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A Mixed-Methods Study of Patient-Provider E-mail Content in a Safety-Net Setting

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Abstract

Objective—To explore the content of patient-provider e-mails in a safety-net primary care clinic.

Methods—We conducted a content analysis using inductive and deductive coding of e-mail exchanges (n=31) collected from January through November of 2013. Participants were English-speaking adult patients with a chronic condition (or their caregivers) cared for at a single publicly-funded general internal medicine clinic and their primary care providers (attending general internist physicians, clinical fellows, internal medicine residents, and nurse practitioners).

Results—All e-mails were non-urgent. Patients included a medical update in 19% of all e-mails. Patients requested action in 77% of e-mails, and the most common requests overall were for action regarding medications or treatment (29%). Requests for information were less common (45% of e-mails). Patient requests (n=56) were resolved in 84% of e-mail exchanges, resulting in 63 actions.

Conclusion—Patients in safety-net clinics are capable of safely and effectively using electronic messaging for between-visit communication with providers.

Practical Implications—Safety-net systems should implement electronic communications tools as soon as possible to increase healthcare access and enhance patient involvement in their care.

Keywords

secure messaging; e-mail; communication; safety-net; primary care

Introduction

The growth of the Internet in modern health care delivery (“Health Information Technology for Economic and Clinical Health (HITECH) Act,” 2009; “Health Information Technology: Initial Set of Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology; Final Rule,” 2010) has resulted in the wide dissemination of and United States federal financial incentives for online patient portals (Blumenthal & Tavenner, 2010). A patient portal is a secure website maintained by healthcare providers and linked to a patient’s electronic health records (EHR). Among many other functions, patient portals enable secure electronic messaging with providers that,

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compared to e-mail, protects personal health information ("The Value of Personal Health Records and Web Portals to Engage Consumers and Improve Quality," 2012). In recent years, secure electronic messaging between patients and providers for between-visit communication has become standard of care ("Crossing the Quality Chasm: A New Health System for the 21st Century," 2001). Both patient portals and secure electronic messaging improve communication ease and efficiency, shared decision-making, patient self-management, patient satisfaction, and chronic disease management (Delbanco & Sands, 2004; Fox, 2011; Harris, Haneuse, Martin, & Ralston, 2009; Liederman, Lee, Baquero, & Seites, 2005; Ralston, Hirsch, et al., 2009; Rosen & Kwoh, 2007; Zhou, Kanter, Wang, & Garrido, 2010). Secure electronic messaging additionally increases physician and patient satisfaction, provider productivity, and health care quality (Gaster et al., 2003; Harris et al., 2009; Pearl, 2014; Ralston, Rutter, et al., 2009; Rosen & Kwoh, 2007; Zhou et al., 2010). Consequently, secure electronic messaging is now utilized across the United States, with a rapid increase in uptake. Kaiser Permanente Northern California experienced an increase in secure electronic messages of 20% per year, on average, from 2008 to 2013 with an estimated 8.2 million messages sent in 2013 (Pearl, 2014). Unfortunately, many urban and safety-net settings experience barriers to online patient portal and secure electronic messaging use, including variations in enrollment depending on race, ethnicity, and age (Goel, Brown, Williams, Hasnain-Wynia, et al., 2011). Electronic communication also occurs in the form of e-mail between patients and providers outside of a secure electronic portal, especially because many health systems do not have patient portals in place. In our formative work with low-income, diverse patients, many who are not familiar with secure electronic messaging via a portal do use e-mail. Therefore, in asking about interest in secure electronic messaging, we use the term "e-mail" because it conveys the idea of non-visit communication in layperson's terms. A recent study found that only 19% of patients in a safety-net public hospital used e-mail with providers, even though 71% were interested in electronic communication (Schickedanz et al., 2013), which could be due to a combination of limited resources as well as ineffective or nonexistent patient education about the potential benefits of electronic communication (Goel, Brown, Williams, Cooper, et al., 2011).

