

# No Shoes, No Socks, More Service: An intervention to improve diabetic foot care

ALISON DUNCAN, MD, RYAN SUGARMAN, MD, ADAM KLEIN, MD, MANRAJ PARMAR, MD, DANIEL DEJOSEPH, MD, MARK WHITE, MD, ISIS MILLER, DO, JONATHAN FERENCE, PHARMD, MARY SOKACH, MD, RICHARD ENGLISH, MD  
The Commonwealth Medical College, Scranton PA

## Introduction

Diabetic foot ulcers are a major cause of morbidity and mortality for diabetic patients.<sup>1</sup> Sequelae from foot ulcers include incontinence, tissue necrosis, gangrene, osteomyelitis and amputation.<sup>2</sup> More than 80,000 lower extremity amputations (LEA) are performed on diabetic patients, annually.<sup>3</sup> The economic cost of diabetic foot complications ran up to 11 billion dollars in 2001 and it has been estimated that foot complications may account for up to 20 percent of the economic cost of diabetes.<sup>4</sup>

Numerous studies have demonstrated that foot exams and early detection of foot injuries are valuable tools in preventing LEAs.<sup>1, 5, 6</sup> The American Diabetes Association and the American Geriatrics Society recommend that diabetic patients receive at least one foot exam from a physician, annually.<sup>7, 8</sup> The American Academy of Family Physicians recommends screening and referral to foot care clinics as an intervention highly likely to be beneficial for reducing

LEAs.<sup>9</sup> The Agency for Healthcare Research and Quality finds compelling evidence that proactive foot care is both clinically and financially effective in preventing hospitalizations and LEAs. According to CDC data, however, approximately one third of diabetic patients do not receive at least one foot exam per year from a physician or other health care provider.<sup>10</sup>

For this study, we looked at the rate of foot exams in two clinics in Luzerne County, PA. The Wyoming Valley Family Practice Residency Program (WVFRP) serves a large, low-income population in and around Wilkes-Barre, PA. As a residency program, the cohort of providers is also large and transient. The Exeter Township Health Center (ETHC) is a Federally Qualified Health Center (FQHC) in a rural area of Luzerne County. It is staffed by a single physician, a physician assistant and several nurses. The patient base is much smaller than the residency program. Demographic differences between the two clinics are summarized in Table 1. ETHC maintains a careful audit of the care that every one of their diabetic patients receives—in compliance with the regulations that apply to FQHCs. WVFRP uses Measuring, Evaluating and Translating Research into Care (METRIC), a validated tool developed by the AAFP to increase provider compliance with the established diabetes care guidelines<sup>11</sup> to measure the compliance of their providers with national guidelines for diabetes care—including annual foot exams.

---

1 King L. *Impact of a preventive program on amputation rates in the diabetic population.* J Wound Ostomy Continence Nurs 35 (5): 479-82; 2008

2 Cavanagh, PR et al. *Treatment of Diabetic Foot Ulcers.* Lancet 1725-1735. Nov 12 2005

3 Cook EA, et al. *The Amputation Prevention Initiative.* Journal of the American Podiatric Medical Association. January 2014 104 (1): 1-10

4 Apelqvist J and Tennvall GR *Counting the costs of the diabetic foot.* Diabetic Voice Special Issue November 2005

5 Rasli M, Zacharin M. *Foot problems and effectiveness of foot care education in children and adolescents with diabetes mellitus.* Pediatr Diabetes 9 (6): 602-8, 2008.

6 Hunt, D *Diabetes: Foot Ulcers and Amputations.* BMJ Clinical Evidence. 2009

7 American Diabetes Association: *Diabetes Care* January 2009 vol. 32 no. Supplement 1 S13-S61

8 *Guidelines for Improving the Care of the Older Person with Diabetes Mellitus.* Journal of American Geriatrics Society. 2003;51.5:S265-280.

---

9 Hunt, Derek. *Diabetes: Foot Ulcers and Amputations* American Family Physician. 80(8):789-790. Oct 15, 2009

10 Coffey RM, Matthews TL, McDermott K. *Diabetes Care Quality Improvement: A Resource Guide for State Action.* (Prepared by The Medstat Group, Inc. and The Council of State Governments under Contract No. 290-00-0004). Rockville, MD: Agency for Healthcare Research and Quality, Department of Health and Human Services; September 2004. AHRQ Pub. No. 04-0072.

