Closing the Referral Loop
Improving Ambulatory Referral Management, Electronic Health Record Connectivity, and Care Coordination Processes

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Abstract: More than 105 million referrals of Medicare beneficiaries to specialists occur annually. Different settings and electronic health records have made care coordination complex. PCPI (formerly American Medical Association-convened Physicians Consortium for Performance Improvement) and The Wright Center for Graduate Medical Education sponsored the Closing the Referral Loop pilot project. Twelve dyads of primary care and specialist physicians sought to improve ambulatory referrals by mapping the referral process, and using care compacts, metrics, and electronic health records. Referrals closed on time increased from 40% to 70%. Clinical questions answered increased from 50% to 75%. Adoption of the change package and lessons from this project may significantly improve ambulatory referral management. **Key words:** *ambulatory, care coordination, clinical question, Closing the Referral Loop, electronic health record, PCPI, primary care physician, referral, specialist, The Wright Center for Graduate Medical Education*

MORE than 105 million referrals of Medicare beneficiaries to specialists are made every year (Anderson, 2010). Two-thirds of the Medicare expenditures involve patients with multiple chronic conditions, with the majority of care provided in the ambulatory setting (Barnett et al., 2012). Medicare patients see an average of 7 physicians, including 5 specialists, from 4 different practices (Cummins et al., 1980). Multiple providers working in different settings, the shift to electronic health record (EHR) systems, and the inpatient use of hospitalists and

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intensivists have increased the complexity of care coordination and relationships among primary care physicians (PCPs), specialists, and patients. Poor referral-related care coordination may increase risk for patients including delayed, redundant, or unnecessary testing, inadequate treatment, and diminished self-care. Specialists report that the purpose of a referral is often unclear and the information sent by the PCP is incomplete. PCPs frequently state that the specialist report does not pertain to the patient's reason for referral (Gandhi et al., 2000; Kirschner & Greenlee, 2010). Adult patients report insufficient care coordination and deficient information transfer among the physicians (Pham et al., 2009).

PURPOSE

In 2013, PCPI (formerly the American Medical Association-convened Physician Consortium for Performance Improvement), a national, clinician-led, nonprofit organization engaged with health care delivery system stakeholders to improve patient health and safety, conducted an extensive literature search, facilitated a focus group of national improvement experts that identified ambulatory referral as a key area for improvement, and convened a panel of experts from organizations that improved the referral process (www.thepcpi.org). The expert panel identified key areas for referral improvement strategies, such as accountability, relationships, and agreements between the PCP and the specialist (through care compacts, which clearly define the relationship and expectations of the primary care and specialist physician teams), EHR connectivity, and patient engagement. They also identified 3 key questions critical to referral completion:

1. Did the referring physicians get their referral questions answered?
2. Did the specialists get the information they needed to complete the referral as requested?
3. Did the patient feel that the care was coordinated and that they got what they needed?

To study ambulatory referral process improvement, PCPI partnered with an organization with demonstrated quality improvement, The Wright Center for Graduate Medical Education (TWC), located in Scranton, Pennsylvania, a nonprofit, community-based graduate medical education consortium and safety net provider of primary care services for more than 40 years, to form the Closing the Referral Loop (CRL) collaborative. CRL's aim was to complete 3 goals: identify key interventions; develop the change package; and complete a pilot project using the Institute for Healthcare Improvement (IHI) collaborative methodology during 2014 to 2015.

STUDY DESIGN AND METHODS

The aim of the pilot project was to improve the efficiency and effectiveness of the referral process between the PCPs and the cardiologists (each pair comprising a "dyad") as demonstrated by the following measures: PCP reason for the referral is clearly stated; PCP referral is timely and sent with consistent supporting information; cardiologist report addresses reason for the referral; cardiologist report has timely completion and report receipt; satisfaction of the PCP, specialist, and patient with the referral process improves; use of the EHR in supporting the referral process and provider communication increases; and timely closure of referrals improves.

