Healthcare 3 (2015) 202–208

Contents lists available at ScienceDirect

Healthcare

journal homepage: www.elsevier.com/locate/hjdsi

Leveraging an electronic referral system to build a medical neighborhood ☆

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ARTICLE INFO

Article history:
Received 22 January 2015
Received in revised form
17 March 2015
Accepted 4 April 2015
Available online 2 May 2015

Keywords:
Medical neighborhood
Electronic consultation
Primary–specialty interface

ABSTRACT

Background: Electronic referral and consultation systems are gaining popularity, but their contribution to the patient centered medical home–neighborhood framework of coordinated care delivery is not clear. We examined how specialists leverage an electronic referral and consultation system to deliver specialty care, identified determinants of high-quality electronic specialist communication and measured the impact of feedback to specialists on communication quality. *Methods:* Referral patterns were identified for 19 specialties using eReferral in the San Francisco public health care delivery system. Primary care provider (PCP) ratings of the quality (helpfulness and educational value) of consultative communication were measured. Using logistic regression, we identified determinants of high-quality specialist communication during pre-consultative exchange or virtual co-management. Predictors included: specialty and reviewer type, referral volume, percent of referrals never scheduled and time spent by reviewers on eReferral. A pre–post analysis examined the impact of feedback on communication quality. *Results:* The percentage of referrals immediately scheduled (27.2–82.8%) and never scheduled (7.7–59.3%) varied by specialty, with medical reviewers (vs. surgical and women's health) and physician reviewers (vs. nurse practitioners) scheduling fewer referrals immediately ($p < 0.001$). Prevalence of high-quality communication was 71%, impacted by referral volume (adjusted odds ratio = 0.78, 95%CI 0.68–0.88 for each additional 1000 referrals/year) and time spent per referral (1.18, 1.04–1.35 for each additional 3 min). *Conclusions:* Specialists can use electronic referral and consultation systems to enhance specialty care delivery with consultative communication that is highly rated by PCPs. *Implications:* These data can inform the structure and functionality of future electronic consultation systems to maximize care coordination. *Level of evidence:* III.

1. Introduction

The traditional primary care–specialty care interface falls short with regards to provider-to-provider communication and care coordination.[1–3] Prior studies have highlighted the enormous task primary care providers (PCPs) face in overcoming the fragmentation inherent in the US health care system.[2] To promote integrated, coordinated care between primary and specialty care, the American College of Physicians has developed a patient centered medical home–neighborhood (PCMH–N) framework for care delivery.[4,5] Through care coordination agreements and mutually agreed upon expectations, the PCMH–N defines new roles and responsibilities for both primary care and specialty care providers. In particular, the PCMH–N codifies a range of clinical interactions between primary and specialty care providers that go beyond traditional face-to-face formal consultations, including pre-consultative exchange designed to expedite or prioritize care and a variety of co-management

☆**Funding/Support**: This work was supported by the Kaiser Permanente Community Benefit Program, Northern California Region. The sponsor had no role in study design or conduct; data collection, management, analysis or interpretation; manuscript preparation, review or approval. DST is supported by K23DK094850 as well as the National Center for Advancing Translational Sciences at the National Institutes of Health, through UCSF-CTSI Grant number UL1 TR000004. The contents of this manuscript are solely the responsibility of the authors and do not represent the official views of the NIH.

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http://dx.doi.org/10.1016/j.hjdsi.2015.04.001
2213-0764/

arrangements that formalize and expand the specialist role in educating primary care colleagues.[6]

While the PCMH–N has tremendous potential to improve care delivery through enhanced communication among providers, there are little published data about how to implement the tenets of a PCMH–N. eReferral, an internet-based asynchronous electronic referral and consultation system developed at San Francisco General Hospital, is an example of a system that has operationalized new primary care and specialty care roles and relationships described in the PCMH–N model.[7] eReferral has increased access to and effectiveness of specialty care through pre-visit communication,[8] and both PCPs and specialists have expressed satisfaction with the system.[9,10] The quality of eReferral communication and its impact on specialty care delivery, however, has not been extensively explored.

Our goals with this study were to: (1) examine how different specialties leverage eReferral to engage in pre-consultative exchange and virtual co-management; (2) assess the quality, defined by helpfulness and educational value, of specialist consultative communication from the PCP perspective using a novel peer evaluation system; (3) identify determinants of high-quality specialist communication; and (4) determine whether individualized feedback to specialists could enhance the quality of consultative exchange. Given widespread electronic medical record adoption, the results can inform the structure and functionality of electronic referral and consultation systems to maximize the efficiency, safety and quality of specialty health care delivery within a modern medical neighborhood.