Despite the rise of secure electronic messaging, there has been little focus recently on the content of patient messages. Studies of the "early adopters" of electronic messages in the 1990s and early 2000s revealed that adult primary care patients used secure electronic messaging either to request information on medications, symptoms, and disease or for administrative tasks such as prescription refills and appointment scheduling (Delbanco & Sands, 2004; Roter, Larson, Sands, Ford, & Houston, 2008; Sittig, 2003; White, Moyer, Stern, & Katz, 2004). However, over a decade later, secure electronic messaging, and indeed all forms of electronic communication, are now much more prevalent in and relevant to an ever-growing patient base. In addition, the use of secure electronic messaging in underserved patient populations, such as those at safety-net hospital clinics, is virtually unstudied despite the notable linguistic and literacy barriers known to be prevalent in such care settings ("America's Safety Net Hospitals and Health Systems, 2010," 2012; Gage & Burch, 2009).

Therefore, we conducted an observational, qualitative e-mail content analysis in an academic, safety-net primary care setting to characterize electronic communication between providers and low-income patients.

Methods

Setting and Design

We conducted an observational study of electronic communication at the General Medicine Clinic at San Francisco General Hospital, a safety-net primary care clinic. The General Medicine Clinic is staffed by academic general internists, internal medicine housestaff, and nurse practitioners that care for a highly diverse, low-income, publicly-insured and uninsured population of about 6,500 unique patients. At the time of this study (January through November of 2013), there was no health-system patient portal in place and thus secure electronic messaging was not available to patients. As a result, all clinic patients had the option to send e-mail to their providers to enhance access between visits. We requested these e-mail correspondences from provider e-mail accounts as part of "usual care," and we collected exchanges that were forwarded to us. All exchanges were initiated by a patient or caregiver e-mail and included a provider response. We asked providers to forward e-mails from patients and caregivers as well as their responses to investigators.

We received 23 "threads," defined as e-mails exchanges over time, that contained 31 "strands," defined as all e-mails related to at least one consistent issue, based on previously described taxonomy (Carrell & Ralston, 2005). One patient had two separate threads with the same provider. E-mails that were part of the same thread were classified as different strands if marked by a clear change in the issues discussed over time. As an example, if a patient replied to a provider e-mail from 30 days prior in order to initiate communication about a new issue, that would be a new "strand." Provider (attending physicians [n=7], clinical fellows [n=3], residents [n=14], and nurse practitioners [n=7]) strands were with both patients (n=27) and caretakers (n=4; henceforth categorized as "patient(s)"). E-mails were stored on a secure database to safeguard protected health information and subsequently de-identified, removing names and contact information, prior to analysis. The institutional review board at the University of California, San Francisco, reviewed this study and found it to be exempt from committee approval.

Demographic analysis

We assessed the gender and age of patients. We reviewed all medical records to assess whether patients were prescribed at least one medication at the time of the first e-mail. We also determined whether patients had chronic illnesses, which are widely prevalent in our patient population.

Qualitative analysis

Two clinician reviewers (J.M, U.S.) assessed the content of the electronic messages to determine whether the messages contained a medically urgent situation that would have been more safely handled with a physician visit or immediate telephone call.

We then performed a content analysis of the e-mail strands. We employed deductive content analysis (Crabtree & Miller, 1999) incorporating a previously described taxonomy for requests for action or information and results of requests (Anand, Feldman, Geller, Bisbee, & Bauchner, 2005; Kravitz, Bell, & Franz, 1999). We selected only those categories that applied to our data set and combined some categories to simplify the analysis. Because the taxonomies in the literature for electronic messages predate the widespread use of patient portals, we also coded inductively, adding themes as they emerged (Charmaz, 2006). We reached thematic saturation after ten patient-provider e-mail exchanges but elected to continue coding the entire sample.