The project was overseen by a leadership team of 7 and managed by a project team of 5 members from the collaborating partners. The PCPI provided access to referral process experts, as well as improvement and measurement expertise. TWC provided quality improvement faculty, an IHI-trained improvement advisor, and an improvement coach to support CRL project management, conduct change package creation/ testing/implementation, as well as ensure data collection and integrity. A change package is a collection of ideas that may be used/tested in a quality improvement project that support secondary and primary drivers in achieving stated aims. (For more information on change packages, see *The Improvement Guide: A*

Practical Approach to Enhancing Organizational Performance, Second Edition). The ideas are not prescriptive and are intended to allow participants to try activities best suited to their settings. TWC also provided EHR expertise, data collection and analysis services, and team coordination. TWC primary care internal medicine residents and cardiology fellows were trained and served as quality improvement coaches for the participating physicians and their staff, assisted sites with data collection, and prepared learning session storyboards. Storyboards are used to share background information about a participating organization or site including basic descriptive, demographic, and current performance information. (See *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance,* Second Edition.) During subsequent meetings, the storyboards are updated to share hypotheses, what ideas were tested, results of the tests, adjustments, and potential next steps, if any, before broader implementation (consistent with Plan, Do, Study, Act), successive cycles used in testing improvement ideas, with peers from other participating organizations or sites. The Wright Center for Graduate Medical Education Institutional Review Board determined that this project did not require oversight because it was focused on quality improvement. No drugs or medical interventions were administered to patients, and no patient identifiers were disclosed during the project. Only process improvements were being made.

In early 2014, TWC recruited 12 PCP-cardiologist dyads to participate in the CRL project. Successful recruitment was tied to strong leadership and professional relationships (ie, PCP and cardiologist, TWC and resident-based practices, TWC and fellow-based practices, and TWC involvement in the Pennsylvania Chronic Care Initiative). Dyads included physicians who were independent, or affiliated with health systems and/or academic medical centers. Nine different EHRs where used across the practice sites. Many physicians stated their reason for participating in the project was their relationships with each other—cardiologists and PCPs—which

had developed over a period of years, many of these stretched back to their medical training days. They also stated that building and maintaining these relationships had become increasingly challenging as PCPs spend less time in the hospital where they traditionally had interacted in-person. The dyad physicians desired easier and more efficient referral communication systems.

The pilot project used the IHI Breakthrough Series Learning Collaborative Model (a pre-work period and two 4-hour in-person learning sessions, separated by 1 action period) to test interventions within and across health care organizations during the 18-month life of the project. Eleven dyads (PCP and specialist as well as their staff) completed the pilot project, collected data on a defined set of measures, and attended monthly improvement webinars and in-person meetings to share challenges, solutions, and lessons learned. The improvement coach initiated and participated in-site visits to all dyads.

The project team with dyad participation developed the CRL change package to include the PCP summary of care record (Centers for Medicare & Medicaid Services, n.d.), the PCP reason for the referral (clinical question), the specialist answer to the clinical question, the specialist referral report (Stremikis et al., 2011), and referral types, time risk stratified as urgent (up to 7 days), priority (7-14 days), and routine (14-28 days). In addition, the project team mapped the referral process (see Figure 1). The process steps were mapped as follows: The PCP determines the referral type, completes summary of care record, specifies the clinical question, and sends referral request to the PC coordinator. The PC coordinator creates the referral and E-faxes the referral to the specialist coordinator. The specialist referral coordinator receives the referral and reviews for referral type and the clinical question. He/she makes an appointment with the patient according to the referral type and time parameter, and communicates date of appointment to the PCP. The specialist sees the patient and sends the referral report and the clinical question answer to the specialist coordinator who then
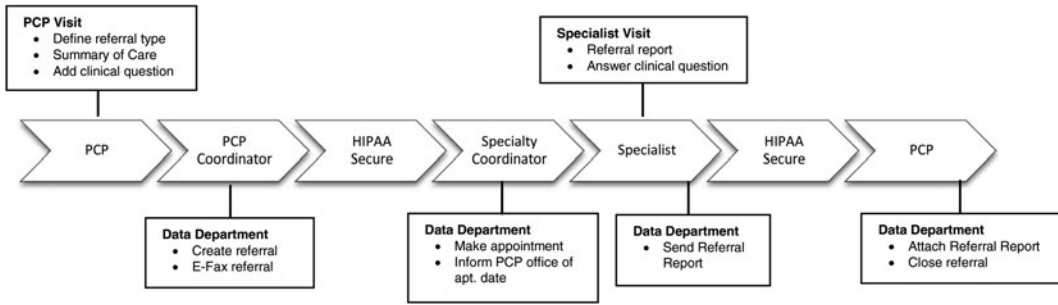
Figure 1. Closing the Referral Loop referral process map.

