



# Implementation of a Multidisciplinary Resident Diabetes Clinic:

## Characterizing the Population and Measuring the Impact on Clinical Outcomes and Process Measures

Carlson, K. MS2; Orsillo, M. DO; Raveendran, A.J. MD, MEd; Chung, G. MD; Malm, T. RPH; Huot, S. MD, PhD; Rabin, T.L. MD, SM  
Yale Primary Care Internal Medicine Residency Program, New Haven, Connecticut



### Background

- Diabetes is a significant public health problem affecting approximately 13% of US adults.
- In 2004, the Yale Primary Care Internal Medicine Residency Program (YPC) began a multidisciplinary, referral-based Diabetes Clinic within the residency outpatient practice.
- Staffing includes generalist attendings with expertise in diabetes management, a chief resident, PGY 1–3 residents, pharmacists, a nutritionist, and a social worker.
- The team provides comprehensive diabetes care for patients who have not met their HbA1c goals.
- Little literature specifically examines the integration of such a model into a primary care teaching practice.

### Objectives

- To analyze the impact of a multidisciplinary, referral-based resident diabetes clinic model on clinical outcome and process measures.
- To assess and define ways to improve quality of care delivered to patients in the diabetes clinic.

### Hypothesis

- Receiving care at the YPC Diabetes Clinic is associated with improved HbA1c and increased attainment of recommended diabetes care measures compared to usual care.

### Methods

- Data were retrospectively collected from the electronic medical record for patients seen at the YPC Diabetes Clinic between 2014 and 2020 (n=364).
- Usual care was compared to Diabetes Clinic care, using patients as their own controls. Data were captured within a 24-month timeframe (12 months prior to and following the first Diabetes Clinic visit).
- The main clinical outcome was change in HbA1c. Pooled HbA1c values prior to the first visit were compared to the final value measured within 12 months after that visit using a paired-sample t-test.
- Process measures included % with measured urine albumin/Cr; % referred to podiatry, ophthalmology, or dietitians; and % immunized against influenza, Hepatitis B, and pneumonia within the 12 months prior to and following the first visit.

Table 1. YPC Diabetes Clinic patient population characteristics

Total Number of Patients	364
Mean Age, years (SD)	53.9 (11.9)
Female %	52.5%
Race (%)	
Black or African American	187 (51.4)
Other	87 (23.9)
White or Caucasian	67 (18.4)
Multiracial	12 (3.3)
Asian	4 (1.1)
Native Hawaiian or Pacific Islander	4 (1.1)
American Indian or Alaska Native	3 (0.8)
Ethnicity (%)	
Non-Hispanic	245 (67.3)
Hispanic or Latino	118 (32.4)
Unknown	1 (0.3)

### Results

- In the 12 months following the first Diabetes Clinic visit, patients attended an average of three Diabetes Clinic sessions (SD=2.66, range=1-16); 37.6% attended only one.

Table 2. Hemoglobin A1c outcomes prior to first Diabetes Clinic visit and change over 12 months

Mean initial HbA1c value before first visit (SD)	10.8 % (2.5)
Mean change after first visit (95% CI, p)	-1.4 (± 0.3, <0.001)

Table 3. Process measures prior to and following first Diabetes Clinic visit

Process Measure	# of Pts (%)
Urine Alb/Cr measured (in 24m window)	338 (92.9)
LDL measured (in 24m window)	337 (92.6)
Referrals	
Podiatry pre-clinic <sup>1</sup>	84 (23.1)
Podiatry post-clinic <sup>2</sup>	121 (33.2)
Ophthalmology pre-clinic	207 (56.9)
Ophthalmology post-clinic	146 (40.1)
Dietician/Nutritionist post-clinic	84 (23.1)
Immunizations (%)	
Influenza (in 24m window)	262 (72.0)
Hepatitis B initiated pre-clinic	188 (51.6)
Hepatitis B initiated post-clinic	58 (15.8)
PPSV23 pre-clinic	248 (68.1)
PPSV23 post-clinic	44 (12.1)

<sup>1,2</sup> 27 patients pre-clinic and 59 patients post-clinic were referred to podiatry despite normal or no foot exam documented.  
Note: 52.2% of patients had a normal foot exam documented within the 24 month window and did not require referral to Podiatry.

### Results cont.

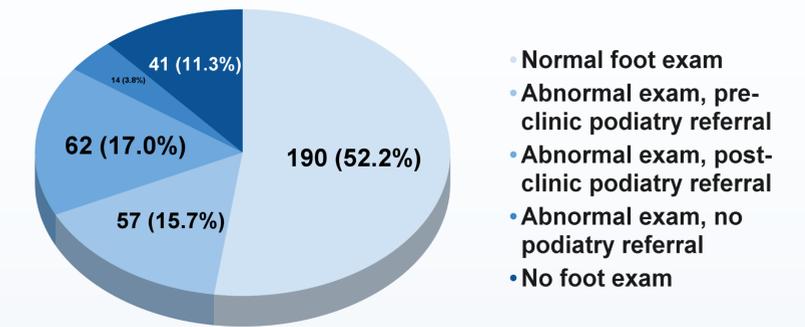


Figure 1. Foot exams and podiatry referrals prior to and 12 months following first diabetes clinic visit

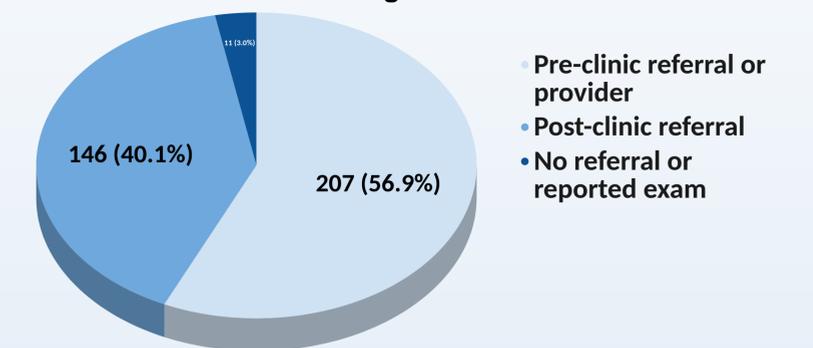


Figure 2. Ophthalmology referrals prior to and 12 months following first diabetes clinic visit

### Conclusion

- The findings of this study demonstrate that the multidisciplinary, referral-based YPC Diabetes Clinic model had a positive impact on diabetes-related clinical outcomes and process measures.
- Future analyses will explore differences in measures between patients seen only once in clinic versus those who were seen multiple times.
- These findings are useful to elucidate areas for future improvements in care and suggest this may be an effective model for other academic internal medicine residency programs.