



Strategies to Improve Annual Diabetic Foot Screening Compliance at a Family Clinic

Carlie Cooksey

Quality Improvement Success Stories are published by the American Diabetes Association in collaboration with the American College of Physicians 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 effort to increase the percentage of patients with diabetes at a family clinic who receive annual foot screenings.

Describe your practice setting and location.

The project site is a primary care practice in Southeast Texas that provides efficient and easily accessible preventive care to patients of all ages and demographics. Given that Texas has the highest uninsured rate in the United States, this clinic also prides itself on offering affordable options for self-pay patients. This family clinic is unique in that it serves as a teaching clinic for medical, nurse practitioner, and physician assistant students. Health care professional trainees are directly supervised by licensed providers during their learning experience. The clinic treats ~2,000 patients annually, 156 of which have been diagnosed with

diabetes. Of those with diagnosed diabetes, 70% are >50 years of age.

Describe the specific quality gap addressed through the initiative.

The American Diabetes Association (ADA) recommends routine screenings for at-risk individuals to prevent mortality; these include blood pressure screenings, eye exams, and foot assessments. Required components of an annual diabetic foot exam (ADFE) include visual inspection, assessment of peripheral pulses, and sensory assessment (1). ADFEs are associated with early detection of peripheral artery disease and neuropathy, prevention of lower-extremity wound formation, and increased value-based reimbursements (2). Factors contributing to a failure to complete or document ADFEs in patients with diabetes include limited appointment time, staff shortages, patient refusal, lack of awareness and training, and lack of appropriate equipment (3,4).

A root cause analysis (RCA) was completed at the project site to identify specific barriers unique to the family practice. The barriers identified included insufficient knowledge regarding documentation, limited assessment tools, patient refusal, and time constraints. The purpose of this quality improvement (QI) project was to increase the rate of ADFEs using targeted evidence-based interventions. Select interventions were chosen to address barriers specific to the target clinic.

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

Diabetic foot assessment and care is a merit-based incentive payment system (MIPS) measure reported annually to the Centers for Medicare & Medicaid Services (CMS). Triggered by poor MIPS performance data, an electronic health record (EHR) audit was completed.

Student, Medical University of South Carolina, Charleston, SC

Corresponding author: Carlie Cooksey, deckerC@muscc.edu

This article contains supplementary material online at <https://doi.org/10.2337/figshare.12512852>.

This series is published by the American Diabetes Association in collaboration with the American College of Physicians, Inc., and the National Diabetes Education Program. The American College of Physicians and the American College of Physicians logos are trademarks or registered trademarks of the American College of Physicians, Inc., in the United States and shall not be used otherwise by any third party without the prior express written consent of the American College of Physicians, Inc. Likewise, products and materials that are not developed by or in partnership with the National Diabetes Education Program are prohibited from using the National Diabetes Education Program logo.

<https://doi.org/10.2337/cd20-0030>

©2020 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. More information is available at <https://www.diabetesjournals.org/content/license>.

Six months of pre-intervention data were gathered, and all patients with an *International Classification of Diseases*, 10th Revision (ICD-10), diagnosis of diabetes were audited to assess whether they had a documented ADFE within the previous 12 months. The ICD-10 codes evaluated included all codes E11.0 through E11.9. Baseline data on partial exams were also recorded, including patients who only had a visual inspection or vascular inspection documented.

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

The rate of completion of ADFEs was 4.9% for 2017 and 10.3% for 2018—far below the state average and national benchmark. The percentage of patients between 18 and 75 years of age with diagnosed diabetes who received a foot exam in Texas as reported in 2017 was 62.9%, and the national benchmark identified by CMS is 76.17% (5,6).

The EHR audit revealed that only 15.6% of eligible patients (15 of 96) seen during the pre-intervention period had had a complete foot exam during the past 12 months. The improvement in ADFE compliance in data obtained from 2017 to 2018 could be attributed partially to an adjustment in staff performance stemming from their awareness of an impending QI project, a phenomenon known as the Hawthorne effect (7). However, the rate was still far below benchmark levels, and intervention was still warranted. The EHR audit also revealed that only 16.7% of eligible patients (16 of 96) seen during the pre-intervention period had a documented neurosensory foot exam in the past 12 months, while 68.8% (66 of 96) had a documented vascular foot exam, and 89.6% (86 of 96) had a documented visual foot exam.

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

This was a 5-month project beginning 1 October 2019 and ending 29 February 2020.