sends the report and the clinical question answer to the PCP. Finally, the PC coordinator attaches the referral report to the EHR and closes the referral as depicted in Figure 1.

At the outset of the pilot project, the organizers assumed that EHRs were set up to support the easy sharing of data and information that would facilitate communication and closing of the referral loop. Participants quickly learned that there was little or no interoperability among different EHRs and that alternative electronic communication channels needed to be deployed to improve workflows and referral management. Based on the pilot study experience, the authors recommend that EHR capabilities need to be enhanced to manage and track the referral process. Recommendations for EHRs to better support the referral process are specified in the Discussion section.

Table 1 lists the CRL measures.

RESULTS

Participants collected data monthly over the 18 months of the pilot, and the results reflected the work of the 12 dyads. During learning session 1, preintervention data were compared and prework, such as storyboards, was shared. Postintervention data were shared during learning session 2. During learning session 3, final interventions and results data were shared and compared.

In the pilot project, initially 24% of the referrals were classified as "urgent" by the PCP (the time frame for urgent completion of the referral was defined as up to 7 days). Postintervention, the need for urgent referrals reduced dra-

Table 1. CRL Measures

Percentage of closed referrals
Percentage of urgent referrals completed within 7 d
Percentage of priority referrals completed within 14 d
Percentage of routine referrals completed within 28 d
Percentage of referrals with specialist reports sent within 7 d of patient appointment
Percentage of clinical questions answered by the specialist
PCP satisfaction with the referral process (5 survey questions, 5-point Likert scale)
Specialist satisfaction with the referral process (6 survey questions, 5-point Likert scale)
Patient satisfaction with the referral process (6 survey questions, 5-point Likert scale)

Abbreviations: CRL, Closing the Referral Loop; PCP, primary care physician.

matically to less than 5%. "Priority" referrals (seen within 7-14 days) also decreased from 10% to less than 5%. As urgent and priority referrals decreased, the number of "routine" referrals (those requiring that the patient be seen within 14-28 days) increased from 65% to 95%. Referral characteristics are displayed in Table 2.

In comparing preintervention data versus postintervention data, there were significant improvements in the percentage of closed referrals postintervention (from 40% to 70%), the percentage of referrals closed within 7 days of the specialist appointment (from 40% to 70%), and the percentage of referrals

Table 2. Summary of Referral Characteristics for Preintervention and Postintervention Referrals

	Preintervention, % (n = 110)	Postintervention, % (n = 240)
Referral type		
Urgent (<7 d)	24	<5
Priority (7-14 d)	10	<5
Routine (15-28 d)	65	95
Referral status		
Open	60	30
Closed	40	70
Referrals closed in a timely manner (specialist visit summary received by the PCP within 7 d of appointment)	40	70
Referrals with the clinical question answered by the specialist.	50	75

Abbreviation: PCP, primary care physician.

with the clinical question answered (from 50% to 75%).

Patient survey responses demonstrated that patients were generally aware of the reason for their referrals and requirements following the specialist visits, with improvement in all domains postintervention (see Table 3). Specifically, patients more frequently endorsed that they felt their specialist knew some or all of their medical history prior to the visit (increased from 88% preintervention to 99% postintervention), and that patients had a better level of understanding of their condition postintervention (increased from 86% preintervention to 99% postintervention).