Qualitative analysis was conducted for classifying patient updates (e.g. symptom changes or results from subspecialty clinics), requests for action (administrative action; appointment; lab tests, x-rays, or other studies; medications or treatments; referral to non-physician; or referral to other physicians) or information (about an appointment; about diagnostic test indications, procedures, interpretations, or results; about drug therapy or nondrug therapy; about insurance, managed care, or financial issues; about physical symptoms, problems, or diseases), and results of requests (administrative paperwork, appointment, dosage change, information or clarification, medical examination, medical guidance, phone call, prescription, specialist consult).

Quantitative analysis

After coding the e-mails, we calculated the frequency of medical updates, requests for action, and requests for information in patient e-mails to providers. We report proportions of requests for actions versus information, the frequency of individual requests, and the frequency of resolved and denied requests. We calculated the relative frequency for each provider action result type. We also report quantitative components of the strands, including the number of e-mails and patient requests (for action or information) per strands as well as the temporal duration of strands (n=29). Descriptive statistics were calculated using Excel.

Results

There were 22 patients in the sample. Fifteen (68%) were female, and the average age was 58 (SD = 10). Review of medical records revealed that 21 (95%) of the 22 patients were prescribed at least one medication at the time of the first e-mail, and all patients had chronic illnesses such as hypertension, diabetes mellitus, hypothyroidism, and osteoarthritis. Clinician reviewers deemed all e-mails to be non-urgent and appropriate for electronic communication. Patients included a medical update in 6 (19% of all) strands. Examples of medical updates included symptom updates such as, “[the rash] itches a bit,” and subspecialty updates such as, “[I] saw the Endocrinologist 2 weeks ago. I think my tiredness and weight gain have to do with my Thyroid. The Endocrinologist disagrees.”

Of all requests (n=56), most were for action (77% of strands and 66% of all requests; Figure 1). Requests for information (n=19) were less common (45% of strands and 34% of all requests; Figure 2). The most common requests overall were for action regarding medications or treatments (n=16); action regarding lab tests, x-rays, other studies (n=7); action regarding a referral to other physicians (n=5); information regarding symptoms (n=5);

information regarding tests or diagnostics procedures (n=5); and information regarding medications or treatments (n=5). Examples of requests for action are in Table 1 and examples of information requests are in Table 2.

Of all requests, 84% were resolved, 5% were denied, and 11% had no known outcome detailed in the strand. Providers fulfilled requests as in this example, “I know we have a printed list of sliding scale dentists in the community in our clinic. I will leave a copy of that list at the front desk tonight for you to pick up.” However, providers explicitly denied requests via e-mail as well such as, “In terms of how poorly your symptoms are currently, putting you on chronic Prednisone is not an option because the side effects are too high.” There were a total of 63 resulting actions and one request (a referral to another physician) without a known response within the strand. The most common results of requests (Figure 3) were a prescription (22%), a provider appointment (21%), information or clarification (16%), medical guidance (14%), and administrative paperwork (13%).

There was an average of 4.4 (SD = 2.5) e-mails per strand, with 19% of strands containing only two e-mails (i.e. 1 initial e-mail and 1 response). There was an average of 1.8 (SD = 1.1) requests per strand, and 45% of all strands contained more than one request. Strands lasted an average of 5.7 days (SD = 8.8) with a range of 0.5 hours to 45 days.

Discussion and Conclusion

Discussion

We completed the first content analysis of electronic messages sent between patients and providers in a safety-net healthcare setting. This is also the first electronic message content analysis performed, to our knowledge, since meaningful use incentives for patient portal use were implemented in the United States. Overall, the taxonomy for coding the electronic message content was consistent with previous literature. However, there were important differences.

The electronic messages that we analyzed were more structurally complex with more requests and e-mails per strand than in prior studies. This chronically ill population also had a higher proportion of medication-related requests than the relatively healthier populations from prior studies (Anand et al., 2005; Sittig, 2003). These differences may reflect the increased health needs and demands of adult, medically-complex, socially-vulnerable populations with economic, cultural, and linguistic access barriers. Such differences may also reflect increased reliance on and trust of electronic communication – in this age of smartphones, Facebook, and Twitter – compared with ten years prior (Fox, 2011).

