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Clinical spotlight intervention to accelerate translation of evidence-based practices in primary care

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ABSTRACT

Evidence-based medical practice is often slow to diffuse into widespread clinical practice. To accelerate translation of updated best practices into clinical care, we developed a quality improvement intervention called the 'Clinical Spotlight'. This programme was based on a knowledge translation model of four steps: education on evidence-based practices, using Lean for incorporation into patient care flow, support of implementation and sustainability, and measurement of outcomes. Using the Clinical Spotlight intervention for addressing the care of patients with type 2 diabetes was associated with appropriate increases in the use of newer classes of glycaemic control medications. We demonstrate statistically significant increases in the use of promoted glycaemic control agents (sodium-glucose cotransporter-2 inhibitor and glucagon-like peptide-1 receptor agonist classes of drugs) at the time of intervention. We conclude that translation of evidence-based practices into clinical care can be enhanced through an educational intervention linked to Lean process improvement and with supported implementation. We are currently expanding our programme to additional clinical areas in primary care.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Even with strong evidence of effectiveness, adoption of new therapeutics into clinical practice can take years.

WHAT THIS STUDY ADDS

⇒ In this paper, we detail a successful four-step model for acceleration of translation of evidence into practice, based on: education on evidence-based practices, using Lean for incorporation into patient care flow, support of implementation and sustainability, and measurement of outcomes.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ We demonstrate improved prescribing of novel glycaemic control medications as an example of how this approach can be used to improve primary care practice.

PROBLEM

At Virginia Mason Medical Center, we had variation in clinical practice and in adoption of updated evidence-based guidelines. There was no reliable method of delivering timely updates of practice-changing clinical guidelines across all nine clinics in the department of primary care. As at many institutions, we did have an institutional committee that helped to identify best-evidence-based practices (our Best Practices Task Force (BPTF)). However, implementation of these practices was delegated to local site-based leaders and provider groups, who had competing priorities, limited time/capacity and no requirement to distribute information to their local providers. The quality and depth of the academic detailing, the structure built to accommodate the resource needs for delivery, and the method for building the support tools (ie, electronic health record, EHR modifications) was lacking.

Our objective was to improve quality through implementation of a systematic educational intervention in primary care, while supporting adoption into the current provider workflow, in order to hasten dissemination of changing evidence-based best practices. We termed this intervention the 'Clinical Spotlight'.

An initial 'Clinical Spotlight' intervention focused on appropriate adoption of novel glycaemic control agents, which deliver better outcomes with potentially beneficial side effects than traditional glycaemic control agents in patients with type 2 diabetes. At our institution, as at other healthcare providers in the USA, there was high variation and limited use of these novel glycaemic control agents by primary care providers.[1 2] Because these agents were relatively new, at the time of the initiation of the project, no benchmark for the ideal rate of prescribing of these agents was established. Accordingly, the specific goal of this work was to increase the number of patients on these newer glycaemic control agents, as supported by clinical evidence.

This project was performed between October 2020 and December 2021 across the Department of Primary Care at a multidisciplinary healthcare network with multiple suburban and urban clinic locations in the Pacific Northwest with approximately 800 providers (including approximately 200 in primary care, of whom 160 were physicians and 40 were advanced registered nurse practitioners or physicians assistants) and 800 000 outpatient visits.

BACKGROUND

Medical practice can be slow to change, despite development of strong evidence. Time from publication of randomised clinical trials providing strong evidence of effectiveness to widespread adoption in clinical practice averages 17 years.[3] This failure to translate research into clinical practice and policy decreases the effectiveness of the healthcare system, potentially harming patients, and with substantial opportunity costs.[4] Our healthcare system was no different from most, lacking a systematic method to support and standardise care around strongest evidence in a time-effective manner.

The first area we targeted was diabetes management. In the past decade, the management of type 2 diabetes has been revolutionised by newer glycaemic control agents in the classes of sodium-glucose cotransporter-2 (SGLT-2) inhibitor[5] and glucagon-like peptide-1 (GLP-1) receptor agonist class[6 7] due to their trajectory changing cardiovascular and nephroprotective effects on patient lives. Since 2018, the American Diabetes Association has listed these drug classes as first-line agents, along with metformin, for the treatment of patients with type 2 diabetes with cardiovascular disease,[8 9] and more recently in 2020 and 2021 American Heart Association[10] and Kidney Disease Improving Global Outcomes guidelines[11] have also listed these agents to be used as first line in patients with comorbid diabetes and cardiac disease, or chronic kidney disease.