Table 3. Comparison of Patient Survey Results Pre-/Postintervention With Percent Difference

Item	Time Point		Change, %
	Preintervention (n = 106)	Postintervention (n = 80)	
Before today's visit, did you know why you were sent to see a cardiologist? Responding "yes," %	94.3	93.6	−0.7
Did your cardiologist know the purpose of your visit? Responding "yes," %	86.8	100	13.2
How much did your cardiologist know about your medical history? Responding "some" or "all," %	87.7	98.6	10.9
After today's visit, do you feel you …? Responding "have a better understanding," %	85.6	98.8	13.15
Do you know the next steps for your plan of care, such as medication or follow-up appointments? Responding "yes," %	92.5	93.8	1.3

One goal of this pilot, utilizing the EHR to improve communication between providers, coincided with the implementation of Centers for Medicare & Medicaid Services (CMS) Meaningful Use Stage 2 EHR criteria (care coordination and exchange of information). At the beginning of the pilot, the majority of referring PCPs reported that they communicated referral information with specialists by fax only (55%). Thirty-six percent of PCPs used a variety of methods to support the referral process (EHR, fax, telephone conversations, e-mail, or text messages). Only 18% of the PCPs used the EHR as their only method of communication. In comparison, 36% of the specialists (twice the percentage of PCPs) used the EHR as their only method of communication, while 36% used the fax as their only method of communication, and 27% used a combination thereof.

Similar percentages in the method of communication were observed pre- and postintervention, which showed there was no major change in information exchange practices postintervention. Thus, in Table 4, methods are reported for all responses rather than stratified by pre-/posttimepoint (Figure 2).

Preintervention survey results showed PCPs felt they often or always sent information regarding the clinical question to specialists prior to the visit; however, the frequency with which PCPs endorsed this item increased from 70% preintervention to 100% postintervention.

Survey responses indicated PCPs typically agreed or strongly agreed that they knew the required referral information expected by the specialist (96%). This percentage increased to 100% postintervention. Prior to the intervention, PCPs reported that 78% of them were satisfied or very satisfied with the methods of communication used to transmit referral information to specialists: that level of satisfaction increased to 100% postintervention. Finally, the frequency with which PCPs showed they often or always received visit summaries after the specialist's visit increased from 85.2% prior to the intervention to 100% postintervention (Figure 3).

Preintervention survey results indicate that 63.6% of the cardiologists felt they often or always received information about the clinical question prior to seeing the patient; the postintervention rating increased to 100%. Approximately 45% of cardiologists in the preintervention survey agreed or strongly agreed that PCPs know the specific type of information specialists want to receive before seeing the patient; this endorsement reached 90% postintervention. Only 27% of the specialists agreed or strongly agreed in the preintervention survey that they have the information they need before seeing the patient; this agreement increased to 81.8% postintervention. Preintervention, 81.8% of specialists were satisfied or very satisfied with their current method of receiving referral information; at postintervention, this response increased to 100%. The specialist preintervention and postintervention response regarding often or always sending the PCP a visit summary was 100%.

Table 4. Method of Communication

Method	Provider Type	
	PCP, % (n = 38)	Specialist, % (n = 22)
EHR only	18	36
EHR, fax, and/or other method	18	27
Fax and/or other method	8	0
Fax only	55	36

Abbreviations: EHR, electronic health record; PCP, primary care physician.

PCP Survey Responses Pre (n=27) and Post (n=11) Intervention

■ Pre ■ Post

70.4% · 100.0% — Often or Always send clinical question information to specialist prior to the referral visit

96.3% · 100.0% — Agree or Strongly Agree they know the specific type(s) of information specialist requires prior to the referral visit

77.8% · 100.0% — Satisfied or Very Satisfied with current method of sending referral information to specialists