E-mails were more focused on requesting provider action or information, rather than patients providing symptom updates, than previously described. Two-thirds of all requests in this setting were for provider actions, in contradistinction to prior studies in which the majority of requests were for information. Conversely, only 19% of strands contained an update on patient symptoms, which is significantly lower than in prior studies among parents of pediatric (25% (Anand et al., 2005)) and adult (41% (White et al., 2004)); “two thirds of patient e-mails” (Roter et al., 2008)) populations. This is critical because each request for

action generated non-visit work for primary care providers. Earlier studies with fewer requests for action (and more symptom updates from patients) may have thus led to an underestimation of provider time needed for addressing issues raised in electronic communication.

Approximately 80% of our patient requests were resolved, in line with previous estimates. Two of the three requests that were denied in our sample reflected patient safety issues: prescribing topical non-steroidal anti-inflammatory agents in a patient on anticoagulant medications and prescribing chronic steroids for asthma. These instances highlight the importance of ensuring trained medical oversight of electronic communication.

This study further demonstrates that patients use electronic messages for appropriate health-related communication, given that clinician review of e-mails deemed them to be non-urgent. The duration of our strands ranged from less than one hour to 45 days, with an average of almost six days, which similarly reflects the lack of urgency of the messages and the ability of providers to respond to electronic messages in this safety-net primary care setting. This finding suggests that patients were able to assess which issues were appropriate for initiating electronic communication, and that providers require several days to address patient messages.

It is also important to distinguish observational studies of electronic communication, including the present study, from a growing body of randomized control trials for between-visit communication. Previous randomized controlled trials in other healthcare settings have reported that proactive secure electronic messaging, (Green et al., 2014; Green et al., 2008; Ralston, Hirsch, et al., 2009; Simon et al., 2011) as well as telephone support, (Allen et al., 2010; Derose et al., 2013; Huffman et al., 2014; Inglis et al., 2010; Kroenke et al., 2014) can improve disease self-management. However, these trials are often less representative of real-world clinical practice in which providers must balance many competing demands and lacking protected time for proactive communication. Our findings of high levels of medication refills and appointment requests, as opposed to broader self-management support discussions, is consistent with previous studies of between-visit communication outside the context of randomized control trials (Lyles, Grothaus, Reid, Sarkar, & Ralston, 2012).

There were several limitations to analysis in the current study. First, the small sampling size and lack of random sampling limits the direct comparison of our study to large content analyses from the past as well as generalizability to the clinic population. Second, the patients used in this study may themselves likely represent an “early adopter” sub-population of low-income, publicly insured or uninsured patients – particularly those with potentially greater technology access and higher computer literacy – making it additionally challenging to generalize to the clinic population as a whole. Third, the e-mail threads that we analyzed were in English, further limiting the scope of this study and generalizability to the larger multilingual population served in our clinic. Fourth, caregivers were included in this sample as “patients,” which is not truly reflective of those receiving direct care but is representative of the reality that caregivers are involved with online health care (Sarkar et al., 2014). Finally, comparisons with studies of secure electronic message are limited by the fact that non-secure e-mail was used in this study. Although e-mail and secure electronic

messaging are distinct entities, e-mail is the best proxy for secure electronic messaging in resource-poor safety-net clinics that lack patient portals.

Conclusion

Patients, their caregivers, and providers in safety-net settings successfully use electronic messages to communicate between visits. We found this communication to be appropriately non-urgent; we did not identify risks to patient safety in the e-mails we reviewed. E-mails predominantly included requests for provider action or information, highlighting the constantly increasing utility of between-visit electronic communication.

