

Distance from Health Care Facility and Other Variables Impact Time to Celiac Disease Diagnosis

HSD81

Authors: Erin B. P. Miller, Kate Avery, Debra G. Silberg

Introduction

The current favored strategy to increase celiac disease (CD) detection is active case finding among patients diagnosed with related conditions. We sought to understand whether the diagnostic interval is uniform across patients with differing demographic characteristics and geographic access.

Methods

We conducted a survey of individuals ages 13+ with a CD diagnosis and at least one of 25 related conditions diagnosed prior to CD (Table 1). Participants reported their age at diagnosis of CD and diagnosis of related conditions. Demographics were also collected. Time to CD diagnosis was defined as the difference between age at first-reported related diagnosis and at CD diagnosis. Participants also reported ZIP codes for both primary residence at the time of CD diagnosis and the diagnosing location. ZIP code centroids were used to estimate the geographic center of each ZIP code service area. Using latitude and longitude coordinates of ZIP code centroids, the shortest straight-line distance was calculated between primary residence and diagnosing locations (Figure 1).

Results

551 participants completed the survey. Most were female (87.1%) and working full-time (59.3%). The average current age was 51.2 years ($SD = 16.0$, 95% CI [49.9, 52.6]) and average age at diagnosis was 42.9 years ($SD = 14.4$, 95% CI [41.7, 44.2]). Some had state or federal marketplace insurance (5.6%).

The average straight-line distance traveled was 14.4 miles ($SD = 115.7$, 95% CI [4.7, 24.1]). Notably, 51.0% of participants had a straight-line distance between their primary residence and diagnosis location of 0.0 miles, meaning most lived and were diagnosed in the same ZIP code.

- **Greater distance traveled for diagnosis was associated with longer time to CD diagnosis** ($p = .0166$, $\rho = .102$).
- Gender was also associated ($p = .0303$, $f = .172$), with **women experiencing longer times than men**.
- Employment status was associated with diagnostic interval length ($p < .00001$, $f = .263$), with **students experiencing shorter times to diagnosis** compared to individuals whose employment status was full-time work, part-time work, stay-at-home parent, or retired (all $p = .0010$).
- **Individuals with marketplace insurance experienced shorter times to diagnosis** compared with those with other insurance types ($p = .0146$, $d = .430$).

Figure 1. The distance between primary residence and diagnosing locations was calculated as the shortest straightline distance between geographic coordinates of the ZIP code centroids.

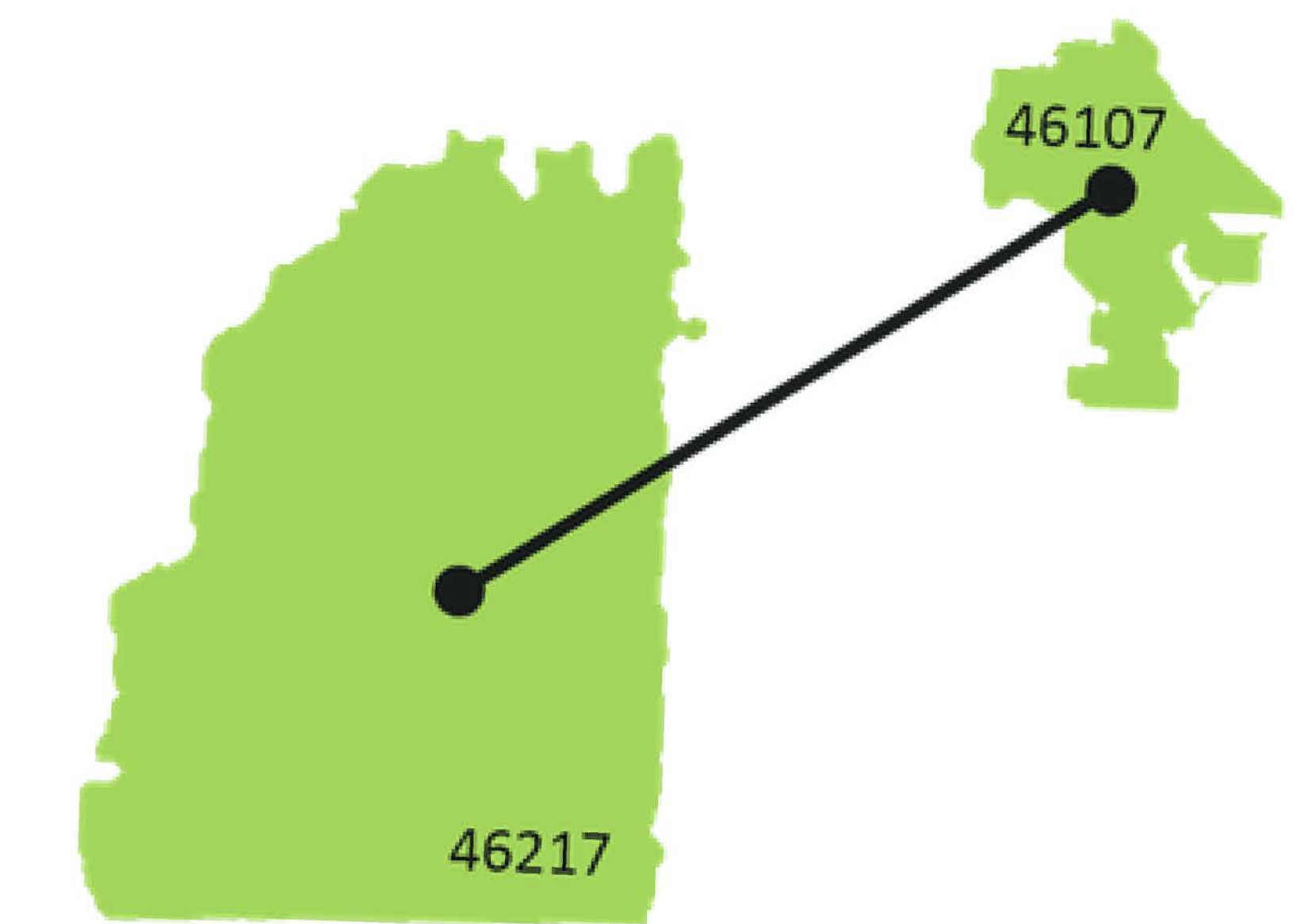


Table 1. List of Related Conditions

- | | | |
|----------------------------|----------------------------------|---|
| • Calcium deficiency | • Magnesium deficiency | • Small intestinal bacterial overgrowth |
| • Down syndrome | • Microscopic colitis | • Type 1 diabetes |
| • Folate deficiency | • Migraine | • Unexplained ataxia |
| • Graves' disease | • Osteopenia | • Vitamin B6 deficiency |
| • Hashimoto's disease | • Osteoporosis | • Vitamin B12 deficiency |
| • Infertility | • Peripheral neuropathy | • Vitamin D deficiency |
| • Iron deficiency | • Recurrent spontaneous abortion | • Vitamin deficiency anemia |
| • Iron deficiency anemia | • Small bowel adenocarcinoma | • Zinc deficiency |
| • Irritable bowel syndrome | | |

Conclusion

The interval between related condition diagnosis and CD diagnosis varies by geographic access and demographic characteristics. These findings suggest that **active case-finding strategies may be less effective for certain populations**, underscoring the need for additional approaches to promote timely CD detection.



This research funded, conducted, analyzed and presented by Beyond Celiac, a patient advocacy nonprofit organization.