Research Article

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Electronic Health Record Implementation: A Quality Assurance Assessment from a Free Clinic Perspective

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Abstract

Introduction: The Health Information Technology for Economic and Clinical Health Act (HITECH Act) in 2009, clinics across the United States have new incentive to ensure that the use of the electronic health record (EHR) works to improve patient access to care and health outcomes.

Methods: As a quality improvement project for implementing a new EHR, four diagnoses were focused on from 1/1/2017 to 7/1/2017 to improve documentation compliance and follow-up diagnostic tests: diabetes (DM), hypertension (HTN), congestive heart failure (CHF) and chronic kidney disease (CKD).

Results: A total of n=502 patient charts were reviewed. The compliance percentage in capturing/documenting the metrics were 100% for age, gender; 49% race/ethnicity; 16% education and employer information; 25% primary care providers; 59% weight and 70%-93% key outcomes based on each diagnosis on the first visit documented in the EHR.

Conclusions: The EHR provided a consistent platform to establish quality metrics in a free clinic not previously acquired. By establishing these benchmarks, a free clinic can adapt and modify meaningful use expectations even though they are not required.

Keywords: Electronic health record; HITECH act; Free clinic

Introduction

With the adoption of the Health Information Technology for Economic and Clinical Health Act (HITECH Act) in 2009, clinics across the United States have new incentive to ensure that the use of the electronic health record (EHR) works to improve patient access to care and health outcomes [1] In the transition period leading to 2016, health care providers were required to adopt the model of "meaningful use" to improve patient care; providers and hospitals that effectively incorporated the "clinical quality measures" of meaningful use as well as some supplementary goals were rewarded financially through the Centers for Medicare and Medicaid Services (CMS) [1,2]. The ultimate goal of meaningful use was to encourage healthcare providers to utilize the EHR to evaluate efficacy of care to their patients, and look for ways to improve overall health outcomes and minimize health disparities across populations [3]. Despite the relative success of incorporation of meaningful use in the EHR, some challenges have been noted. This includes technological issues, including inaccurate medication lists and updated medication information, maintaining an up to date and recent problem list as well as active diagnosis codes for each patient, making wrongful diagnoses or associations due to errors made in patient charting, and lack of provider time and education to utilize the EHR

[3,4]. Successes have also been noted in the incorporation of EHRs, and with technology evolving, access to patient records is becoming incredibly easier for providers with phone applications now rising in utility and popularity, with safety of protected health information becoming a prime concern [5].

Despite attempts to improve access to health care with the Affordable Care Act, many are still left uninsured, or unable to visit their primary care providers due to lack of funding. To help fill this gap in access to care, many forms of free clinics have become prominent in providing care to those who cannot afford a standard medical visit. Studies have shown that those seeking care at a free clinic cannot afford a standard medical visit, have trouble scheduling appointments, or have a lack of education in how to seek appropriate medical care [6,7]. Commonly, those who visit a free clinic are unemployed or low-income, and have much greater health disparities compared to the greater population. Additionally, patients at free clinics report having difficulty in finding transportation to and from appointments, or cannot miss time from work to see a provider [7,8]. Moreover, free clinics that promote Interprofessional practice allow patients to benefit by seeing multiple providers in a single visit as well as a place for students to learn multidisciplinary care [9].

The Union Gospel Mission's Free Medical Clinic in Yakima, WA (YUGM) is a free clinic, working to address the needs of a medically

underserved area experiencing a severe provider shortage. The clinic sees more than 14,000 patient visits each year, and provides an array of services such physical exams, medications, diagnostic testing, and treatments including orthopedics, osteopathic manipulative treatment (OMT), physical therapy, and health education [9]. Coupled with limited access to health care, Yakima County is 49.5% Hispanic, and reports higher incidences of health risk factors such as food insecurity, high cholesterol, and obesity compared to Washington state [10]. The free clinic works to alleviate the health disparities facing Yakima, operating with limited funding through local hospitals, donations, and volunteer work. Because YUGM is a free clinic without federal funding, it is not subject to the HITECH Act, and the meaningful use EHR incentive program. Therefore, utilization of an EHR and updates to patient charts become less of a priority over seeing additional patients per day. This problem plagues small provider medical practices as well, and providers often find that the time it takes to update patient charts in an EHR is not an effective use of time, they have inadequate education on the EHR, or find the EHR has limited functionality [11]. Because YUGM sees a high volume of patients annually, and operates on a volunteer basis, inconsistencies in the EHR are seen. The goal of this quality improvement initiative was to establish baseline figures to identify key areas of improvement by utilizing YUGM's new EHR system. Additionally, by focusing on key diagnoses known to increase emergency room visits in the area, respective metrics of improvement established to evaluate ways to incorporate meaningful use objectives and to provide better care in a free clinic model.

