



# Increasing Use of Patient-Generated Health Data

*A virtual provider training and encouragement increased use of electronic blood glucose flow sheets*

**Target a Priority Outcome** The Office of the National Coordinator for Health Information Technology (ONC) in the Department of Health and Human Services is tasked with coordinating nationwide efforts to implement and use health information technology (IT). Patient-generated health data—information regarding an individual’s health that is collected by the patient—is identified as an important area for advancing person-centered and self-managed health.<sup>1</sup> Amid advances in technology, it has become easier for providers to engage with their patients electronically, as a means of inviting and supporting individuals’ health decision making and self-management. However, the use of these newer modes of communication remains far from universal.

**Translate Evidence-Based Insights** Electronic sharing of patient-generated health data between visits is a potentially valuable tool for patients with diabetes performing self-monitoring of blood glucose, who can share their glucose levels with their providers via electronic blood glucose flow sheets.<sup>2</sup> Providers can remind patients to perform self-monitoring and share the information with them using electronic flow sheets. This information can then be used by providers to monitor patients’ glucose levels between visits frequently and more effectively, potentially even substituting away from conducting other monitoring tests in the office or making adjustments to medications. Evidence suggests that information frictions — in particular, a lack of familiarity with new technology — are a barrier to updating behaviors across medical providers and practices.<sup>3</sup> To address this barrier, ONC, Inova Health System, and the Office of Evaluation Sciences (OES) designed an intervention in which providers were invited to attend a virtual

training; encouraged to place a bulk order for flow sheets, which enabled patients with diabetes to track blood glucose electronically; and offered in-person support, including a template for reaching out to patients.

**Embed Tests** The intervention was tested using a cluster randomized controlled trial with 20 primary care practices in the Washington, D.C., metro area, totaling 68 primary care doctors and 7,052 patients. Ten practices (34 doctors and 3,411 patients) were randomly assigned to receive the aforementioned intervention of provider training, encouragement and support, while ten practices (34 doctors and 3,641 patients) were assigned to the control condition of business as usual.<sup>4</sup>

**Analyze Using Existing Data** Data from electronic health records were used to compare flow sheet usage (provider orders and patient completion rates) as well as potential health outcomes (medication changes made following the intervention).<sup>5</sup> Reported treatment effects are adjusted for baseline outcomes and patients’ demographic characteristics from electronic medical record data.

**Results** Patients at practices randomly assigned to the treatment group were 63.6 percentage points ( $p = .001$ , 95% CI [32.5, 94.7]) more likely to receive an electronic flow sheet order than patients in the control group, of whom 0.1% received an order for flow sheets. Patients at treatment practices were also 4.7 and 2.3 percentage points ( $p < .001$ , 95% CI [3.2, 6.3];  $p = .001$ , 95% CI [1.3, 3.2]) more likely to use the flow sheet during the 1-14 and 15-26 week periods (respectively) following

<sup>1</sup> Office of the National Coordinator for Health Information Technology. *Federal Health IT Strategic Plan 2015-2020*. 2014. Available at <https://www.healthit.gov>.

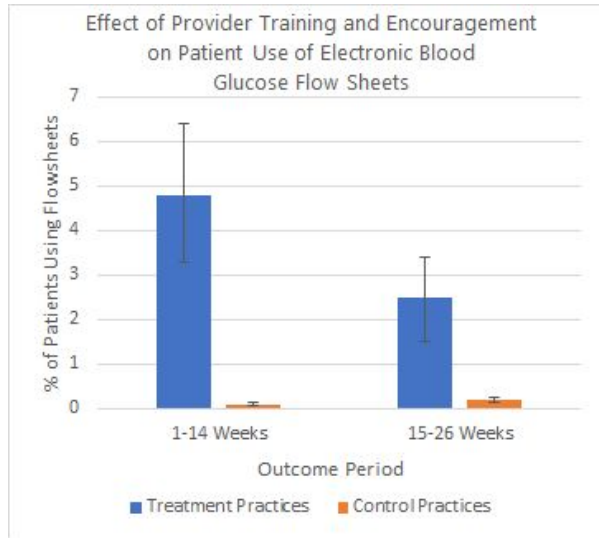
<sup>2</sup> Kirk JK, Stegner J. Self-Monitoring of Blood Glucose: Practical Aspects. *Journal of Diabetes Science and Technology*. 2010;4(2):435-439.

<sup>3</sup> Chan D. Informational Frictions and Practice Variation: Evidence from Physicians in Training. 2016. *NBER Working Paper* No. 21855.

<sup>4</sup> Allyson Root, Season Majors, Mary Ann Friesen, and Christopher Connolly. (2018). Blood Glucose Monitoring in Electronic Health Records. Identification No. NCT03542487. Retrieved from: <https://clinicaltrials.gov/ct2/show/NCT03542487>.

<sup>5</sup> All of the analysis reported in this abstract was prespecified in an analysis plan, which can be found at <https://oes.gsa.gov>. Other outcomes evaluated but not reported here, such as A1c (lab test of average blood glucose control) test value and frequency, are described in the analysis plan. No significant impact of the intervention was detected for these other outcomes.

the provider training than patients in the control group, of whom 0.1% used flow sheets.



Patients in the treatment group were 3.6 percentage points ( $p = .043$ , 95% CI[-7.1,-0.2]) less likely to see a change to their active medications in the 14 weeks after the provider trainings than patients in the control group, of whom 20.4% had a medication change – indicating that tracking may be a substitute for changes in treatment.

**Build Evidence** This study showed that provider training and support can increase take-up of electronic blood glucose flow sheets for patients with diabetes, which may have downstream effects on patient care. From a policy standpoint, this suggests that provider training and support is a critical aspect of health IT adoption. Future work should compare different strategies for best supporting providers in adopting new technology.