



Cleveland Clinic Foundation Internal Medicine Residency Program

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Quality Improvement Success Stories are published by the American Diabetes Association in collaboration with the American College of Physicians, Inc. (ACP), and the National Diabetes Education Program. This series is intended to highlight best practices and strategies from programs and clinics that have successfully improved the quality of care for people with diabetes or related conditions. Each article in the series is reviewed and follows a standard format developed by the editors of *Clinical Diabetes*. The following article describes an initiative of the Cleveland Clinic's internal medicine residents to improve diabetes care and outcomes within an underserved patient population at an East Cleveland, OH, health center.

Describe your practice setting and location.

This was a quality improvement (QI) project executed by the Cleveland Clinic's internal medicine residents. The practice location for this project was Stephanie Tubbs Jones Health Center (STJHC), an affiliate of the Cleveland Clinic Foundation in Cleveland, OH. STJHC is one of the main continuity clinics through which the internal medicine residents complete their ambulatory training. This clinic site is unique because it is located in the underserved city of East Cleveland. The population of East Cleveland is 91.5% African Americans, and the median household income as of 2017 was \$21,000 (1).

The STJHC internal medicine resident clinic is staffed by 45 internal medicine residents and four attending

physicians. The same nine residents rotate through clinic for one full week (40 hours) every 5 weeks. Residents have a panel of patients for whom they are the primary care provider and are responsible for overseeing all of the health care needs of these patients. The four attending physicians are responsible for ensuring that evidence-based practices are being carried out and that appropriate testing and follow-up are done for every patient seen by the resident physicians. A total of three postgraduate year 2 and three postgraduate year 3 internal medicine residents and one attending physician were involved in this study.

Describe the specific quality gap addressed through the initiative.

Over the past several years, there has been a surge of primary literature focused on improving glycemic control among various patient populations. A recurrent theme that has been brought to light is the discrepancies in diabetes management and glycemic control across certain demographics (2). The highest prevalence of diabetes is seen among American Indian, African American, and Hispanic populations (3–5). There is also a higher prevalence within rural populations and in communities with low socioeconomic levels (3).

Based on these statistics, health care institutions across the country have adopted QI projects to help generate solutions for the diabetes epidemic (6). This effort has trickled down to residency programs, which are now encouraging medical trainees to take part in projects that will improve the health of their patient populations (7). The Cleveland Clinic Foundation internal medicine residency program is one of the many training programs across the country that has embedded QI in their curriculum.

The Cleveland Clinic residents at STJHC developed a QI project to better define the barriers to achieving glycemic control among their patients with diabetes in the underserved population of East Cleveland in July 2017. Using the Cleveland Clinic institution-wide goal of having <10% of patients with an A1C >9%, the residents examined their own patient panels to determine how many of their patients had an A1C >9%. The aim of this project was to apply sustainable measures in this underserved primary care population to achieve a 10% reduction in the number of patients with an A1C >9% over a 6-month period.

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How did you identify this quality gap? In other words, where did you get your baseline data?

The quality gap was identified through retrospective assessment of each resident's patient panel to identify how many patients had an A1C >9%. Residents reviewed their patients through the electronic medical record (EMR) system EPIC to determine their eligibility for this initiative. The project included all adult patients (≥ 18 years of age) established to have type 1 or type 2 diabetes who were scheduled between 1 July and 6 October 2017 with second- or third-year senior residents at the STJHC. For completion purposes, patients with a known history of diabetes who were scheduled for a clinic visit during that time period were included even if they did not show up for their appointment.

Summarize the initial data for your practice (before the improvement initiative).

A total of 200 patients with diabetes were scheduled with the six residents at the STJHC internal medicine resident clinic between 1 July and 6 October 2017. Those with an A1C >9% who were scheduled with the same senior resident at the same clinic site and within the same time frame numbered 37. This translates to 19% of the patient population seen during this 3-month period. The average A1C among these 37 patients was 10.8%. The group consisted of 59% female and 41% male patients.

What was the time frame from initiation of your QI initiative to its completion?

This QI project was carried out over a 6-month period beginning on 7 October 2017 and ending on 31 March 2018. Initial data were collected over the 3 months before this time frame, from 1 July to 6 October 2017. Because this was a residents' QI project, the overall timeline was limited to one academic year (July 2017 to June 2018).

Describe your core QI team. Who served as project leader, and why was this person selected? Who else served on the team?

