Improving Referral Communication Using a Referral Tool Within an Electronic Medical Record

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Abstract

Objectives: Poor outpatient referral communication is an important quality and safety issue. We implemented an electronic referral tool to analyze its impact on communication between primary care physicians (PCPs) and specialists. **Methods:** We studied one practice site that implemented the referral tool and one that did not and surveyed affiliated specialists, PCPs, and patients about referral communication. **Results:** Specialists more often received information before the referral visit from intervention PCPs versus nonintervention PCPs (62 percent vs. 12 percent, $P < 0.0001$), a finding that persisted after adjustment (OR = 3.3, $P = 0.008$). Intervention PCPs more often received return communication from specialists (69 percent vs. 50 percent, $P = 0.08$), a finding of borderline statistical significance. Finally, patients of intervention PCPs were more likely than patients of control PCPs to report that specialists had received information before their visit (70 percent vs. 43 percent, $P = 0.007$). **Conclusion:** Referrals are a key outpatient transition of care. Facilitating transmission of referral information electronically can improve physician communication.

Introduction

Communicating patient information at the time of specialty referral is essential to high-quality consultation and coordinated, safe patient care. Both primary care and specialist physicians value this information exchange for shared patients,[1] but dissatisfaction with the current referral process is widespread among primary care physicians (PCPs) and their consultants.[2, 3, 4] About half the time, the reason for dissatisfaction is a delayed or missing referral letter and reports. Other reasons include dissatisfaction with redundancies in the referral process, missing information in the referral communication, time required to write a referral note, and difficulty in finding a specialist.[3, 4, 5, 6, 7, 8, 9] Studies have highlighted the problem of poor communication between PCPs and specialists in terms of timeliness and content. This represents a major opportunity for improvement.[10]

Strategies for improving communication of referral information have been proposed, including scheduling the specialist appointment from the referring physician's office and providing pertinent information to the specialist, which have been shown to increase referral completion.[2] Specialists who received timely patient referral information reported providing optimal care twice as often as specialists who did not.[11] Other studies have looked at the benefits of physician

training on how to write letters[12] and the value of form letters and standard templates to improve letter quality from both PCPs and specialists.[13, 14]

Few studies have examined the effects of electronic medical records (EMRs) on care coordination in general or on the referral process in particular.[10] Computer access to chart notes was associated with increased communication between referring physicians and specialists, with specialists receiving written or e-mail referral letters more than twice as often as by telephone or other verbal communication.[11] Benefits of e-mail communication about referrals include the option for asynchronous communication, increased flexibility, and opportunities for back-and-forth interchange and enhanced rapport.[15] To our knowledge, no controlled trial of electronic communication of referral information has been performed.

We hypothesized that electronic communication via a referrals tool embedded within an EMR has the potential to improve the timeliness and quality of referral communication and may also improve patients' referral experiences. In this study, we used an electronic application, Referral Manager, within an ambulatory EMR, to optimize delivery of the referral and supporting patient information to the specialist. We then surveyed specialists, PCPs, and patients about their referral experiences.

Methods

Study Setting

We studied two community health centers in the Partners HealthCare System in Boston, MA. As members of the Partners system, these practices are part of an integrated care delivery system, connecting two academic medical centers to outpatient primary care and specialist practices in the greater Boston area. Both practices use the Partners' Longitudinal Medical Record (LMR) system, an EMR that allows Partners' practices to share patient information, such as medications, problem lists, and visit notes.

One adult primary care practice used a Referral Manager application (described below) as an additional module within LMR (intervention arm); a second adult primary care practice referred patients in the usual manner without access to the module (control arm). The PCPs and administrative staff that managed the referral process at the intervention practice were trained in the use of Referral Manager. This study was approved by the Partners Institutional Review Board and was registered at ClinicalTrials.gov (ID NCT00129064).

Referral Manager Application

The Referral Manager application is an integrated module of the LMR system.[16] Designed to fit into the referral process workflow, the application has the following features:

- PCPs may initiate, approve, or deny a request for a referral.
- Users are prompted to fill in basic referral elements as listed below. Italicized items are required elements completed by PCPs; a practice referral manager usually completes the remaining information.

