine specialties: Nephrology, Cardiology, Oncology, Pulmonary, and Neurology. These medical specialties were chosen due to potentially time-sensitive medical issues the patient may be facing as well as a perceived urgency by the patient. Referrals to other areas such as surgical specialties, Home

Health, Mental Health, and Social Services were excluded as these services had different benchmarks and care issues.

Protection of Human Participants

To protect human subjects, approval of the project by the UC Davis Institutional Review Board (IRB) was obtained prior to the start of data collection and received an expedited approval. Informed consent was not obtained because it was a retrospective, minimal risk project. Because this was a QI project with system-wide implications appropriate administrative personnel were kept informed.

Sample

The cross-sectional sample data were from referrals placed in the electronic health record in one Northern California academic health center during February 2015 for Nephrology, Cardiology, Oncology, Pulmonary, and Neurology. The review of one month of referral data was felt adequate to provide sufficient data to assess the current status of delays in receiving timely referral processing and access to care across specialties as well as to identify associated factors with delays. The EHR was queried to capture patient records that had a "consultation (a one time visit) or consultation and visits (ongoing treatment)" request for one of the previously identified specialties. Patients under the age of 18 were excluded, as were all other referral types (ancillary, surgical, continuing care, etc.).

Data Collection Process

The data for this quality improvement project were collected retrospectively from the EPIC electronic health record through the Clinical and Translational Science Center (CTSC). All the data extracted were de-identified and entered into password protected excel documents.

The data will be stored for 3 years and then destroyed. The data were stored on a password-protected computer in a locked office.

Data were gathered from the Chart Review section in the EHR (Encounters, Notes/Transcriptions, and Referral/Authorizations history) to gather any information or communication exchange about the referral. The query included: date of the referral including referral history, appointment data including date of appointment, cancellations, or no-shows, patient's insurance, age in years, race. Time stamp data were also collected in order to identify if a particular part of the referral process was especially prone to delays

After the data were obtained, the researcher validated the data by cross referencing the medical record to verify referral processing times as well whether the referral was in fact new or was an established patient or hospital discharge referral. The EHR data was examined to ensure that the referrals had been appropriately categorized as a new patient and excluded established patients and hospital discharge referrals.

Measures

Variables associated with Internal Factors

Time from referral to appointment- Measured in number of days

Appointment history – Assessed only for patients with appointment times 2 SD above the average, and included qualitative assessment of cancellations, no-shows, rescheduled appointments.

Variables associated with External factors

Insurance – Medicare, Medi-Cal, Medi-Cal Capitated, HMO/PPO, Other

Age – Measured in years

Race – Black, Asian, Declined to State/Unknown, Hispanic, White, Other

Data Analysis

An excel spreadsheet was used to compile all the data obtained. Descriptive statistics were used to summarize the demographic characteristics of the sample. Continuous variables were summarized using means, ranges, and standard deviations while categorical variables were summarized using frequencies and percentages. The average number of days to appointment was calculated for each medical specialty using SPSS statistical software (version 22) which was also used to perform regression analysis examining the relationship between specialty and number of days to appointment while adjusting age, gender, race, and insurance. The level of statistical significance was set at $p < .05$. A member of the committee provided statistical support for this project.

Results

Referral wait times are key to patient satisfaction, quality of care, efficiency and the organizations local and national reputation for excellence. This quality improvement project was examining external and internal factors that led to referral delays across five medical specialties: Nephrology, Cardiology, Oncology, Pulmonary, Neurology.

There were 752 total referrals for 742 patients across the five specialties. Ten patients had received a referral to two departments during that timeframe. The demographic characteristics of the data sample are summarized in Table 1.

Table 1

Demographic Characteristics of Referral Sample

	All Referrals	Nephrology	Cardiology	Oncology	Pulmonary	Neurology
	n=752[a] n (%)	n=32 n (%)	n=202 n (%)	n=209 n (%)	n=96 n (%)	n=213 n (%)
Days to Appt.						
Mean (SD)	39 (30)	27 (28)	29 (23)	30 (20)	50 (32)	54 (35)
Age						
Mean (SD)	59 (17)	66 (17)	62 (17)	60 (16)	61 (15)	55 (17)
Gender						
Female	400 (54)	17 (53)	92 (46)	122 (58)	50 (52)	124 (58)
Male	342 (46)	15 (47)	110 (54)	87 (42)	46 (48)	89 (42)
Race						
Black	60 (8)	4 (13)	18 (9)	17 (8)	4 (4)	18 (8)
Asian	57 (8)	7 (22)	13 (6)	20 (10)	6 (6)	12 (6)
Unknown	63 (8)	2 (6)	18 (9)	11 (5)	21 (22)	11 (5)
Hispanic	53 (7)	3 (9)	17 (8)	14 (7)	7 (7)	13 (6)
Other	51 (7)	0 (0)	15 (7)	16 (8)	7 (7)	13 (6)
White	458 (62)	16 (50)	121 (60)	131 (63)	51 (53)	146 (69)
Insurance						
Other	14 (2)	0 (0)	1 (0)	5 (2)	3 (3)	5 (2)
M-Cal (Cap.)	43 (6)	1 (3)	4 (2)	17 (8)	5 (5)	17 (8)
PPO/HMO	298 (40)	12 (38)	78 (39)	78 (37)	41 (43)	87 (41)
M-Cal	33 (4)	1 (3)	6 (3)	12 (6)	3 (3)	11 (5)
Medicare	354 (48)	18 (56)	113 (56)	91 (44)	44 (46)	93 (44)