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

The project leader was a doctoral nurse practitioner candidate who completed this QI initiative as part of her curriculum to develop expertise in analytical methods to improve patient care. Project champions included the

clinic physician and the nurse practitioner, whose leadership and practice authority helped obtain buy-in from other staff members and trainees.

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

There were two components to the interventions implemented for this QI initiative: brief training sessions and the introduction of foot-screening tool bundles in exam rooms.

A PowerPoint presentation was created to educate staff and health care professional trainees on the components of diabetic foot exams, the importance of annual exams, how to document foot exams in the EHR, and how to overcome patient refusal. This in-service was also added to the orientation for new trainees to ensure that education materials reached all who would be working with patients with diabetes.

The second initiative included the provision of foot-screening bundles and posters. The bundles included a 10-g monofilament tool, a 128-Hz tuning fork, a reflex hammer, and a diabetic foot screening algorithm, as well as patient education posters. The neurosensory tools were placed in each exam room to ensure quick and easy accessibility during busy clinic days. The diabetic foot screening algorithm was created for the project site using an algorithm published by the Texas Department of State Health Services as a guide. The goal of the algorithm was to give staff and health care professional trainees an efficient, replicable assessment and treatment guide for patients with detected foot abnormalities. Posters were displayed in each exam room, asking all patients with diabetes to remove their shoes.

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

Evidence-based interventions based on the identified barriers within the practice guided the interventions implemented in this QI project. Therefore, emphasis was placed on improving EHR documentation and education. Staff and health care professional trainees were provided with a brief in-service presentation that educated them on how to document foot exam findings within the EHR, which health care procedure codes are relevant to diabetic foot exams, and how to determine whether a patient has had a foot exam completed in the past year.

The diabetic foot screening algorithm was also implemented to assist staff and health care professional trainees

QUALITY IMPROVEMENT SUCCESS STORY

in using the correct evidence-based treatment of abnormalities detected during foot exams. The algorithm was tailored to fit the patient acuity of the clinic, as well as the limitations of the clinic regarding a lack of specialized test availability, which required outside referrals.

If you used the “Plan, Do, Study, Act” change model, provide details for one example in the following sections.

- **Plan.** Staff and trainees were educated on the diabetic foot screening bundle through an in-service presentation. Bundle supplies were made available in each exam room.
- **Do.** The intervention period took place over 5 months; however, data were collected and evaluated biweekly during this period.
- **Study.** Every 2 weeks, data were assessed to determine compliance. This assessment was done by running an EHR report for all patients with diabetes who were seen within the 2-week period and assessing for the completion of an ADFE or the documentation of an ADFE within the past 12 months.
- **Act.** An RCA was completed when compliance decreased during a 2-week period to identify potential barriers to compliance and adjust interventions as needed.

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

After the 5-month intervention period, there was a clinically significant increase in the ADFE compliance rate. The number of eligible patients with a documented ADFE within the past 12 months of their most recent clinic visit increased from 16 to 71% (75 of 106), surpassing the most recent reported state average of 62%. The evidence-based interventions also translated into a clinically significant increase in the completion of neurosensory exams from 17 to 71% (75 of 106), which was the ADFE exam component with the lowest compliance pre-intervention (Supplementary Figure S1). The clinic also realized a significant increase in the rate detected foot abnormalities, which improved by 9%. This improvement allowed patients to receive treatment for conditions, including neuropathy, onychomycosis, and onychocryptosis, which otherwise may have gone untreated.

To ensure timely data evaluation and allow for compliance analysis and project improvement, data were

reviewed biweekly. The records of all patients with diabetes seen during the 2-week period were audited to determine whether they had a foot exam completed during the visit or already had a documented exam within the past 12 months before the visit. A percentage of compliant patients was generated using the number with a documented foot exam as the numerator and the total number of patients with diabetes seen in the 2-week period as the denominator.

During one 2-week period, an RCA determined that ADFE compliance decreased because of the time of day the in-service training was provided to new trainees. The in-service was changed to be delivered prior to any patient contact, and ADFE compliance increased during the subsequent 2-week period.

An additional RCA was completed to identify the root cause of decline in biweekly ADFE compliance during the months of December and January. This analysis revealed that 38% of the patients with diabetes who were evaluated during these months presented with an acute complaint, and diabetes was not discussed during these visits. Consistent with the recommendations provided in a literature search, the clinic hosted “comprehensive diabetic visits” in the month of February, during which all preventive examinations for patients with diabetes were addressed, including foot exams, eye exams, and routine blood work. Biweekly compliance rates increased to 76% after this intervention. These data are presented in Supplementary Figure S2 on a monthly rather than biweekly basis to improve the readability of the figure.