However, at our institution, these drug classes were primarily being prescribed by endocrinologists. There was resistance to adopting these medications into practice by primary care providers due to myriad reasons at our institution, as well as reported in the literature, including lack of knowledge about benefits, mechanisms of action and potential risks of these drug classes, insurance coverage, and treatment inertia since glycaemic control agents had not changed much in many years[12] Additionally, specific agents in each drug class have been shown to have specific treatment benefit instead of a class-effect, further complicating change in provider prescribing behaviour. For optimal, individualised care, providers needed to understand proven benefits of individual drugs in each class.

Our institution has focused on implementing evidence-based practices for over a decade, with development of an institutional BPTF in primary care. In line with the Lean principle of standardising care and reducing variability, the BPTF is charged with identifying and implementing best practices across primary care. The BPTF is composed of leaders from primary care as well as nursing, and pharmacy, and in addition to vetting evidence-based care, serve as a channel for other specialty groups at our institution to inform primary care practice. This includes standards for referral to other specialists, and scope of practice. Though successful at defining best practices, and visible as a resource for providers, the BPTF has a broad scope and responsibilities, and thus, is not always able to provide timely updates on evolving evidence. Further, decisions by leaders at the BPTF did not necessarily translate to change in actual provision of care at the level of the individual provider. In effect, there could be substantial lags in time between development of new evidence and BPTF issuance of guidance, and between BPTF guidance and actual change in practice. We recognised that sustainable change in practice could be improved using the Lean principles of 'just-in-time' provision of information and 'mistake-proofing'.[13–15]

Measurement

Our primary outcome was the use of newer glycaemic control agents, as supported by best evidence. We interrogated the EHR for all patients with type 2 diabetes who had a prescription for one of the agents in question, or a control agent, prescribed by primary care providers, in the time frame 1 January 2018 to 31 December 2021. We included initial and renewal prescriptions, but not medication refills, as the latter group are not reliably captured in the EHR. Only patients aged 18 years or older were included. For the analysis, we compared the preintervention period (1 January 2018–31 October 2020) to postintervention (1 November 2020–31 December 2021). We also portray the data graphically by quarter, as run charts depicting changes over time. Statistical analysis was performed using StataMP V.16.0 (StataCorp). The t-test was used to compare means, and the χ^2 to compare proportions before and after the intervention.

The drugs supported by evidence, and included in the Clinical Spotlight, were in the GLP-1 receptor agonist class (dulaglutide,[16] liraglutide[17] and semaglutide[18]), but not albiglutide or lixisenatide),[6 7] while exenatide was specifically identified as a less effective drug for diabetes management.[19] In the SGLT-2 inhibitor class, use of dapagliflozin,[20] empagliflozin[21] and canagliflozin[22] was supported by the Clinical Spotlight discussion but not ertugliflozin.[5] Combination medications were separated into their two components before analysis; patients could be on more than one therapeutic class. Four infrequently prescribed medications (albiglutide, chlorpropamide, ertugliflozin and repaglinide) were not included. We also evaluated prescribing rates for the sulfonylurea class of diabetic medications (glimepiride, glipizide and glyburide), as these were the most widely prescribed second line agent for diabetes management, but not part of the Clinical Spotlight intervention and therefore would not be expected to change with the intervention. These serve as control medications for the intervention. Because use of exenatide for type 2 diabetes was not supported by the