    - *Reason for referral* (drop-down lists of relevant issues appear based on the specialty chosen).
    - Drop down lists of relevant issues appear based on the specialty chosen.
    - Information to include with the referral letter (e.g., patient's medications, allergies, problem, procedure lists, and visit notes in LMR; default preferences are available).
    - Pertinent past medical history and question(s) to be answered.
    - *Specialty* (from a drop down list) or name of specialist (from a drop down list).
    - Appointment date and time.
    - Number of visits approved and the level of urgency for the referral.
    - Special instructions for the office staff and patient.
    - Method by which to send information to specialist: e-mail or fax.
- Referrals may be routed for further actions (e.g., authorization by physician, completion of appointment details by administrative staff, etc.) to different users within a practice through the use of queues for administrative staff and physician users.
- Referral letters are created from the information that is entered by users and are e-mailed to the specialists on the day prior to the patient appointment. E-mails among study practices are within the Partners' firewall and therefore secure.
- PCPs and practice staff may track referrals, determine referral status, and be notified about the presence of a consultation letter in the LMR.

The Referral Manager application performs background procedures, such as searching specialist schedules to match a specific patient referral with its corresponding specialist appointment; sending e-mails of referral letters to specialists automatically at the appropriate time to ensure that the information reaches the specialist before the patient appointment; determining if patients keep their appointment with specialists; and determining if and when a consultation note has been returned by the specialist.

Data Collection

Referral identification. As a standard part of Referral Manager, data entered into the referral screen is stored in the LMR database. The date and time for each step of the referral process is captured and recorded. Supplemental data stored for each referral includes the initiator of the referral, types of information included in each referral, coded diagnoses selected, clinical questions, and "no-shows" for appointments.

For each referral in the intervention arm, a new referral to a provider of the same specialty was identified for the control arm based on matching by specialty. The primary exclusion criteria for referrals in both arms included:

- Patient did not attend specialist appointment.
- Patient was not yet 18 years of age at the time of the appointment.
- Specialist was not part of Partners HealthCare system.
- Patient had seen the specialist within the past 12 months or had seen the specialist more than 12 months ago for the same problem.

- Referrals to urology, gynecology, reproduction, psychiatry, infectious disease, physical therapy, gastroenterology for screening colonoscopy, or ophthalmology, due to the routine nature of many of these referrals and privacy issues.
- Appointment was changed or did not appear in the LMR system.

In the control arm, in order to verify that the visit was a new referral from a study PCP (rather than one initiated by the patient or another provider), patients were excluded if they had not seen their PCP in the last 12 weeks.

Physician survey. For referrals meeting the inclusion criteria, surveys were sent in the body of an e-mail message to the specialist and the PCP involved in the referral. Specialists were surveyed the day after their appointment with the patient. Nonresponders were sent one reminder survey 3 days later. PCPs were surveyed 2 weeks after the patient's visit with the specialist. Nonresponders were sent one reminder survey 3 days later. If PCPs responded to the 2-week survey saying that they had not yet heard from the specialist, they were surveyed again 4 weeks after the specialist visit, with a reminder survey 3 days afterwards to nonresponders. The number of PCP surveys is a subset of the total referrals because we set a maximum of five surveys per physician. Physicians who refused the surveys were placed on a "do not survey" list, and referrals involving their patients were excluded from future contact. Each PCP and the matched specialist physician who saw the patient received no more than one original survey and one reminder survey per day.

PCPs and specialists associated with the intervention practice were surveyed from November 2005 through July 2006, with surveys conducted daily. PCPs and specialists associated with the control practice were surveyed from January 2006 through July 2006, with surveys conducted weekly to match the number of referrals in each specialty in the intervention arm for the previous week.

Patient survey. After their visit to the specialist, patients with eligible referral visits were mailed an informational letter providing them an opportunity to opt out of a telephone survey. Research assistants made up to 10 attempts to contact patients by telephone within 3 weeks of the referral visit to the specialist. Letters and surveys were available in Spanish for Spanish-speaking patients. Patients provided consent when contacted by phone. Patients were excluded if they did not speak English or Spanish; could not complete the interview; or were deceased, hospitalized, out of the country; or had mental status limitations. Surveys were conducted from August 2006 to February 2007.

Outcomes

Our principal outcome for the specialist surveys was specialist receipt of referral information from the PCP prior to the patient visit. For the PCP surveys, the primary outcome of interest was PCP receipt of information back from the specialist after the patient's specialist visit. For the patient survey, the primary outcomes of interest were specialist awareness of the reason for their visit prior to the visit and overall patient rating of specialist-PCP communication.