Pre- and post-in-service quizzes were given to all health care professional trainees to assess for an increase in ADFE knowledge after the in-service session. Quiz questions were developed by the doctoral nurse practitioner student and divided into two domains to assess for gaps in knowledge (Supplementary Appendix A). These domains included knowledge regarding how to complete ADFEs and knowledge regarding how to document ADFEs. Test scores on ADFE completion increased by 12% after the education session, and scores on ADFE documentation increased by 38%. There was an overall increase in test scores after the education session, indicating that trainees lacked sufficient knowledge to meet ADFE compliance benchmarks before the intervention.

What are your next steps?

We made practice changes that are sustainable based on stakeholder buy-in and positive outcomes of this

multifaceted QI project. Because of the success seen with the paper algorithm, an ADFE template has been incorporated into the EHR, prompting staff and students to complete foot exams for patients with an eligible ICD-10 code and history of diabetes. This measure may further increase compliance with ADFE. The clinic also plans to continue hosting annual “comprehensive diabetic visits” for patients who predominately come to the clinic for acute issues, thereby missing the opportunity to receive a foot exam. We recommend that our intervention bundle be evaluated in other family clinics to strengthen its generalizability because rapid turnover in health care professional trainees within this clinic presents a unique set of barriers.

Since the implementation of this project, CMS has changed the MIPS quality measures regarding diabetic foot care. Although visual and vascular exams are still important components of ADFE and strongly recommended by the ADA, quality measures now focus on neurological and sensory examination, and footwear evaluation has been added to the factors that determine reimbursement. We recommend that future QI projects include interventions to increase annual evaluation of footwear because this type of assessment was limited in this QI project.

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

This project taught us the importance of frequent evaluation of process measures to ensure the success of a project. Using the “Plan, Do, Study, Act” model allowed us to make changes to interventions when ADFE compliance declined during the post-intervention period, resulting in increased compliance overall.

Lessons were also learned through the limitations to this QI project. We learned the importance of obtaining buy-in from the staff and health care professional trainees who would be completing ADFEs to improve compliance rates. The project champions played an important role in maintaining buy-in by tying engagement in this QI project to trainees’ clinical success. Frequent turnover of health professional trainees at the clinic made maintaining engagement difficult, as was revealed by the RCAs. We worked to overcome this problem by meeting with staff and trainees to review

biweekly data. Project improvements also facilitated continued engagement.

QI projects designed to improve annual preventive exam compliance can greatly improve quality of life in individuals with chronic conditions. Evidence-based interventions aimed at increasing ADFE compliance should be implemented to promote early detection of foot abnormalities, prevent the development of serious foot lesions, decrease diabetes-associated complications, and reduce health care spending.

ACKNOWLEDGMENT

The author thanks Dr. Hanan Hussein and Lindsey Jones, APRN, for their clinical support and contribution to this work. The author also thanks Dr. Whitney Smith and Dr. Emily Johnson for their input regarding data interpretation and review of this manuscript.

DUALITY OF INTEREST

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

GUARANTOR AUTHOR

As the sole author, C.C. is the guarantor of this work and, as such, had full access to all data reported and takes responsibility for the integrity of the data and the accuracy of the data analysis.

REFERENCES

1. American Diabetes Association. 10. Microvascular complications and foot care: *Standards of Medical Care in Diabetes—2018*. *Diabetes Care* 2018;41(Suppl. 1):S105–S118
2. Beckman TJ. Regular screening in type 2 diabetes: a mnemonic approach for improving compliance, detecting complications. *Postgrad Med* 2004;115:19–20, 23–27
3. Allen ML, Van der Does AM, Gunst C. Improving diabetic foot screening at a primary care clinic: a quality improvement project. *Afr J Prim Health Care Fam Med* 2016;8:e1–e9
4. Gallman EC, Conner RS, Johnson E. Improving the detection of foot abnormalities in patients with diabetes. *Clin Diabetes* 2017; 35:55–59
5. Centers for Disease Control and Prevention. *Diabetes Report Card 2017*. Atlanta, GA, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, 2018
6. Centers for Medicare & Medicaid Services. *2018 Value-Based Payment Modifier Program Experience Report*. Baltimore, MD, Department of Health and Human Services, 2018
7. Goodwin MA, Stange KC, Zyzanski SJ, Crabtree BF, Borawski EA, Flocke SA. The Hawthorne effect in direct observation research with physicians and patients. *J Eval Clin Pract* 2017;23: 1322–1328