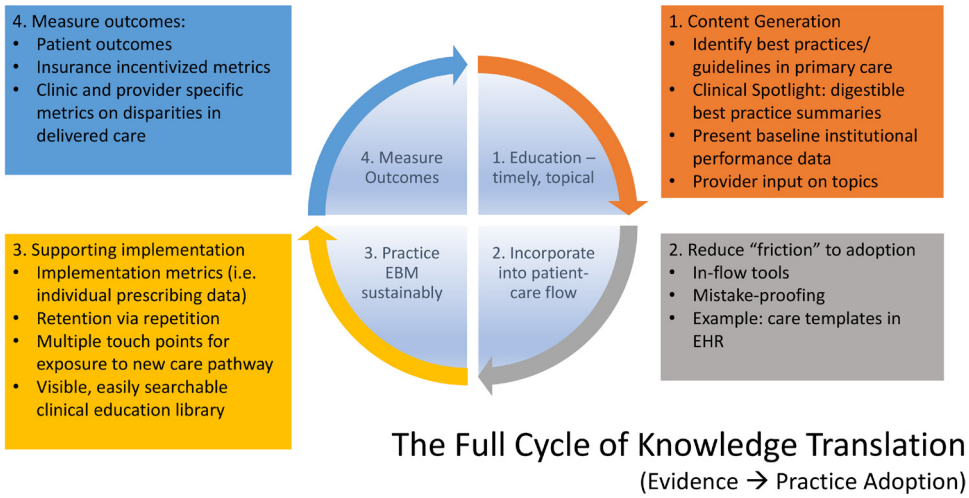

Figure 1 Knowledge translation model. EBM, evidence-based medicine.

evidence, following the Clinical Spotlight intervention, use of exenatide was expected to decrease.

Our primary outcome was the number of patients prescribed these medications, and therefore could have been biased by increasing number of patients with type 2 diabetes. To exclude this bias, we also evaluated the total number of patients with type 2 diabetes. Aside from a sharp drop corresponding to the early phase of the COVID-19 pandemic (March–May 2020), the total number of patients with type 2 diabetes remained constant (data not shown).

Preintervention, the prescribing rates for the newer glycaemic control medications were low, despite strong evidence and the existence of national guidelines supporting their use. Prescriptions for appropriate GLP-1 receptor agonists averaged only 76.9 prescriptions per month and for the appropriate SGLT-2 inhibitors only 43.8 prescriptions per month. This contrasts with the 157.4 prescriptions per month for the sulfonylurea class agents.

Design

This quality improvement intervention, which we term Clinical Spotlights, was built around aknowledge translation model (figure 1) that we adapted from prior published work.[23–25] This approach leveraged our established institutional Lean management model to support and sustain improvement.[13] The model is composed of four stages. The first stage is identification and dissemination of evidence- based best practices. The second stage is redesign of our systems and processes to support evidence-based care. The third stage is executing on and monitoring implementation, and the fourth stage is measurement of patient outcomes figure 1.

Stage 1: Education on evidence-based best practices: Identification of best practices was led by the physician leader of this quality improvement effort and supported by the pre-existent institutional BPTF in primary care. Together, they identified clinical areas for focus, and vetted national guidelines and recent peer-reviewed publications to identify areas of consensus around evidence-based best practices. The adopted best practices were then disseminated through physician peer presentations to the physicians and advanced practice providers at each site of practice.

Stage 2: System redesign: This step leverages our Lean management method.[13] A basic principle of Lean is the idea of flow, where materials and information are presented to the provider just-in-time for their optimal use, without extra effort.[26] A second Lean construct is that of mistake-proofing where features of the system prevent mistakes, by supporting or defaulting to the best practices.[15] Under this approach, we modified our EHR and practice patterns to support evidence-based best practices, providing information and guidance to support providers in delivering the most appropriate care.

Stage 3: Supporting implementation. To implement and sustain changes in practice, we focused on continued reinforcement, with individual level feedback. In addition to the initial educational presentations, the Clinical Spotlights were designed for repeated exposure of the content to the providers. This occurred both through system redesign workflow changes and by making the presentation content and supporting resources available online at provider workstations from the clinical education library. For individual provider feedback, we recognised early in our Lean journey the importance of separating measures of implementation from measures of outcome, with the early focus in quality improvement on implementation.[27] This third phase of the knowledge translation model therefore included assessment of implementation of the best practices when possible, in a highly visible manner, with direct feedback to the providers. Monitoring of implementation allowed us to identify early and address any challenges with the intervention.

Stage 4: The final stage of the knowledge translation framework was measurement of outcomes. These outcomes include clinical quality metrics that are incorporated into various pay for performance programmes in

the US healthcare system. Because of the many complex factors contributing to outcomes and the long time lag, for the provider feedback and project results we focused on implementation.

Strategy

In October 2019, we launched our quality improvement initiative, called Clinical Spotlight, to empower providers across primary care to practice evidence-based, high value and cost-effective patient care based on current practice changing research and guidelines. The initial focus for this work was on the management of diabetes.