Practical Implications

The findings from this study highlight the need for wider implementation of advances in electronic messaging, specifically secure electronic messaging through patient portals. This is especially true in California's outpatient safety-net clinics, where 72% had not implemented EHR by 2012 (Lopez, Patterson, John, & Sarkar, 2012). Moreover, secure electronic messaging in this setting would benefit greatly from advances beyond the unstructured e-mail communication directly with providers presented here, which pose significant security and patient outcome liabilities. Some health systems route electronic messages to a triage nurse, in a similar fashion to commonly used telephone triage nurses, whose role decreases primary care visits (Bunn, Byrne, & Kendall, 2004). One such example of secure electronic message triaging, the EMAIL System, employs nurses to use subject headings and message content to appropriately route incoming messages, with only 43.4% of messages requiring follow-up by a physician (White et al., 2004). This system resulted in greater e-mail volume to physicians but no difference in phone volume or rates of patient no-shows, with more favorable attitudes from physicians (Katz, Moyer, Cox, & Stern, 2003). Our system could also benefit from an upstream decision component (similar to online customer service features of websites such as Amazon.com) that would alleviate some of the clinic-dependent triage decision-making. In such a system, similar to that used by the Department of Veterans Affairs "My Health*e*Vet (Haun et al., 2014)," free text would be replaced with drop-down menus to either select a desired recipient or specify "medical updates," "requests for information," or "requests for action." A recent study demonstrates the benefits of patient self-triage in patient portals with improved medication adherence associated with an automated refill request function (Sarkar et al., 2014).

Future studies need to further explore the impact of secure electronic messaging on provider workload, which is one of the main concerns that providers express regarding electronic communication (Hobbs et al., 2003). This will be especially important in safety-net settings, where physician workload is already high (Linzer et al., 2005). Health systems must allot providers enough time to address patient needs that arise electronically and consider incorporating a team-based workflow into secure electronic messaging. It is also unclear how secure electronic messaging will affect face-to-face visits in a safety-net setting given that prior studies demonstrate mixed impacts on in-person utilization (Bergmo, Kummervold, Gammon, & Dahl, 2005; Liss et al., 2014; Palen, Ross, Powers, & Xu, 2012; Shimada et al., 2013; Zhou, Garrido, Chin, Wiesenthal, & Liang, 2007). Finally, given the increasingly broad adoption of this medium across the United States, more studies are

needed in varying care settings to elucidate the factors influencing utilization and content of electronic communication.

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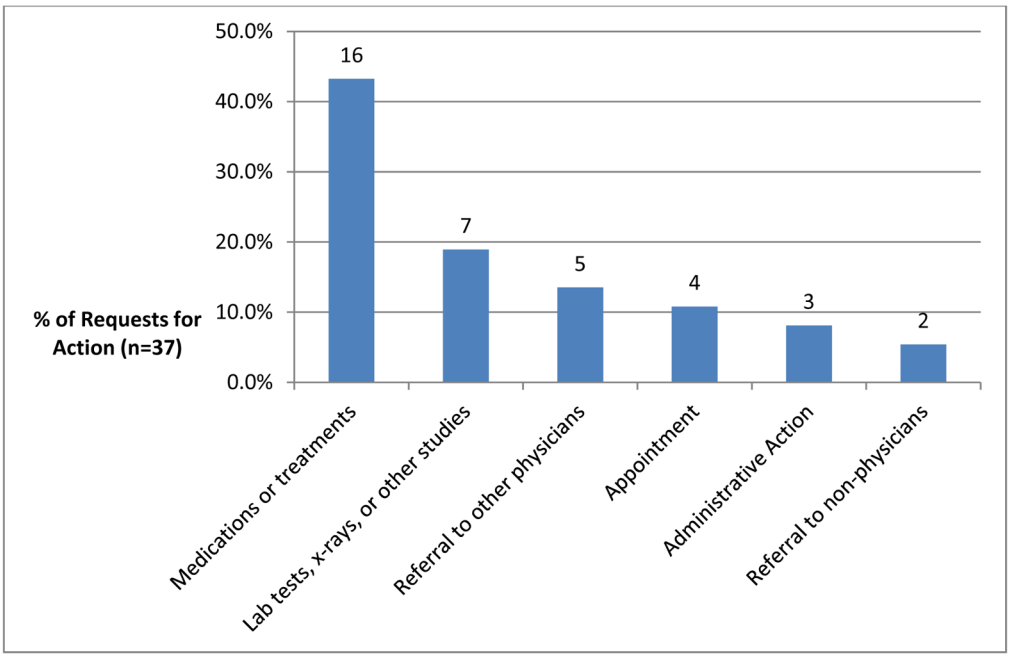