11 Penaranda, E M.D. et al. *"METRIC: A Sweet Tool to Improve Adherence to Diabetes Care Guidelines."* El Paso Physician 2009 vol. 32 no. 3. Case Report.

**Table 1**

Clinic	WVFRP	ETHC
Age (years)	Range 20-87, Average 56	Range 30-85+, 72.4% are older than 55
Socioeconomic (by payer)	<ul style="list-style-type: none"> <li>• 32.8% Self Pay</li> <li>• 29.5% Medicaid</li> <li>• 18.9% Medicare</li> <li>• 10.7% HMO/PPO</li> <li>• 8.1% Blue Cross/Blue Shield</li> </ul>	<ul style="list-style-type: none"> <li>• 42.4% Private Insurance</li> <li>• 12.9% Medicaid</li> <li>• 2.4% Medicare</li> <li>• 1.2% Medicaid and Medicare</li> <li>• 15.3% Medicare and Private</li> <li>• 23.5% Other</li> <li>• 2.4% Uninsured</li> </ul>

In October, 2009, we reviewed the METRIC data from WVFRP and the federal audit data from ETHC. The rate of annual foot exams was 50% and 52%, respectively. The rate for Pennsylvania is 75% (which is comparable to the New Mexico average of 74.8%) and the national average was 68%.<sup>10,12,13</sup> We discussed these numbers with the physicians at WVFRP and ETHC. The physicians described the foot exam as “easy to forget”, and identified the time it took to remove shoes and socks as an impediment to performing an exam with only limited time in each patient encounter. From their feedback and a review of the literature, we designed an intervention that educated physicians and nurses about the importance of foot exams, asked nurses to make sure that the feet of all diabetic patients were bare before the physician entered the exam room and asked physicians to examine the feet of every diabetic patient at every visit. We titled the intervention, “No Shoes, No Socks, More Service.”

## Methods

We conducted educational interventions with nursing staff during their lunch breaks at both clinics. The

12 Pennsylvania Department of Public Health and Pennsylvania Medical Society Medical Care Standards for Diabetic Adults. 2008

13 Centers for Disease Control and Prevention: National Diabetes Surveillance System. Available online at: <http://www.cdc.gov/diabetes/statistics>. Retrieved [03/27/2014].

format of the intervention was informative and interactive—we asked the nurses to describe diabetic feet, we provided them with statistics on their clinic’s compliance versus the state and national averages. We asked them to brainstorm some reasons for the low numbers. We wrote their responses on a flip chart. Then, we asked them to commit to removing the shoes and socks of every diabetic patient before that patient saw their provider. The rationale we gave for this request was that bare feet would remind the physician or PA to do the exam and valuable time would be saved during the exam—since the patient’s feet would already be bare. We discussed the logistics of identifying diabetic patients and making sure that their feet did not get cold while waiting for the doctor.

WVFRP has a large resident and attending population and we held a lunchtime group educational intervention for the physicians. We presented the physicians with the statistics on the clinic’s compliance versus the state and national data. We also presented data from studies regarding the incidence of foot ulcers, LEAs and the role of foot exams in reducing foot ulcers and LEAs. Finally, we asked the physicians to conduct and document a foot exam on every diabetic patient at every visit and to educate the patient by describing what they were looking for during the exam. The rationale that we gave to the physicians for this request was that patients retain information better with repeated exposure<sup>14</sup> that foot ulcers can develop rapidly and that by examining the feet of every diabetic patient with every visit they would improve their compliance with ADA recommendations.

The physician and PA at ETHC attended the nurse’s intervention and had a conversation with one of the investigators that followed the same script as the physicians’ intervention at WVFRP. The interventions were done in March 2010 and the follow up data was collected in June 2010.

14 Sun P, Jao S, Lin H, Chan R, Chou C, Wei S. *Improving preventive foot care for diabetic patients participating in group education*. Journal of the American Podiatric Medical Association. July 2009. 99 (4): 295-300.