The core of the dissemination of best practices was the Clinical Spotlight, a 30 min quarterly (or 10 min monthly) presentation we developed to educate Primary Care providers with high-yield, practice-changing updates in medicine. These evidence-based guidelines and research were curated, and presented as distilled, 'digestible' nuggets of information, which can be directly applied at point-of-patient care. The interactive format was designed to enhance retention, using Board examination style multiple-choice questions, and downloadable slides with graphic illustrations for future reference. These also included any available organisational health equity metrics regarding the topic being addressed, to create awareness to address disparities in healthcare delivery.

Our quality improvement team was composed of self-selected primary care physicians from each of our nine urban and suburban practice sites. These physicians served as local 'EBM (evidence-based medicine) Education Champions' to disseminate these Clinical Spotlights to the primary care providers at their site. The work was fully supported by the Department of Primary Care leadership. As compensation, these Champions were given productivity credit and protected time to attend relevant local quality improvement meetings and present to the practitioners at each site of practice. This was typically 2 hours of meetings per quarter. The Champions presented the Clinical Spotlights material at meetings that were already scheduled at each site (eg, monthly provider meetings or monthly Journal Club meetings).

This educational intervention underwent continuous feedback and improvement through the development and implementation. The Education Champions solicited feedback from the audience after each session, with quarterly meetings of the Education Champions for identification and implementation of improvements in the sessions and supporting materials. Individual clinicians were able to engage in open discussions during the educational sessions, which were relatively small in size (6–12 participants), and provide feedback.

Diabetes management

The initial Clinical Spotlight intervention was around diabetes management. As detailed above, new classes of drugs for long-term glycaemic control in diabetes have been developed over the past decade, but uptake into clinical practice has been slow. The objective of this initial Clinical Spotlight was to increase appropriate use of SGLT-2 inhibitors and GLP-1 receptor agonist class agents, based on guidelines from the 2020 American Diabetes Association and the individual trials informing these guidelines. Education on evidence-based care for diabetes management was presented through a Clinical Spotlight to the nine sites of practice in September through December of 2020, as a 30 min presentation by the local champion.

To support this change in provider practice in real time, we developed a care template in the EHR. This template was designed to provide the provider with all the necessary information for a patient visit for diabetes management in flow, meaning at the time of need, during the patient visit. Elements included: medication prescribing (including dosing) under different circumstances, referring to specialty care (ie, ophthalmic examination for diabetic retinopathy), laboratory testing (ie, haemoglobin A1C, urine microalbumin) and linking to national society (ie, American Diabetes Association) evidence-based treatment algorithms and patient education materials. Providers could access the diabetic management template through a dropdown menu in the EHR, and once populated, the template would serve as the clinical note for that visit. With the template information in front of the providers at the time of prescribing and test ordering, mistakes from lack of familiarity with these newer medications could be avoided.

To develop the care template, we solicited input from the BPTF and endocrinology representative on both the content and structure of the template. With this feedback, the template went through a series of iterations before going live in the EHR in September 2021. Currently, the template undergoes revisions annually to align with the evidence-based updates from the American Diabetes Association. Input on the templates is also solicited from the participants in the educational intervention at each educational session.

To support implementation, and enhance sustainability, we monitor provider performance. Working with our Education Champions and clinical pharmacists, we use internal registry data to provide quarterly feedback to providers on the implementation of the practices supported by the Clinical Spotlights (ie, the prescribing of newer glycaemic control agents). For diabetes management, we are unable to collect and report provider-level prescribing rates due to logistical challenges. However, aggregate data for all primary care providers is available for group feedback (table 1, figure 2). For other Clinical Spotlights, such as hypertension management, we are able to directly measure and report on individual provider level implementation (ie, clinical pharmacist referral).