Data Analysis

Data were collected, entered, and analyzed using Microsoft Access®. Additional univariate and multivariate analyses were performed using SAS® (Cary, NC). We performed a multivariate logistic regression using the stepwise method, including variables in the model with a P value <0.1. We started with patient age, patient sex, insurance status, intervention status, and specialty. Sex, insurance status, and intervention status remained in the model.

Results

A total of 430 referrals made up the physician survey component of the study (261 interventions and 169 controls). Referral characteristics are shown in Table 1. Orthopedics and gastroenterology were the specialties referred to most often. Characteristics of the two participating practices and their patient populations for the specialist survey are also shown in Table 2. Of note, there were more PCPs and specialists in the intervention practice, and intervention patients were younger. Demographics of patient survey respondents are shown in Table 3; the control and intervention practices differed somewhat in terms of overall health and ethnicity/race.

Table 1. Types of referrals

	N (%)			
Types of referrals	**Intervention specialist survey sent** (N = 261)	**Control specialist survey sent** (N = 169)	**Intervention specialist survey responses** (N = 141)	**Control specialist survey responses** (N = 94)
Orthopedics	36 (13.8)	56 (33.1)	19 (13.5)	31 (32.9)
Gastroenterology	56 (21.5)	27 (16.0)	36 (25.5)	13 (13.8)
Neurology	10 (3.8)	24 (14.2)	6 (4.2)	12 (12.7)
Rheumatology	9 (3.4)	19 (11.2)	7 (4.9)	12 (12.7)
Cardiology	10 (3.8)	14 (8.3)	6 (4.2)	7 (7.4)
Dermatology	33 (12.6)	0 (0.0)	21 (14.9)	0 (0.0)
Endocrinology	4 (1.4)	13 (7.7)	3 (2.1)	11 (11.7)
Other	103 (39.5)	16 (9.5)	43 (30.5)	8 (8.5)

Table 2. Specialist survey practice and patient characteristics

	Entire referral sample		Referrals with specialist survey responses	
	Intervention	**Control**	**Intervention**	**Control**
Number of PCPs	12	7	10	6
Referrals per PCP				
Mean	21	24	14	16
Range	1 - 78	1 - 43	2 - 42	3 - 24
Number of Specialists[a]	104	94	70	57
Patient characteristics				
Age (mean, SD)	46 (0.8)	52 (1.2)[b]	46 (1.1)	52 (1.7)[c]
% Female	69	74	73	74
% Insured	79	80	77	76

a Total for unique specialists was 113; 14 (12%) saw patients from both practices

b $P \leq 0.0001$

c $P = 0.003$

Table 3. Patient survey respondent demographics

	N (%)		
Demographic	**Intervention**[a] (N = 113)	**Control** (N = 30)	***P*-value**
Overall health			
Very good-excellent	23 (20)	7 (23)	0.67
Good	32 (28)	9 (30)	
Fair	46 (41)	9 (30)	
Poor	12 (11)	5 (17)	
Education			
Less than high school	46 (41)	9 (30)	0.11
High school graduate	24 (21)	5 (17)	
Some college/tech education	23 (20)	5 (17)	
College graduate and beyond	18 (16)	11 (37)	
Employment			
Yes	56 (50)	13 (43)	0.54
No	57 (50)	17 (57)	
Ethnicity/Race*			
Hispanic	92 (81)	9 (30)	<0.0001
White	12 (11)	14 (47)	
Black	7 (6)	4 (13)	
Other	2 (2)	3 (10)	

a Percentages may not total 100 due to rounding and missing responses.

Response Rates

As shown in Table 4, the response rate for specialists was 55 percent (235/430). Of the 113 specialists who responded, 12 percent saw patients from both the control and intervention practices, accounting for 34 percent of survey responses (Table 2). The PCP response rate was 46 percent (54/117). The absolute response rate for the patient survey was 36.2 percent, although the participation rate after successful patient contact was 68 percent (143/210).