2. Methods

2.1. Setting

eReferral is an electronic referral and consultation system designed to optimize the efficient use of specialty resources within the San Francisco Health Network (SFHN), the integrated public health care delivery system that serves San Francisco's uninsured and underinsured residents (approximate $N=123{,}000$). SFHN specialty services receive referrals from PCPs who work in hospital-based primary care clinics, primary care sites managed by the San Francisco Department of Public Health, and independently funded community health centers. To request a consultation, PCPs initiate an electronic referral and provide relevant history and physical exam findings. When pertinent, they also include patient preference for in-person vs. electronic consultation, as patients do not explicitly participate in the electronic referral and consultation process. Pertinent patient demographic information and laboratory data are automatically appended. Each specialty service generally has 1–2 designated specialty clinician reviewers, either physicians or nurse practitioners (NPs) who review and respond to each consultative request. These reviewers are chosen by the specialties, and while an emphasis is made on having an experienced clinician serve as reviewer, the decision is ultimately that of the specialty service. Physician reviewers receive a designated percentage of salary support for this role and NP reviewers are hired with this role as part of their job description.

2.2. eReferral use across specialties: volume, disposition and time spent

We examined referral patterns from January 1 to December 31, 2012 for 19 different subspecialties. Unique eReferral consultations are defined as a consultation for a specific problem that includes all back and forth communication for that problem. Typically these represent unique patients; uncommonly a given patient can have two unique consultations to the same specialist for different problems.

Reviewers consider each consultative request, and can immediately forward it for scheduling, respond with questions, request additional evaluation, or provide management suggestions. Referrals can be grouped into one of four categories: (1) those requiring additional diagnostic workup or history before clinical consultation, representing pre-consultative exchange; (2) those that can be managed by the referring clinician with guidance from the specialist without a face-to-face specialist appointment, representing clinical consultation or virtual co-management; (3) those requiring a specialist appointment that can wait for the next available appointment, representing routine referrals; and (4) those requiring an expedited appointment with a specialty provider, representing urgent referrals. This process may require multiple exchanges between the referring PCP and the specialist reviewer until they reach consensus on the best solution for the patient. Referrals that are not scheduled for an appointment are closed six months after the last exchange and are considered “never scheduled.” While most never scheduled appointments reflect a consensus by the PCP and specialist reviewer, some may also reflect resolution of the medical problem thus eliminating the need for a specialist consultation, or a patient being lost to follow-up in the health care system. Referral disposition for this study was broken into 3 distinct categories based upon the above outcomes: (a) percent of referrals initially scheduled, (b) percent of referrals scheduled after electronic communication between the referring and specialist provider, and (c) percent of referrals never scheduled for a face-to-face visit.

We also examined time spent by specialist reviewers per unique referral, calculated by the average number of minutes reviewers were logged on to the eReferral system per month, divided by the number of unique referrals/consultations, over a 7-month period (August 2012–February 2013).

2.3. Ratings

In June 2011, we embedded a bi-directional communication ratings system in eReferral, using a tool developed by 2 authors (AHC and EJM) with input from key informant PCPs and specialists. Specialty reviewers evaluated PCP referral requests on the clarity of their consultative question and the completeness of pre-referral workup (data not presented in this manuscript). PCPs assessed the quality (helpfulness and educational value) of specialist consultative communication with 2 questions with 5-point Likert scale responses: “How helpful was this response in guiding the evaluation or ongoing management of the patient?” and “How would you rate the educational value of the specialist reviewer's response”. PCPs rated specialist communication only for patients who were not initially scheduled for an appointment and were thus candidates for pre-consultative exchange or virtual co-management. One star represented the lowest value; 5 stars the highest. Ratings were dichotomized into “high quality” if they received 4–5 stars for either educational value or helpfulness *or* “low to average quality” if they received 1–3 stars for *both* educational value and helpfulness.

2.4. Intervention to enhance quality of specialist consultative communication

Ratings data from June 2011 to May 2012 were aggregated and presented to specialty reviewers during feedback sessions that took place between May and November 2012. These one-hour, individualized sessions were led by eReferral clinical champions (AHM, EJM) and were placed squarely the context of eReferral quality improvement. Specialty reviewers were shown examples of their own highly rated and poorly rated communication exchanges, as well as highly rated communication exchanges from other specialists. Also, opportunities for enhanced communication