Methods

The Union Gospel Mission's Free Medical Clinic was established in 1995. Initially, the medical clinic was a located in two old hotel rooms refurbished and turned into medical exam rooms and two dental bays, separated by only thin curtains. This was where both medical and dental care were provided to the underserved/underinsured of the community for over 20 years. Due to the large uninsured population in Yakima, the two hotel rooms were quickly too small to support the patient population. Documentation at the clinic is challenging as the number of patients supported by the clinic is large compared to the small staff and volunteers. When the clinic needed an EHR management system to keep up with the needs of the patient population, YUGM was looking for a model that provided easy access for the volunteers and was available for little to no cost. In 2016, YUGM medical center began collaborating with Practice Fusion, a cloud based HER [12], because they provide a free service to free clinics. In December 2016, YUGM launched Practice Fusion. Challenges were met as volunteer providers adjusted to the change. Practice Fusion is certified as a complete EHR for meaningful use [13]; however, in our survey of the EHR, we found that YUGM medical center has not met the meaningful use clinical quality measures set out by CMS. To track and provide quality improvement data based on population information, we first needed accurate population information. We found that demographics were often missing from the EHR. By updating the intake forms to include gender, race, primary care provider, employment, and level of education, we were able to begin documenting patient demographics. As we input patient data into the EHR, we reviewed the patient charts to survey quality. In our evaluation of the EHR, often the most important information from the

visit (diagnosis codes, complete patient history, vital signs, medications, and physical exam data, etc.) was incomplete or missing. We ran an initial query of patients with diabetes, and only 125 patients out of an estimated 8,000 patients in the system were documented to have diabetes by ICD code. However, when examining the free text within the patient chart, many patients had diabetes (DM), hypertension (HTN), congestive heart failure (CHF) and chronic kidney disease (CKD), but the charts were not documented by ICD code.

We chose the four diagnoses to focus on improving input of ICD codes and quality of documentation due to the high emergency room utilization for these diagnoses in Yakima [14]. We evaluated the EHR at YUGM to evaluate the consistency of maintenance of these active diagnoses, and if providers were monitoring metrics for each diagnosis to track treatment efficacy of these patients. The metrics used were as follows: A1C or serum blood glucose for diabetes, blood pressure for hypertension, serum creatinine, BUN, and eGFR for CKD, and O_2 saturation for CHF. Furthermore, we tracked weight for each diagnosis.

After data entry was complete for patients from January 1, 2017 to July 31, 2017, an additional query was run at this time to track quality improvement indicators on the number of patients with each ICD code: DM (250), HTN (401), CHF (428), and CKD (585). The query data was entered into a spreadsheet along with gender, age, race, ethnicity, education, employer and primary care clinic. The query provided many duplicates that were removed and data was checked for accuracy in respect to patient information. General descriptive analyses were conducted to assess quality improvement over time.

Results

A total of n=502 patient charts were reviewed for quality improvement and assurance on documentation of meaningful use outcomes based on the diagnoses of: DM (n=244), HTN, CHF, and CKD. The average age (SD) of the DM (n=244), HTN (n=230), CHF (n=9), and CKD (n=24) groups were 52.9 years (± 11.3); 66.3 years (± 13.6); 55.5 years (± 11.1); 50.1 years (± 11.6), respectively. The distribution of gender for the groups were DM, 154 females and 90 males; HTN, 152 females and 78 males; CHF, 5 females and 4 males; and CKD, 11 females and 13 males. The compliance percentage in capturing/documenting the metrics of age and gender in the EHR was 100% for both values. In Table 1, race/ethnicity were captured on average at a 49% of the time whereby the HTN group had the highest average of documentation.

Education and employer information was documented on average 16% records and a primary care provider 25% of records. In Table 2, the EHR had weight captured at 59% for most of the diagnosis groups. In addition, meaningful use key outcomes based on each diagnosis were captured ranging from 70%-93% on the first visit documented in the EHR. The DM group first visit EHR A1C was 9.8 ± 2.4. The CHF group first visit EHR O2SAT was 97.1% (± 2.4). The HTN group first visit EHR blood pressure numbers were systolic, 146.3 ± 20.6 mmHg and diastolic, 87.6 ± 13.1 mmHg. Lastly, the CKD group EHR first visit values were creatinine, 1.38 ± 1.2; blood urea nitrogen, 24.3 ± 11.1; and estimated glomerular filtration rate, 66.5 ± 27.8).