Physician Surveys

Specialists seeing patients referred by intervention PCPs were significantly more likely than those seeing patients referred by control PCPs to have received information from the PCP prior to the referral visit (62 percent vs. 12 percent) (Table 5). When specialists did receive information, it contained all the necessary information in 93 percent of intervention referrals and 91 percent of control referrals. On multivariate analysis controlling for patient sex, insurance status, and intervention status, specialists were more likely to have received information on patients referred by intervention PCPs compared with control PCPs.

Of the 83 control specialists who reported that they did not receive information, 20 percent felt that additional information would have been helpful. The additional information most often requested by control specialists was the problem to be addressed (53 percent), more patient history (41 percent), and question to be answered (35 percent). Intervention PCPs were more likely to receive communication back from the specialists (69 percent vs. 50 percent), although this finding was of borderline statistical significance ($P = 0.08$).

Table 4. Response rates

Measure	Intervention	Control	Total
Specialist survey sent	261	169	430
Specialist survey responses [N (%)]	141 (54)	94 (55)	235 (55)
PCP survey sent	68	49	117
PCP survey responses [N (%)]	36 (53)	18 (37)	54 (46)
Patients we attempted to contact	269	126	395
Patients who were contacted [N (%)]	165 (61)	45 (36)[a]	210 (53)
Patients who completed survey [N (%)]	113 (69)	30 (67)	143 (68)

a $P < 0.0001$

Table 5. Physician survey results

Measure	N (%) Intervention (N = 141)	Control (N = 94)	Total (N = 235)	*P*- value
Specialist received information prior to visit	88 (62)	11 (12)	99 (42)	0.008 OR 3.3[a]
Specialist did not receive information prior to visit	53 (38)	83 (88)	136 (58)	NS
Information would have been helpful	10 (19)	17 (20)	27 (20)	NS

a Multivariate analysis controlling for patient and referral characteristics.
NS = not significant

Patient Surveys

As summarized in Table 6, intervention patients were significantly more likely to report that specialists had received information prior to their visit (70 percent vs. 43 percent), and they heard information from their specialist that conflicted with their PCP significantly less often than did control patients (6 percent vs. 20 percent). There were also trends toward intervention patients reporting that the specialist was aware of the reason for the visit more often (76 percent vs. 60 percent) and rating specialist-PCP communication higher (58 percent vs. 43 percent) compared with control patients.

Of the 30 patients who had returned to see the PCP by the time of the survey, 61 percent (14/23) of intervention patients reported that their PCP had heard back from their specialist compared to 43 percent (3/7) of control patients.

Table 6. Patient survey results

Measure	N (%) Intervention (N = 113)	Control (N = 30)	*P*-value
Specialist received information prior to visit	79 (70)	13 (43)	0.007
Received conflicting information from specialist and PCP	7 (6)	6 (20)	0.02
Specialist aware of reason for visit	86 (76)	18 (60)	0.08
Rating of specialist-PCP communication as good, very good, or excellent	66 (58)	13 (43)	0.14

Discussion

We found that when PCPs used an electronic referral tool within an EMR, the chances that information would be communicated to specialists prior to the patient's referral visit were three times as high as when PCPs did not use the tool. In addition, when the electronic referral tool was used, intervention patients were significantly more likely to report that specialists had received pertinent information prior to their visit and significantly less likely to have received conflicting information. There was also a trend towards intervention PCPs being more likely than control PCPs to receive information back from the specialists. These three findings strongly suggest that communication between PCPs and specialists was improved in our trial.

Our results also strongly suggest that the electronic referral tool was the source of the improved communication because the content of communication, once received, was equivalent between control and intervention practices. Therefore, the key to improving PCP-specialist referral communication is ensuring that communication occurs, rather than specifying the content of the communication. Our Referral Manager application helps ensure that communication occurs by allowing the PCP to specify the referred-to specialty and the reason for the referral and by automatically sending the referral question and supporting medical information in a timely fashion.

The intervention also tended to improve communication from the specialist back to the PCP, although this finding was of borderline statistical significance. While Referral Manager did not specifically address this return path of referral communication, this trend suggests that a specialist who receives communication is more likely to try to "return the favor" by initiating return communication. Such two-way communication is essential for clinical care, as poor communication is consistently a leading cause of medical errors.[17, 18]

Only 20 percent of doctors who did not receive communication felt that it would have been helpful. This surprising finding may be explained by specialists' lowered expectations for information from PCPs, a dysfunctional consequence of the culture of poor communication around referrals that our study seeks to redress. The benefits of the referral tool for referrals in this subset of specialists may have been large, as suggested by the fact that the information specialists sought involved required fields in Referral Manager, such as "the reason for the referral." Our design of Referral Manager appears to provide the right balance of required and optional fields, thereby laying the foundation for future design of these kinds of tools in EMR systems.