85.2% · 100.0% — Often or Always receive a visit summary from the specialist after the referral visit
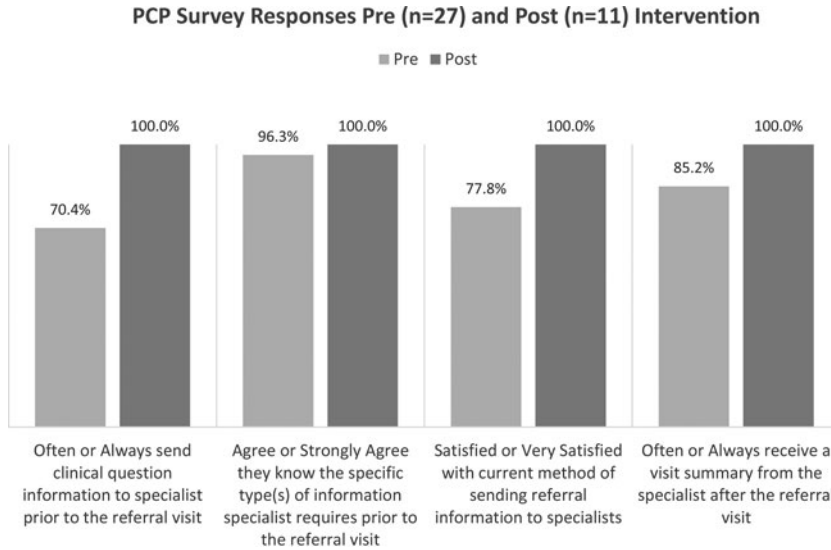
Figure 2. Primary care physician survey results (n = 38).

DISCUSSION

Categorizing referral types as urgent, priority, and routine during the project prework was vital to clarify the referral process. As the project proceeded, urgent referral became increasingly defined by a more immediate time frame (<24-hour response time) that usually required immediate transition of the patient to emergency department, hospital, or cardiac intervention center and a direct phone call from PCPs to specialists (most often to the specialists' cell phone). Urgent referrals became an immediate communication and hand-off. Completion of the referral no longer needed to be tracked and no longer fit the
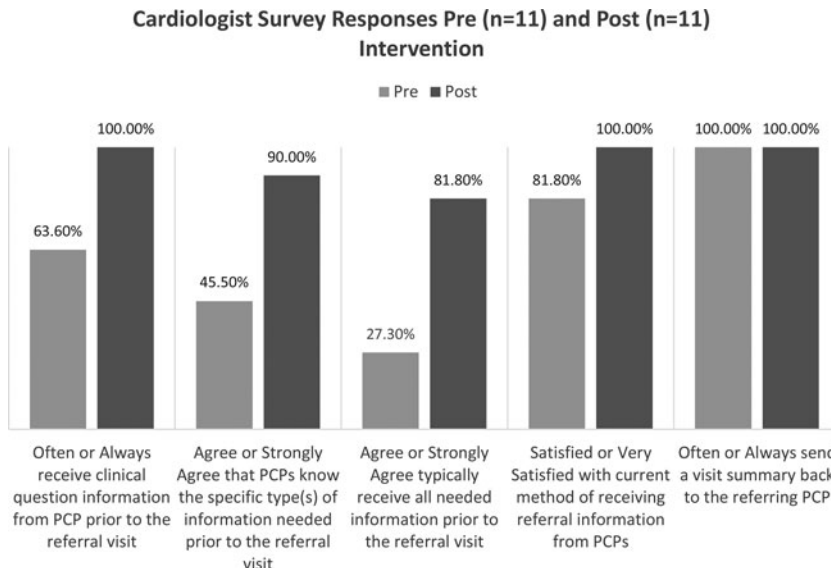
Cardiologist Survey Responses Pre (n=11) and Post (n=11) Intervention

■ Pre ■ Post

63.60% · 100.00% — Often or Always receive clinical question information from PCP prior to the referral visit

45.50% · 90.00% — Agree or Strongly Agree that PCPs know the specific type(s) of information needed prior to the referral visit

27.30% · 81.80% — Agree or Strongly Agree typically receive all needed information prior to the referral visit

81.80% · 100.00% — Satisfied or Very Satisfied with current method of receiving referral information from PCPs