The final stage of the knowledge translation model is the measurement of patient outcomes. Patient outcomes are complex and multifactorial, with a long delay time before an effect is seen. Accordingly, for diabetes management, though we share individual provider level patient outcome data available in the form of patient

Table 1 Average number of patients with medication orders per month, by intervention

	Preintervention	Postintervention	
	1 January 2018–31 October 2020	1 November 2020–31 December 2021	P value
No of months	34	14	
Intervention medications			
GLP-1 receptor agonists, mean (SD)			
Dulaglutide	26.0 (11.0)	76.6 (18.4)	<0.001
Liraglutide	40.1 (7.7)	63.1 (15.2)	<0.001
Semaglutide	10.8 (8.0)	114.2 (66.4)	<0.001
SGLT-2 Inhibitors, mean (SD)			
Canagliflozin	6.2 (2.5)	10.9 (3.4)	<0.001
Dapagliflozin	5.8 (2.3)	16.8 (8.2)	<0.001
Empagliflozin	38.0 (18.8)	142.2 (40.5)	<0.001
Control medications			
Sulfonylureas, mean (SD)			
Glimepiride	92.9 (15.1)	102.6 (13.0)	0.041
Glipizide	57.6 (8.5)	67.6 (10.8)	0.002
Glyburide	6.9 (3.2)	7.1 (2.6)	0.89
GLP-1 receptor agonists, mean (SD)			
Exenatide	11.4 (3.1)	8.7 (2.5)	0.006

GLP-1, glucagon-like peptide-1; SGLT-2, sodium-glucose cotransporter-2.

haemoglobin A1C, this information is affected by so many factors that it is of limited use in determining the specific effectiveness of the Clinical Spotlight intervention. Additionally, improved outcomes with SGLT2 inhibitors and GLP-1 receptor agonist agents have already been established in randomised clinical trials.[5–9 16–22] Hence, we focused on the implementation metric of measuring the increase in number of patients being prescribed these novel agents as a metric for practice behaviour change.

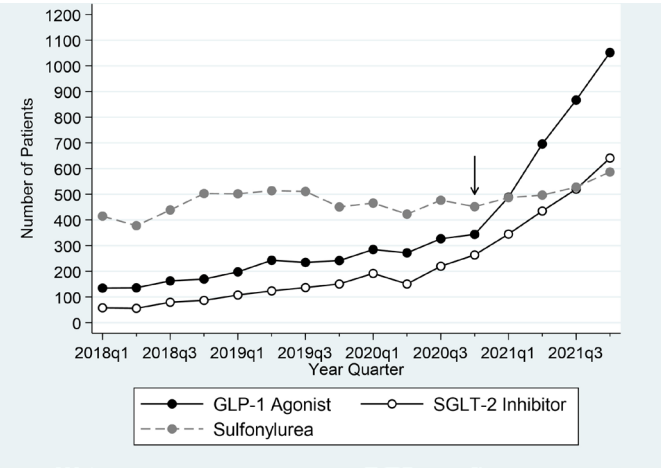

Figure 2 Number of patients with prescription for each class of medication per month. The arrow is the time of intervention. GLP-1, glucagon-like peptide-1; SGLT-2, sodium-glucose cotransporter-2.

With the successful implementation of the novel glycaemic control agents Clinical Spotlight, we have expanded the work into multiple other topics in primary care: outpatient hypertension management, management of low back pain—including appropriate use of imaging, and cardiovascular risk recognition and reduction in women.

We also continue to refine the Clinical Spotlights based on learnings from these initial efforts. We are particularly focused on mistake-proofing to enhance the sustainability of the knowledge translation model. For example, hypertension management includes use of multiple agents at lower doses rather than single agent therapy, home and clinic monitoring with automated blood pressure cuffs, and referral to clinical pharmacists for ongoing management. Mistake-proofing includes a care template in the EHR that contains a description of the standard process for blood pressure measurement, medication use and dosage guidelines, and criteria and process for referral of patients with uncontrolled hypertension to specialised clinical pharmacists. We did not involve patients or the public in the design of this project.

RESULTS

There were 11 417 patients aged 18 years and over who received a prescription for one of the diabetic control medications over the course of the study. Of these, 6182 (54%) were male, with average age 62 years.

Clinical Spotlight supported glycaemic control medications increased substantially following the intervention. There was an average of 253.9 prescriptions per month for appropriate GLP-1 receptor agonists per month post-intervention, compared with 76.9 per month pre-intervention. The increases were statistically significant in all medication types supported by the Clinical Spotlight (p<0.001, table 1). For the SGLT-2 inhibitor class, the average number of prescriptions per month increased from 43.8 to 169.9, with statistically significant increases in all medication types (p<0.001, table 1). The sulfonylurea class control medications demonstrated more modest increases, from 157.4 to 177.3 average prescriptions per month, though this did achieve statistical significance for glimepiride and glipizide (table 1). The GLP-1 receptor agonist control medication, exenatide, decreased as desired following the intervention, from 11.4 to 8.7 average prescriptions per month (p=0.006, table 1).