FIGURE 1.
Types of requests for action from patients to providers

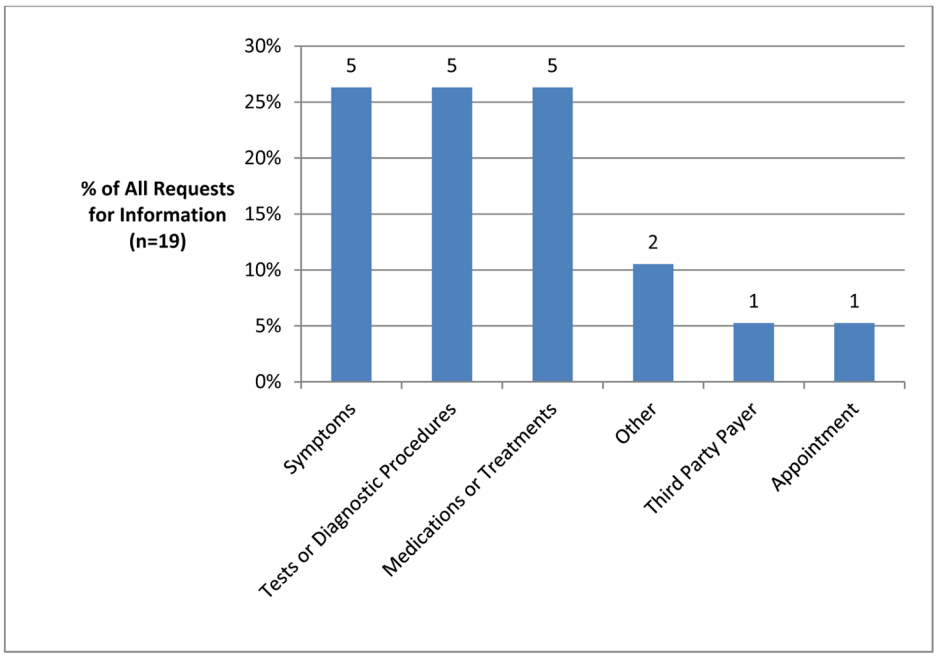

FIGURE 2.
Types of requests for information from patients to providers

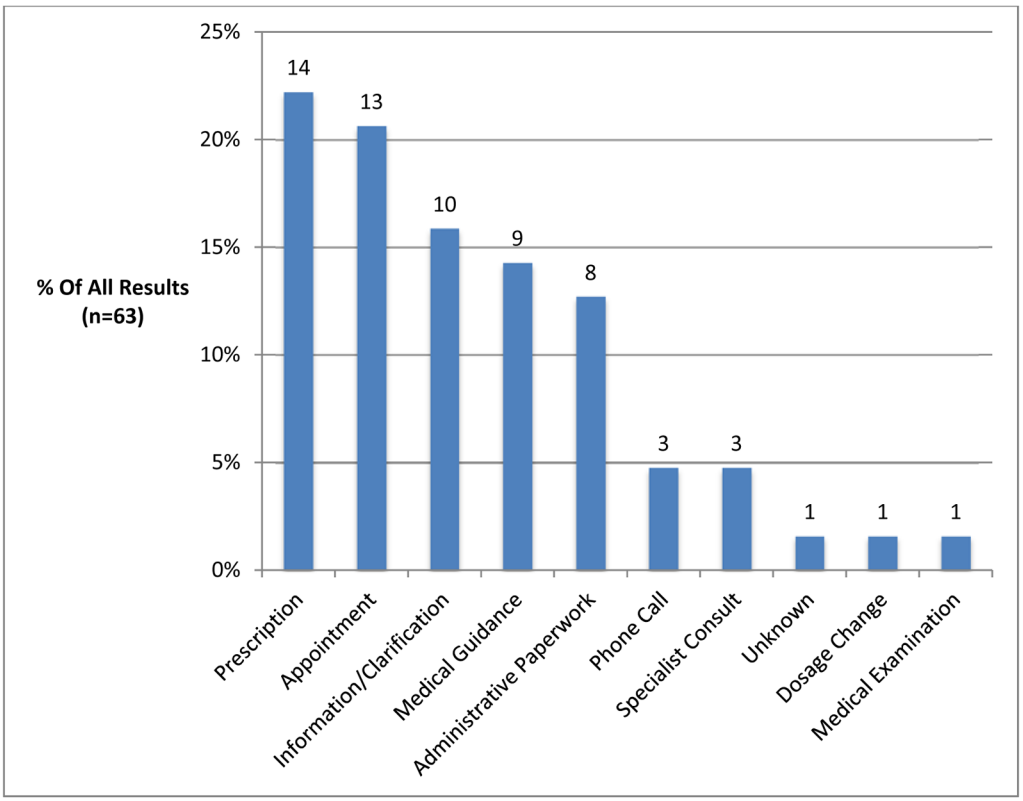

FIGURE 3.
Frequency of all requests

TABLE 1

Requests for provider action from patients: sub-types and example quotations

Request for Action Sub-Type	Example Quotation
For laboratory testing, imaging tests, or other diagnostic studies	"I forgot to bring my blood lab slip and was hoping that one of you could leave one for me at [building section] Ward 92 or GM [(General Medicine)] clinic. I need to do a Thyroid check. So T3, T4, and TSh [sic]. I'm planning to come Friday (tomorrow) mid-day. Please let me know if this is possible."
For new medication, new form/dose/route of an old medication, refill or renewal of medication taken or prescribed in the past month	"Need a refillGabapentin 300mg capsule 3 x daily"
For referral to a physician specialist	"Oh one more thing could you get me a referral to orthopedic clinic so I can get the pain shots in my knees."
For referral to a nonphysician	"Also, we spoke about me speaking with someone within the clinic about my disability and dental resources. But I didn't get any referrals."
For other services	"… my sister said I had some mail From Disability Insurance I been making all my appointment with social security Just waitting [sic] on there Decision I'm Dropping off the paper to you today for the state Disability so it will continue."