Note. [a] The age, gender, race, and insurance statistics were calculated using n=742 due to 10 patients having referrals to two departments.

No statistically significant correlation was found between the number of referrals by department and the amount of time to appointment. Cardiology, Oncology and Pulmonary had essentially the same number of referrals but their access time varied from 29 to 54 days. Even the lower volume specialties, Nephrology and Pulmonary, had varying access times of 27 and 50 days respectively. There was a fairly even distribution across the specialties by gender, with a slightly higher number of females for each specialty and overall. Interestingly, the overall

breakdown of referral by race showed the distribution was not equal across specialties. Black patients accounted for 8% of total referrals but received a higher percentage of referrals (13%) to Nephrology and lower percentage of referrals to Pulmonary (4%). Asian patients also experienced a high referral rate to Nephrology (22%) in comparison to the other specialties (overall 8%). The insurance for the majority of referrals was PPO/HMO or Medicare, accounting for 88% of the referrals.

For this project, the referrals with appointment times that were two or more standard deviations from the mean were considered outliers. The decision was made to closely examine referrals that were outliers to identify causes of the significant delay in access to care. Across the five specialties common themes existed for delays in patients timely access. Referrals that required additional triage by the physician or clinic staff added 1-3 month delays to the scheduling process. Patient delays occurred due to transportation issues, availability for appointments, and health status. Multiple instances existed where the appointment would have been within one month from the referral but the patient cancelled/rescheduled or did not show for the originally scheduled appointment. The were three occasions where the referral was not processed by the referring department which added up to an additional 6 weeks of delay. Delays were also found in the clinic processes as the referral was documented as ready to schedule but an appointment was not made until 1-2 months later. Lastly, a 1-4 month delay was seen from the time the patient was scheduled until the next available appointment. Table 2 illustrates the delays outliers by specialty.

Table 2

Referrals with Appointments >2 SD from the Mean Referral Time by Specialty (Outliers)

	Nephrology	Cardiology	Oncology	Pulmonary	Neurology
Outliers (n, %)	(3, 1)	(11, 0.5)	(8, 0.4)	(4, 0.4)	(12, 0.6)
Mean (Days to appt.)	93	95	95	123	139
Median	91	89	97	123	141
Range	9	48	42	20	33

*SD: standard deviation

The outlying referral racial demographics were found to be similar to the original data sample, with the majority being Caucasian patients. The insurance status data also reflected that the majority of patients experiencing the prolonged delay had either Medicare or HMO/PPO. A general linear model was created to examine the relationship between specialty and days to appointment while adjusting age, gender, race and insurance. Table 3 illustrates differences in the estimated days of delay across the five specialties.

Table 3

Estimated: Days of Delay

			95 % Confidence Interval	
	Mean	Standard Error	Lower Bound	Upper Bound
Nephrology	15.7	1.2	11.3	21.9
Cardiology	22.0	1.1	18.4	26.3
Oncology	24.3	1.1	20.6	28.8
Pulmonary ***	41.2	1.1	33.4	51.0
Neurology ***	46.6	1.1	39.0	55.6

*** $p < .001$
Adjusted for age, race, gender, and insurance.

Across the three departments of Nephrology, Cardiology and Oncology there were no statistically significant differences in mean days to referral. There were no significant differences between the Pulmonary and Neurology departments as well. However, a significant difference was found in wait times for Pulmonary and Neurology departments when compared to

the other departments. ($p < .001$). There were no significant differences between the Pulmonary and Neurology departments. Examining reasons for this were beyond the scope of this project.

Discussion

The purpose of this retrospective, descriptive quality improvement project was to examine potential internal and external factors that might affect timely access to care in a medical specialty clinic. Although examining the accuracy of EHR data was not part of the QI project, it was identified as an issue. Delays in access to specialty care can be frustrating and concerning for the patient. The delay can lead to the patient seeking higher levels of care, such as urgent care or the emergency department, which leads to duplication of testing and higher costs of providing care. Additionally, these delays lead to loss of trust by the patients in the healthcare system and provider (Murray, 2002; Reichman, 2007). It is important to improve referral wait times, which is key to patient satisfaction, providing quality care, and affecting patients' perception of organizational efficiency and overall reputation of the organization.