The core QI team consisted of six senior internal medical residents, three in the second year and three in the third year of training, and one staff physician. The project leader was the staff physician who practices daily at STJHC in both the resident clinic and in a private clinic. It was important for the leader of the team to be the staff physician because she is primarily based out of STJHC, whereas the residents rotated through the clinic every 5 weeks.

As the leader, the staff physician was able to provide the resident team deeper insight about the clinic's patient population to guide the residents toward more population-based solutions to improve patients' diabetes management. She also delivered a lecture series to the resident team every 5 weeks, in which important aspects of QI were discussed. Finally, she ensured that the team stayed on track to complete their project successfully and on time.

The six residents worked together to brainstorm low-effort, high-impact solutions that would help to improve diabetes management within their high-risk patient population (Supplementary Figure S1). They were then responsible for carrying out their initiatives, keeping track of their study population, and evaluating the impact of their plan at the end of the project. There was a final presentation at the end of the study period, during which the project was presented to the internal medicine program, including other residents and associate program directors.

Describe the structural changes you made to your practice through this initiative.

As part of the quality assessment and improvement curriculum for the internal medicine residency program, the residents followed a Plan-Do-Study-Act model. They began by identifying the patients scheduled in their clinic between 1 July and 6 October 2017 using the EMR system. Patients with an A1C >9% were flagged as "high risk."

Once those patients were identified, a thorough examination of their charts was performed to explore possible barriers to explain their uncontrolled diabetes. The resident team began by performing a root-cause analysis through the use of a fishbone diagram and identified four main types of barriers to achieving glycemic control: patients, providers, processes, and systems (Supplementary Figure S1). Specific limitations were recognized within each category, and a total of 18 barriers were identified through this process.

These barriers were further analyzed in a decision matrix (Supplementary Figure S2), through which the residents evaluated each barrier based on its frequency, its impact on improving a patient's A1C, and the ease with which it could be overcome. The barriers were ranked from 1 to 5, with 5 indicating the most common, highest impact, and easiest to correct, and a total of 15 being the highest achievable score. The barriers were then plotted on an effort-impact matrix based on their numerical ranking (Supplementary Figure S3).

The residents examined the higher-impact barriers and decided to directly address three in this initiative: low use

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of ancillary staff in the clinic (i.e., pharmacists, diabetes educators, and nutritionists), unengaged patients, and poor health literacy among patients. They decided to tackle these barriers by increasing residents' referrals to ancillary staff, calling patients directly to encourage them to come to their appointments, and educating high-risk patients in the clinic about their diabetes, including the importance of dietary modification and medication compliance.

The ancillary staff available at STJHC includes pharmacists, diabetes educators, and nutritionists. The pharmacists are able to review patients' medication lists, titrate antihyperglycemic agents, and educate patients on how to administer their medications. The diabetes educators provide patients with general information regarding their disease and teach them the importance of dietary modification and medication compliance. The nutritionists instruct patients on how to follow a low-glycemic diet and provide specific meal plans in individual and group classes. These services were already present at STJHC; however, there was a lack of knowledge on the part of the resident team regarding their accessibility in the clinic and how to incorporate the expertise of ancillary staff in their patients' care. For that reason, these services were underutilized by resident teams.

The residents in this initiative applied these three countermeasures during their outpatient weeks from October 2017 to March 2018, which comprised a total of six clinic weeks. The patient cohort had their A1C tested at the end of the 6-month period either at a Cleveland Clinic laboratory or in the clinic with a point-of-care device.

Describe the most important changes you made to your process of care delivery.

The most important change made through this QI project was the incorporation of a multidisciplinary approach when managing high-risk patients with diabetes. The residents became comfortable with the ancillary staff available at their clinic site and included them in the care plans for their high-risk patients. Each type of provider had a specific role when working with the patients; thus, every aspect of poor glycemic control could be addressed.

Having residents call high-risk patients to encourage them to make it to all of their scheduled appointments was another important procedural change. In the past, patients would receive reminder calls from the clerical staff regarding upcoming appointments; however, having their provider call them directly made the phone calls more personal and empowered patients to come to their appointments.

Summarize your final outcome data (at the end of the improvement initiative) and how they compared with your baseline data.