100.00% · 100.00% — Often or Always send a visit summary back to the referring PCP

Figure 3. Cardiologist survey results (n = 22).

referral process. Priority referrals (completion in 7-14 days) also declined to less than 5%. Routine referrals (completion in 14-28 days) increased to 95%, becoming the norm. This change suggests that as definitions of referral types were agreed upon among the dyads and time frames for each type of referral were increasingly met, the participants became more comfortable with and confident in the improved referral process. The improvement in percentage of closed referrals (70%) and referrals closed in 7 days (70%) can also be linked to agreement regarding referrals types and time frame expectations, clinical question clarity, and the patient care summary.

At the start of the CRL, EHR interconnectivity was minimal because most EHRs could only accomplish a few of the steps in the referral process. By the end of the pilot, most PCP EHRs could send the referral request and summary of care record. Typically, the clinical question was included in the referral request, but not in an easily identified location or structured field. Usually, the cardiologist's EHR was sent the referral report to the PCP but not as an automatic function. Dyads that could not communicate using existing EHR configurations used fax or implemented a health information service provider to facilitate communication. EHRs were unable to track referral process steps including receipt of the referral, patient appointment date, and patient completion of the cardiology appointment; these process steps were tracked manually. Communication between the PCP and the cardiologist with the same EHR was enhanced by the utilization of direct messaging in the last 6 months of the CRL for 5 of 12 dyads, minimizing the need for frequent phone calls. The use of the EHR as the only method of communicating did not increase during the project. This is surprising and discouraging because CMS Meaningful Use Stage 2 EHR Criteria (purported as essential to care coordination) were also being implemented during the pilot project, and the enormous investment had no effect on referral management by the EHR.

Patient survey responses showed that patients generally were satisfied and aware of the reason for their referrals and requirements following the specialist visits, with improvement in all domains postintervention. Specifically, patients more frequently reported that they had a better level of understanding of their condition postintervention. The project team identified problems with the patient survey including a disparity between the patient questionnaire responses using a Likert scale and written comments in opened-ended comments in the survey; patient misperception of the survey purpose (patients felt they were evaluating the doctor rather than the referral process); and limited patient understanding of the referral process.

Preintervention PCP survey responses indicated that PCPs generally were satisfied with the referral process, and even more satisfied with the postintervention process. We observed initial disagreement between the ratings of PCPs and cardiologists in 3 referral areas including specialist receipt of the clinical question information prior to the visit, PCP knowledge of the information required, and the frequency with which postvisit summaries were sent back to PCPs. These differences were minimized in the postintervention surveys with cardiologist responses showing significant improvement in receipt of information from PCPs about the clinical question, and PCP knowledge of the specific information required. In addition, the cardiologists' postintervention surveys showed significant improvement related to having all the information they needed before seeing the patient (from 27.3% to 81.8%).

It should be noted that the average number of monthly referrals per dyad increased over the 18 months from 8.5 per month per dyad to 19.3 per month per dyad. Within 6 months of starting the CRL, several dyads started spreading the implemented referral process within the PCP and specialty practices. One dyad spread the referral process to several noncardiac specialties. A Federally Qualified Health Center (FQHC) dyad spread the referral process to multiple FQHCs. The spread of the referral process within the offices and beyond can most likely be attributed to an improved referral design and the related

benefits experienced by physicians, staff, and patients.

Based on what was learned in the pilot project, standardization of the referral process, building the infrastructure for enhanced electronic communication and referral management will significantly improve referral outcomes.

Limitations in the CRL pilot project included participant representation from a small geographic region; greater than expected time needed to complete care compacts and referral process mapping; and limited capacity to assess patient engagement and understanding of and satisfaction with the referral process.