When embarking on a quality improvement project it is important to have accurate data in order to identify the correct issues and better informed decision-making. The institution recently adopted new software for referral processing. After beginning the data cleaning process, it was clear that many of the referrals were actually hospital discharges or authorizations for established patients, requiring additional validation of new referral status through medical record review. Referrals were being categorized as new by the organization if the referral request was for "consultation and visits" or for "consultation". As this was a fairly new system, defined workflows for this process had not been focused towards ensuring clean data for new referrals. Additional training was identified as a need and was implemented for the referral coordinators to eliminate the erroneous categorization of established patients as new patients.

When compared to institutional dashboards this discrepancy was also identified. Through discussion and reporting of these findings, the Ambulatory Operations and Data Governance Committee identified the need to further define metrics and reporting, with the goal that future data used across the organization are consistent and validated.

Internal factors that can affect referral processing are related to lack of documentation by clinic staff to appropriately track when they have made contact with the patient. With the implementation of a new referral system last year, training focused on referral throughput. The lack of attention to correct documentation and clarity to workflows has led to inconsistent documentation and categorization of referrals as well as inaccuracies in calculating wait times. Internal processes were found to be factors that lead to delays in some of the referrals that were outliers. Internal factors such as staff absences, vacancies or lack of adequate staffing can all lead to delays in obtaining authorizations, obtaining records, timely communication with the patient and/or provider, or scheduling. While it was not a focus of this project, staffing is also a factor in timely referral processing; (Deckard et al., 2010). Outliers, patients outside of two standard deviations from the mean days to appointment, were found to have delays in referrals of up to a month before the referring office processed the referral to the specialists' office. At the specialists' office there was up to an additional 6 weeks of delay for triaging the referral to determine which provider to which the patient should be scheduled. As identified in the results, the only significant difference was type of specialty unit so it would be important to further examine what is leading to those delays in the two specialties.

External factors also played a role in delays. Patients canceling or declining earlier appointments may create the illusion of delayed access to care because the EMR does not capture the information in a way that it can be reported. Through discussion and research it was

evident that the definition to how access to care is measured varies. Some characterize it as the time the referral is initially placed to the time of appointment, while others define it as the time the specialty receives it until the appointment. Neither of these definitions account for the patient declining or rescheduling an appointment. There can be delays at any point in the referral process but it seems that separate metrics are needed in order to identify what part of the process is leading to the delay in access to care. Analysis of the referrals that were outliers showed that delays are also frequently attributed to a patient cancelling or rescheduling appointments or when the clinic has difficulty reaching the patient to schedule in the first place. Current EMR reporting does not have an efficient way to capture this information, which ultimately skews the data on wait times.

Limitations

A limitation of this project was that only referrals with an appointment were examined. Referrals that were received and denied or never appointed were not analyzed. Never appointed referrals occur for a multitude of reasons: inappropriate referral, lack of authorization, insufficient records received, and insurance denied. Patients from this subset may have additional factors that affect referral delays. Another limitation was the data examined were based on entry into electronic medical records so omissions by users or care sought outside of the health system were not reflected in the findings.

Recommendations for Future Research

Future work needs to focus on standardizing metrics across organizations. Patients, medical groups, health systems, insurance and governing bodies all define access to care

differently (Andersen, Davidson, & Baumeister, 2007). It will be important to have measurements that capture the wait time from start to finish, as this is the patient's experience. Electronic health record fields need to be studied further to determine how best to optimize data collection within a health system and across organizations that can be compared and generalized.

Implications for Nursing

To address issues facing the health care delivery system it is essential to have high quality data. Accurate reporting is key to a nurse manager. Without meaningful data, process improvement interventions may erroneously focus on the wrong factor. With growing needs to improve the reliability and efficiency of the referral process to improve patient access and care nurse leaders have the skills necessary to lead this improvement process. Nursing leadership positions are demanding; it is crucial for nurse leaders to be able to assume that the data they are using to base future improvements are accurate.

Conclusion

With any new use of electronic health records (EHR), there has to be a rigorous and well-informed attention to terminology. Defining terms is vital to implementing the EHR in a meaningful way so that data are consistent and accurate. Nurses need to have a role in this design and early implementation work. Nurse leaders need to be aware that reports generated from the EHR may not be accurate. Validating a data subset before proceeding with a project is crucial to its success by confirming that the appropriate measurements and interventions have been selected. Nurse leaders should be aware that data validation is a critical step that should be incorporated to ensure a successful quality improvement process.

Additionally, uniformity of metric definitions will align regulatory agencies, health systems and providers and allow for collaboration and sharing of best practices to improve

referral access to specialty care. Improving patient access, like many other issues in health care, needs to be solved through interdisciplinary collaboration between the patient, physician, nursing, information technology, office staff, insurance companies and office staff. With a continuous commitment and passion to improve patient's access to care, together we can make a difference.

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