Design and Implementation of an Electronic Survey for Follow-Up of Acute Conditions in Primary Care

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Introduction: Acute conditions make up a large portion of the reason for visits to primary care practices[1]. These acute conditions can sometimes progress to more serious illnesses. Resource limitations make scheduling follow-up visits, calls or messages to check for resolution of these conditions impractical. Awareness of patient outcomes helps prevent diagnostic delays, and engaging patients to seek follow-up care if they are not improving creates a diagnostic safety net[2,3]. This initial study aimed to assess provider and patient engagement in an electronic follow up survey after a primary care encounter for an acute condition.

Methods: We identified seventy acute primary care conditions based on their frequency and expected clinical resolution time. When these problems were added to the electronic health record (EHR) of a national primary care system, an electronic survey order was automatically created and sent to the patient at a predetermined follow up interval unless the clinician opted out of the order. The survey (see inset) asked the patient if their condition was now resolved, improving, unchanged or worse. Patients whose conditions were unchanged or worse were prompted to send a message to their provider or schedule a follow-up visit.

We analyzed new, acute problems created during the four week period following the initial roll-out of the surveys. We explored provider opt-out of and patient responses to the surveys, along with attributes of the provider, patient, and condition. Using stepwise logistic regression, we examined the association of provider characteristics and condition type with the likelihood of provider and patient engagement with the feature. Analyses were performed in R v3.4.1 with MASS v7.3.

Results: The sample consisted of 20,402 acute problems created in the four weeks after January 25, 2019. Providers opted out for 43% of the problems, allowing 12,809 follow-up surveys to be sent. Once sent, the patient response rate was 46%. Most often, patients indicated the problem was either resolved (28%) or improving (54%), while fewer patients responded saying it was unchanged (16%) or worse (2%). Select results from preliminary models are shown in the table. Provider characteristics seemed to play a substantial role in opt-out behavior, with providers who had been at the practice longer being less likely to opt-out of follow-up. However, other characteristics, including having a primary care relationship with the provider, did not seem to influence patient engagement. The specific condition seemed to impact both provider and patient behavior. Providers more consistently opted out of sending surveys for musculoskeletal-related pain, gastrointestinal issues and vaginal concerns, but were less likely to opt out of sending surveys for acute respiratory problems. Patients seemed to respond more consistently to requests for follow-up on their gastrointestinal issues and some respiratory complaints, but were less likely to respond to requests related to certain musculoskeletal pain.

Discussion: Electronic surveys appear to be a useful method for collecting information about patient progress and the natural course of acute conditions. Initial models begin to paint a picture of testable hypotheses and potential caveats that can be further investigated as use of this feature grows.

The provider engagement characteristics evaluated here suggest opportunities for improving change management and mentoring of newer providers in the use of this feature. It also suggests that the type of condition may influence engagement in the feature, as providers may not seek follow-up for certain conditions, and patients may similarly not respond. These biases may be concordant, as seen with musculoskeletal pain, or discordant, as with gastrointestinal complaints. There are multiple hypotheses for why this may be: differences in treatment plans based on the type of condition, provider or patient comfort regarding the topic, or incorrectly calibrated follow-up criteria or timeline. Further study is warranted to understand and mitigate these phenomena.

The utility of this new data source is exciting: having contemporaneous progress data about acute conditions opens doors for direct and timely follow-up, clinical phenotyping of acute conditions and smarter clinical decision support. These initial results find that patients and providers largely embrace this tool for many situations. Further study is underway to understand patterns of provider adoption and condition-based variations in provider and patient engagement.

	Provider Opt-Out, AOR (95% CI)	Patient Engagement, AOR (95% CI)
Provider is patient's PCP	1.185 (1.273 - 1.367)	--
Provider tenure at practice (years)	0.948 (0.934 - 0.962)	--
Problem: Acute Bronchitis	0.621 (0.484 - 0.795)	--
Problem: Diarrhea	1.323 (1.057 - 1.656)	1.422 (1.000 - 2.023)
Problem: GI Disturbance	1.666 (1.022 - 2.717)	2.254 (1.065 - 4.773)
Problem: Shoulder Pain	1.206 (0.985 - 1.476)	0.567 (0.353 - 0.911)
Problem: Lower Back Pain	1.388 (1.188 - 1.621)	--
Problem: Knee Pain	1.401 (1.172 - 1.675)	--
Problem: Pneumonia	--	1.916 (1.087 - 3.376)
Problem: Vaginal Discharge	1.929 (1.284 - 2.896)	--
"--" means variable not included in stepwise regression model		

References
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