The most significant barrier to closing the referral loop was the inability of EHRs to (1) document and track referral process steps, including the appointment with the cardiologist; (2) efficiently capture or send referral information between offices; (3) efficiently communicate questions and issues between offices; and (4) produce referral tracking reports for staff monitoring. As a result, the authors recommend the following modifications for EHRs: structured fields for the referral type; summary of care record; clinical question; date of specialist appointment; referral report and answer to the clinical questions; and the EHR must be able to report referral by type and timeliness of each step of the process, as well as the number of open and closed referrals. In addition, the EHR must be able to support timely electronic communication between the PCP and the specialist for problem-solving.

Another major challenge was the cardiologists' availability for CRL calls and meetings. Participation in a collaborative was a new experience that required an unexpected level of communication and time for many participants.

Because this is a pilot, the study was not designed to detect changes within this complex set of hierarchical data. Furthermore, because some specialists were represented in more than 1 dyad, there are intercorrelations within and between dyads, further complicating our ability to tease out true intervention ef-

fects. The model is further complicated when addressing the patient surveys, because patients share a relationship with both a PCP and a specialist. Furthermore, we are unable to determine whether unmeasured provider, practice, and patient characteristics may have influenced item responses.

Nonetheless, these results can be used to inform the design of a larger study with sufficiently large sample size and power to detect statistically significant changes in pre- and postintervention observations utilizing an appropriate modeling technique such as a generalized estimating equation (GEE). The GEE is used to estimate average responses over an entire cohort, and generally considered robust when correlated data with one-to-many relationships, and other unmeasured dependence between covariates and outcomes may exist.

DIRECTION FOR FUTURE RESEARCH

Based on the experience and lessons learned in this pilot, a scale-and-spread project involving 60 to 70 dyads in a mix of settings would be a logical next step to test the applicability and validity of the workflow improvements and practice management lessons in this pilot. In addition, expanding beyond cardiology to other specialties, such as oncology, nephrology, and neurology, would be valuable, given the breadth and sheer number of ambulatory referrals in the United States.

A key issue in referral management is a lack of understanding of the factors contributing to patient "no shows" where patients who have an appointment with a specialist do not complete the appointment. Patient no shows should be studied to identify drivers of no-show behavior and interventions to overcome the patient barriers to completing the appointment. Reducing the numbers of patients who do not complete their appointment may have a positive impact on care quality and safety, and reduce the total cost of care.

A second area for future research is to explore the patient's role, understanding, and satisfaction with the referral process. The investigators were unable to gain insight in this area due to ineffective survey design and time

constraints. The use of patient focus groups to obtain qualitative data may be useful to augment understanding of patient expectations and behaviors, and to identify strategies that promote adherence to the patients' care plan.

Another area for future research is the potential reduction in health care costs due to a decrease in unnecessary referrals and/or redundant testing. Evaluating the relationship between the clinical question and answer, and the purpose of the referral, may assist in identifying alternative communication options such as e-mail referrals, which may have an impact on the total cost of care.

Because most of the workflow changes in CRL were designed as workarounds for incompatible EHRs, the adoption of referral management standards by EHR vendors is critical for the sustainability, systemization, and spread of timely, complete referral processes. The investigators believe that if a minimum standard were adopted by EHR vendors such as referral definitions, date of the specialist appointment, the clinical question and answer, a structured specialist report, and indicators of steps in the referral process, many of the workflow changes would not be necessary and large-scale implementation could occur.

CONCLUSION

With the adoption of alternative payment models as envisioned under the Medicare Access and CHIP Reauthorization Act of 2015, ambulatory referrals likely will become more important to policymakers, clinicians, and others, as they attempt to increase quality of care and control health care spending by retaining patient referrals within organizations or networks (Stremikis et al., 2011). The findings of the CRL pilot project clearly show that implementing a few key strategy can have a significant impact on the quality of the referral process, as well as the number of timely, completed referrals and physician satisfaction. Referred patients may experience harm if necessary treatment is delayed or does not occur, or if the patient receives redundant testing. By improving and building robust ambulatory referral management processes, we can enable primary care and specialist physicians to triage referrals to coordinate care better, as well as close more referrals in a timely manner, which may have a significant impact on how patients flow through the US health care system. By doing so, this work may contribute to achieving the triple and the quadruple aims of health care.

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