Our referral tool also fits into clinicians' workflow. This was evidenced by a referral tool adoption rate of greater than 99 percent at the intervention practice, according to the practice manager, even though its use was not required (data not shown). Perhaps in the future, use of this kind of tool for all referrals will help close some of the information gaps and improve tracking of referrals, while ensuring flexibility, since referrals to some specialties for routine care (e.g., ophthalmology) probably do not need the same level of detail. In the future, we plan to explore customizing the referral information according to the needs of different specialists.

Many patients could clearly identify when effective communication had occurred between their PCP and specialist; intervention patients were significantly more likely than control patients to

report that the specialist had received prior information. Our data suggest that this realization might influence patients' referral experiences, especially their ratings of the quality of PCP-specialist communication. Patients expect rapid communication between the specialist and the PCP, and they often have questions for the PCP that cannot be resolved if this communication has not occurred.[4] These findings underscore the importance of improving communication to improve clinical quality and patient care experiences.

Widespread use of an electronic referral module could provide additional benefits. Electronic referrals can facilitate the inclusion of decision support into the referral process. For example, referring to cardiology for a coded diagnosis of new "atrial fibrillation" could trigger decision support suggesting that certain tests be ordered prior to the specialist appointment. In addition, systems could display clinical guidelines for certain common diagnoses, which might prevent unnecessary referrals. Practices also could track the reasons referrals are made to ensure standardization and appropriateness of referrals and to promote benchmarking and related quality improvement activities. To enhance the security of interprovider communications outside of a practice's firewall, applications could create secure Web pages that could be accessed via e-mailed hyperlinks, thereby avoiding transmission of health information. Enhanced security of interprovider communications would be an integral component of a next-generation referral application.

The ability for PCPs and practice staff to track referrals is another potentially important benefit of an electronic referral module. As many as 20 percent of patients referred to specialists do not follow through with the visit.[18] In one study of missed and delayed diagnoses in the ambulatory setting, 5 percent of cases involved the failure of a requested referral to occur, and 2 percent involved failure of the referred-to clinician to send results to the referring clinician.[19] At one malpractice insurer, when looking at high-severity, missed-diagnosis malpractice claims, referral tracking issues came up in 55 percent of cases.[a] A tool that allows PCPs and practice staff to electronically track referrals and be notified of no-shows could reduce some of the risk in the referral process. This aspect of our electronic referral tool could benefit from further study and evaluation.

Implementation of an electronic referral tool is challenging. It is critical to ensure that the application fits well into the workflow of the physicians and practices' administrative staff. Usability is also important, and we consciously decided to limit the number of required fields to strike a balance between obtaining useful (coded and free-text) information, while not making data entry too onerous for the clinician. Adoption has been strong at the practice that has used the tool, and clinician response has been very positive. Plans are currently underway to implement the referral tool at other primary care practices in the system.

Limitations of this study include the potential for response bias, especially due to the difficulty in obtaining survey responses from PCPs. In addition, because of difficulties in contacting patients (especially controls, who were harder to reach), our patient survey numbers are low, limiting our

[a] Personal communication from A. Puopolo, Harvard Risk Management Foundation Director of Loss Prevention, 2007.

ability to draw strong conclusions from this part of the study. We also do not have a good explanation for the difference in response rates between control and intervention patients, given that we attempted to contact them in the same manner. Finally, for logistic reasons, our study was not a randomized controlled trial or crossover trial. Although we tried to match the intervention practice with a similar type of practice (both community health centers that use the same EMR) and we controlled for differences in the primary outcome with multivariate analyses, unmeasured confounders could account for the differences we observed. Further studies with randomized controlled trials, using a larger sample, could be done to verify our results.

Conclusion

Referral communication is a critical, yet unevenly accomplished part of ambulatory care. Ensuring that this communication happens reliably is an essential component of the safe transition of patient care among providers. We found that an electronic referral tool improved communication from the PCP to the specialist. Further studies should be done to better understand adoption strategies and potential benefits of this technology.

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