All three countermeasures were applied from October 2017 until March 2018. These measures include referring patients to ancillary services, calling patients directly to encourage compliance, and providing diabetes counseling during appointments. Of the 37 patients studied, 30 (81%) were seen by a pharmacist, 26 (70%) were seen by a diabetes educator, and 18 (48%) were seen by a nutritionist. By the end of the sixth month, follow-up A1C testing showed a reduction in the total number of patients with an A1C >9% from 19 to 15%. This translated into improved glycemic control for seven of the 37 patients enrolled in the initiative over the 6-month period. These seven patients were seen by all three types of ancillary staff members and had an average of 1.6 follow-up visits with their primary care provider. The average A1C among these seven patients was 8.6%. This study achieved its goal of bringing about a 10% reduction in the number of patients with an A1C >9%.

What are your next steps?

Although the size of this project was small, there are several valuable lessons that can be applied in this resident clinic moving forward. It is clear that among high-risk patient populations, a multidisciplinary approach is crucial to improving glycemic control (8). The residents at STJHC are now instructed to consult with a pharmacist, diabetes educator, and nutritionist for all patients who have an A1C >9%. Additionally, incoming residents to the clinic are introduced to the clinic's ancillary staff members at orientation so they build rapport with these providers early in their training. This practice facilitates easier communication and exchange of information so that all providers are working together to serve patients.

Another change made as a result of this project was to encourage residents to maintain close follow-up with their high-risk patients with diabetes to ensure that appropriate testing is being completed on time and that these patients are not lost to follow-up. When patients do not complete an ordered test, the resident physicians are now taking the initiative to reach out to these patients directly to address the barriers preventing them from managing their diabetes. This project helped residents identify the high-risk patients they need to follow-up closely through more frequent chart review or telephone calls.

Finally, this project team hopes to promote more extensive diabetes education for residents through their ambulatory

curriculum. Moving forward, the plan is to have a dedicated lecture series on diabetes management in the first few weeks of residency training so that new residents become comfortable and confident in this area. This goal is important because the residents are responsible for teaching their patients about the diabetes and guiding them to the appropriate treatments. One of the interventions in this project was to have providers counsel high-risk patients about diabetes during their follow-up visits. Thus, moving forward, it is crucial that the providers themselves have sufficient knowledge about this disease.

What lessons did you learn through your QI process that you would like to share with others?

QI projects allow trainees to examine their own clinical practices and create innovative ways to improve existing processes. In the realm of diabetes management, the multidisciplinary approach has been shown to be the most effective in improving patients' diabetes status, especially in high-risk populations (8). In this initiative, the use of diabetes educators, pharmacists, and nutritionists helped to ensure that patients were receiving frequent follow-up and guidance to help them better control their condition. The patients who had an improvement in their A1C were seen by all three types of ancillary staff.

It was important for the residents involved in this project to learn the utility of the multidisciplinary approach early in their training because it is a model that will serve them moving forward in all fields of medicine. To ensure that this process was incorporated into the work flow of the remaining residents at STJHC, signs were placed in the resident workroom reminding all providers of the three interventions that should be applied to all patients with an A1C >9%. The results of this project were also presented to the internal medicine resident class at the end of the academic year to highlight its success and to showcase its reproducibility in other resident clinics.

Another important lesson from this project regarded how to address compliance among patients with poor health literacy. The residents called their high-risk patients to encourage their compliance with laboratory testing and appointments, and this practice had a positive impact on glycemic control. In addition, patients felt encouraged when their providers took the time to educate them about their diabetes. This attention demonstrated to the residents that poor health literacy does not necessarily equate to disengaged patients. With a little more encouragement through telephone encounters and counseling, high-risk patients can become active participants in their medical care and decision-making.

This QI project also highlighted the importance of determining the right countermeasures for each patient population, because these may differ among communities.

All of the fundamental lessons learned from this project should encourage medical trainees to continue to work on QI initiatives to enhance health outcomes within their communities.

DUALITY OF INTEREST

No potential conflicts of interest relevant to this article were reported.

AUTHOR CONTRIBUTIONS

C.Z., J.E.-A., A.A.-H., S.S., K.A.-I., and K.A.R. conceived of and designed the project, collected the data, and performed the analysis. A.B. conceived of and designed the project and oversaw completion of each task involved in carrying it out in a timely manner. C.Z. is the guarantor of this work and, as such, had full access to all the data reported and takes responsibility for the integrity of the project presentation.

PRIOR PRESENTATION

Data from this project were presented at the 21st Annual Meeting of the Ohio River Regional Chapter of the American Association of Clinical Endocrinologists, Columbus, OH, 26–27 July 2019.

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