For an appointment	"Thank you can I a [sic] early appointment and I lost 45 pounds"

TABLE 2

Requests for information from patients to providers: sub-types and example quotations

Request for Information Sub- Type	Example Quotation
About physical symptoms, problems, or diseases	“I wanted to ask whether mom ([name]) has hypothyroidism or hyperthyroidism? I believe it was hypo, but wanted to verify with you.”
About diagnostic test indications, procedures, interpretations, or results	“I got an appointment with you on Tuesday the 19th. Should I get any blood test before I see you and we could talk about my problem?”
About drug therapy or nondrug therapy	“First did you ever get anything from Dr. [Provider 1] or [Provider 2]? It was about the topical anti-inflammatory cream. This has been ever since 10/24/2012. [Provider 2] said she passed this on to you. “
About insurance, managed care, or financial issues	“SORRY TO BOTHER YOU. I KNOW YOU ARE VERY BUST [sic]. BUT THESE MEDICARE FOLKS THAT WE TALKED ABOUT LAST WEEK HAVE YOU [sic] TO GET A HOLD OF ME. ITS BEEN A WEEK. AND MY MEDICARE WILL BE EFFECTIVE 04/01 WHICH IS NOT THAT FAR AWAY. WHEN TIME PERMITS COULD YOU PLEASE TRY AGAIN. THANKS YOU ROCK. I LL [sic] CHECK BACK LATER.....”
About an appointment	“Question: when will be my next office visit with you.”
Not otherwise classified	“Thank you [Provider]! Is [building section] 1m the general medicine clinic?”