Figure 2 demonstrates the relationship of the increase in prescribing of novel diabetic control medications to the intervention, with a sharp increase in prescribing at the time of the intervention. Note that the effect of the intervention is spread over 6–12 months as patients can only be counted when they return to the provider for a new prescription, which may only happen in 6–12 month intervals

Lessons and limitations

Our Clinical Spotlight intervention demonstrated that translation of evidence-based practice into primary care can be accelerated by tailored clinical education coupled with improved support EHE tools. Under our Lean management method, the EHR tools serve as just-in-time resources for the provider in-flow and serve to mistake-proof newer advances in patient care. We are currently expanding our work to other clinical conditions across primary care.

We have received informal, anecdotal provider feedback that a major reason for Clinical Spotlight's popularity and engagement was that it reconnected providers with the joy of practising clinical medicine. Feedback was that receiving curated, readily usable didactics in the midst of otherwise arduous primary care delivery days was a driver of intellectual reinvigoration and general engagement. We also note that informal feedback from the Education Champions has been positive, and that turnover in this volunteer role has been low. Given high current levels of provider burnout, there is added value in any intervention that reconnects providers with the joy of medicine.

A challenge with the Clinical Spotlights, is that they required prioritised time from the project leader and local champions. Furthermore, primary care providers themselves had to have time and motivation to engage at the Clinical Spotlight sessions. Therefore, we identified that leadership buy-in was critical to make this work a priority. Specifically, site leaders were explicitly tasked with creating and supporting a consistent and reliable forum for the presentations. We believe that a key to the success of this work was that the Clinical Spotlight team received support for their effort, in the form of productivity credit and protected time to present the Clinical Spotlight work to the providers at each site.

Incorporating content from Clinical Spotlight into provider workflow was also important to ensure implementation and sustainability of the evidence-based practice. However, the providers varied in their technological savviness and familiarity with clinic work-flow tools that can serve as visual cues to practising evidence-based medicine, including the care template that served as the basis for this work, as well as the online clinical library and other tools. Lack of familiarity with these tools limited the uptake by some providers.

We also acknowledge that though we are seeing increased evidence-based usage of the target diabetic control agents, we do not yet have long term results, or measured improvement in patient outcomes. However, as the work was driven by randomised clinical trial data showing improved patient outcomes,[16–22] we are satisfied with the validity of increased prescribing as a surrogate measure. We also acknowledge that there may have been temporal increases in prescribing the newer classes of diabetic control agents independent of our intervention. Potential confounders that could have contributed to increasing prescribing of these newer agents included published papers, other non-institutional medical education programmes, and direct-to-consumer marketing raising awareness among patients and providers. Further, not all the agents in the Clinical Spotlight were available in generic formulations. Accordingly, variable rules around insurance coverage, need for prior authorisation, and even past metrics of provider-level feedback on generic prescribing rates may have affected provider utilisation of these agents. However, the run chart does show the temporal relationship between the intervention and the results. Further, other recent literature supports that uptake of these agents has been slow in the other institutions in the US in the absence of our intervention.[1 2] At the initiation of the project, no evidence was available to establish a benchmark for the appropriate rate of usage of these agents. As the current evidence base expands,[1] we will be able to determine a more concrete goal for the project, beyond our current goal of simply expanding usage as supported by existing evidence.

If we were initiating this project today, we would make other improvements. First, we would include patients in the project design, to insure that we are making patient-centred recommendations and addressing health equity. Second, we would perform more rigorous surveys of the providers and Education Champions to better understand any effect on burnout and job satisfaction.

CONCLUSION

We describe a successful effort to accelerate the pace of incorporation of evidence-based best practices into clinical care through the use of Clinical Spotlights. This

knowledge translation model leverages our institutional Lean management system, coupling provider education with just-in-time practice support tools in the EHR to mistake proof the use of newer diabetic control medications. We are currently implementing this approach across other clinical conditions of high value, variation and volume in primary care.

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