---

### **Results—rate of foot exams**

In June, the WVFPRP METRIC data showed an 80% rate of foot exams and the ETHC showed a rate of 63.2%. Both clinics improved their rate of foot exams with a much stronger improvement at the WVFPRP.

### **Results—feedback from the educational interventions**

The investigators found the interventions were received differently at the two clinics. At ETHC, the nursing staff was very positive about the intervention, but did not engage much in the interactive portion of the intervention. At WVFPRP, the nurses participated fully in the interactive portion of the educational intervention and made several suggestions of how, in the future, they could take an even larger role in foot exam compliance—even doing foot exams, themselves. During the intervention for physicians, several physicians objected to doing a foot exam at every patient encounter. Their objections were met with anecdotes from other physicians about good clinical outcomes from catching foot ulcers early.

### **Results—Post-intervention interview with WVFPRP**

In January, 2011 we attended morning rounds at WVFPRP to ask them how they felt about the intervention. The physicians felt that the removal of shoes contributed directly to the increase in foot exams. One resident commented, “We were seeing bare feet--and it reminded us.” The physicians also felt that the educational intervention raised their awareness of the importance of educating patients, repeatedly, about their foot care. The education did not stop at the feet, however. The physicians found themselves talking with their patients about many aspects of diabetes care. The physicians spoke positively about checking the feet at every visit--as an opportunity for diabetes care. One physician offered, “Often the patient came in for a sick visit and the exam made it a diabetes focused visit.” Several of the residents stated that they intended to implement the “No Shoes, No Socks, More Service” model in their own practices in the future.

We were unable to set up a meeting with the nursing staff so we asked them to answer a few survey questions about their experience with “No Shoes, No Socks, More Service.” The questions were “Do you feel that the intervention (removing the shoes and socks of diabetic patients) was beneficial? How so? Did you encounter any problems or challenges in removing the shoes and socks of diabetic patients? Did you find any solutions to those challenges? Was the educational session with the medical students last year helpful? How so? What changes would you make? Are you still removing the shoes and socks of diabetic patients?” The survey was given in April 2011. The nurses were still removing the shoes and socks of diabetic patients. They found the intervention to be beneficial, mostly for the opportunity it gave them to do diabetic foot care education. One respondent wrote, “It provided an opportunity for foot care teaching. Discussed importance [of] wearing slippers at night to avoid injury--this was a perfect opportunity for me to bring that subject up.” A few nurses commented on the reluctance of some patients to remove their shoes and socks, but they were also confident in their ability to allay the concerns of the patients and, ultimately, to remove the shoes and socks. Another nurse wrote, “Some patients did not anticipate removing their socks and shoes and felt uncomfortable doing so because of appearance of feet, nails, odor, etc.... Once you reassured them and explained the rationale as to why we were doing it they felt more at ease.” The nurse continued to describe how most diabetic patients had started taking their shoes and socks off as soon as they were placed in an exam room.

### **Results—Post intervention interview with ETHC**

Several months after the conclusion of the final collecting period, “No Shoes, No Socks, More Service” was still being practiced at ETHC. The physicians and staff viewed it as a change that helped ETHC meet the high standards required to be an FQHC. The removal of the shoes and socks also served as a reminder for the physician to discuss diabetic healthcare during sick visits, whereas in the past it was much easier to focus on the immediate issues and neglect longer term health advice.

---

## Discussion

After the “No Shoes, No Socks, More Service” educational intervention, the rate of foot exams increased at both clinics. This might indicate that removing the time obstacle of having to remove a patient’s shoes and socks as well as providing the visual cue of bare feet encourages physicians to do foot exams on diabetic patients.

There are several limitations in this study. We measured compliance over a short period of three months and we do not know if additional interventions would be needed to maintain these

results. There is a considerable difference between the rate increase at WVFPRP and ETHC. We propose that the different data collection tools play a role in this difference. At WVFPRP, the clinicians choose a sample of diabetic patients and enter the data for those patients into the METRIC system. We consider the potential for sampling error to be substantial with this tool. At ETHC, the data is reported for every patient seen in the clinic. This eliminates the potential for sampling error. While the rate of foot exams increased at ETHC, it is still below the state and national averages so there may be other obstacles to doing foot exams that were not addressed in this study.