Diagnosis		Gender	Age	Race	Ethnicity	Education	Employer	Primary Care Physician
DM	Numerator	244	244	105	161	48	72	40
	Denominator	244	244	244	244	244	244	244
	Captured in EMR (%)	100%	100%	43%	65%	19%	29%	16%
CHF	Numerator	9	9	4	4	2	1	0
	Denominator	9	9	9	9	9	9	9
	Captured in EMR (%)	100%	100%	44%	44%	22%	11%	0%
HTN	Numerator	230	230	143	145	38	36	93
	Denominator	230	230	230	230	230	230	230
	Captured in EMR (%)	100%	100%	62%	63%	16%	15%	40%
CKD	Numerator	24	24	0	17	0	4	11
	Denominator	24	24	24	24	24	24	24
	Captured in EMR (%)	100%	100%	0%	71%	0%	17%	46%
DM: Diabetes Mellitus; CHF: Congestive Heart Failure; HTN: Hypertension; CKD: Chronic Kidney Disease								

Table 1: General electronic health record documentation compliance for demographics.

Diagnosis		Key Outcomes			
DM		**Weight**	**A1C**		
	Numerator	145	186		
	Denominator	244	244		
	Captured in EMR (%)	59%	76%		
	Average (SD)	173.5 ± 35.0 lbs	9.8 ± 2.4		
CHF		**Weight**	**O2SAT**		
	Numerator	145	186		
	Denominator	244	244		
	Captured in EMR (%)	59%	76%		
	Average (SD)	186.7 ± 39.3 lbs	97.1 ± 2.4 %		
HTN		**Weight**	**SBP**	**DBP**	
	Numerator	132	216	216	
	Denominator	230	230	230	
	Captured in EMR (%)	57%	93%	93%	
	Average (SD)	184.3 ± 37.9 lbs	146.3 ± 20.6 mm	87.6 ± 13.1 mm	
CKD		**Weight**	**Creatinine**	**eGFR**	**eGFR**
	Numerator	14	19	17	17
	Denominator	24	24	24	24
	Captured in EMR (%)	58%	79%	70%	70%

	Average (SD)	167.2 ± 25.6 lbs	1.38 ± 1.2	24.3 ± 11.1	66.5 ± 7.8
DM: Diabetes Mellitus; CHF: Congestive Heart Failure; HTN: Hypertension; CKD: Chronic Kidney Disease; EMR: Electronic Medical Record; A1C : Glycosylated Hemoglobin; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; BUN: Blood Urea Nitrogen					

Table 2: Compliance to meaningful use outcomes per diagnosis.

Discussion

The EHR provided a consistent platform to establish quality metrics in a free clinic not previously acquired. Our results indicate that the high priority diagnoses of DM, HTN, CHF, and CKD had regularly reported values on the first visit recorded for meaningful use outcomes in the EHR. The documented A1C levels are considered high for the recommended diabetic range for controlled diabetes; however, the other values appear to be within normal limits or close to normal limits for O2SAT, blood pressure, creatinine, BUN, and eGFR.

Several studies have shown that implementing EHRs and meaningful use metrics improve patient satisfaction and clinic workflows [15]. Linder et al. states that the use of a structured documentation is associated with improved performance on several quality measures compared to other means of documentation [16]. Fisher et al. discovered that process challenges and breakdowns in a low-resource medical setting could be improved with better documentation [17]. On the other hand, Makam et al. showed that clinicians were not highly satisfied with EHRs meeting "meaningful use" criteria due to time efficiency issues and reducing provider optimization [18]. With the above in mind, several free clinics that implemented a provider-based EMR had improved diagnostic information, improved data quality, and higher satisfaction expressed by both providers and patients [19]. Thus, key components of EHR implementation need to weigh both patient and provider satisfaction along with the desired clinical outcomes.

Even with positive results, our quality improvement project has several limitations moving forward. While EHRs and meaningful use metrics are required for coding and billing purposes in Medicaid and Medicare eligible practices, they are not required in free clinics. The free clinic model does not negate the necessity of quality care and the need for quality improvement. With a mostly volunteer clinical staff, following these guidelines are challenging as the perception of a non-billing model that a complete medical record is not required to provide quality healthcare. Adequate documentation is necessary in lower socioeconomic free clinics, especially with several support volunteer providers. The EMR provides a communication foundation, regardless of payer/billing models, for volunteer providers to deliver the highest quality care by having an accurate and up-to-date chart [20].

In our evaluation, all values for the follow-up diagnostic tests for the priority areas showed some areas necessary for improvement. In addition, improving patient reported values, collection methods, and data entry are essential to provide all free clinic clinicians with a complete history and physical. By establishing these benchmarks, a free clinic can adapt and modify meaningful use expectations even though they are not required. Overall, with more quality improvement goals, we anticipate the EHR will continue to improve quality, safety, care coordination, efficiency, and reduce health disparities.

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