

Utilization of Epic Cosmos to Extract Social Determinants of Health Data on the Diabetic Amputee Patient Population

Yiming Zhang, MS¹, Tammy T. Nguyen, MD, PhD^{1,2,3}

¹UMass Chan Medical School, Worcester, MA; ²UMass Memorial Diabetes Center of Excellence, Worcester, MA; ³University of Massachusetts Division of Vascular and Endovascular Surgery, Worcester, MA



Introduction:

- Diabetes is a chronic disease due to poorly controlled blood glucose that affects 529 million people in 2021, which represents 6.1% of the global population.¹
- Poorly managed diabetes and diabetic foot ulcer (DFU) significantly increases the lifetime risk of lower extremity amputation (LEA).²



Figure 1. Pillars of Social Determinants of Health (SDoH)

- Social determinants of health (SDoH) is defined as the nonmedical factors that influence health outcomes, such as conditions in which people are born, grow, work, live, worship, and age (Figure 1).³

ICD-10-CM SDoH Z-codes	Description
Z55	Problems related to education and literacy
Z56	Problems related to employment and unemployment
Z57	Occupational exposure to risk factors
Z59	Problems related to housing and economic circumstances
Z60	Problems related to social environment
Z62	Problems related to upbringing
Z63	Other problems related to primary support group, including family circumstances
Z64	Problems related to certain psychosocial circumstances
Z65	Problems related to other psychosocial circumstances
Z72	Problems related to lifestyle
Z75	Problems related to medical facilities and other health care

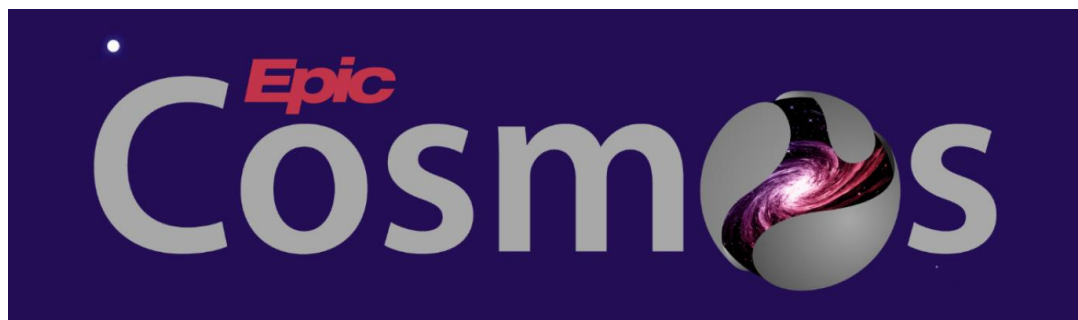
Table 1. ICD-10-CM Z-codes for SDoH Risk Factors

Objective:

To better understand the prevalence and specific SDoH risk factors that affect patients with diabetes and LEA, we utilized a national electronic health record (EHR) to pair diabetes and major LEA CPT codes with SDoH Z-codes in the ICD-10-CM official guidelines.

Methods:

The Epic Cosmos platform is a HIPAA-compliant database that incorporates de-identified information from the longitudinal national healthcare records.



Cosmos Community

1,415 Hospitals 246 Million Patients 33K Clinics

Figure 2. Epic Cosmos Database

- ICD-10-CM Z-codes between Z55 and Z75 identified patient's SDoH risk factors (Table 1).
- Prevalence of SDoH Z-codes was queried for poorly controlled (PC) -Diabetics +/- LEA (HbA1c \geq 6.5%) compared to Non (N/C) - Diabetics +/- LEA
- Specific SDoH risk Z-codes were identified and ranked to determine highest risk for each subgroup

Results:

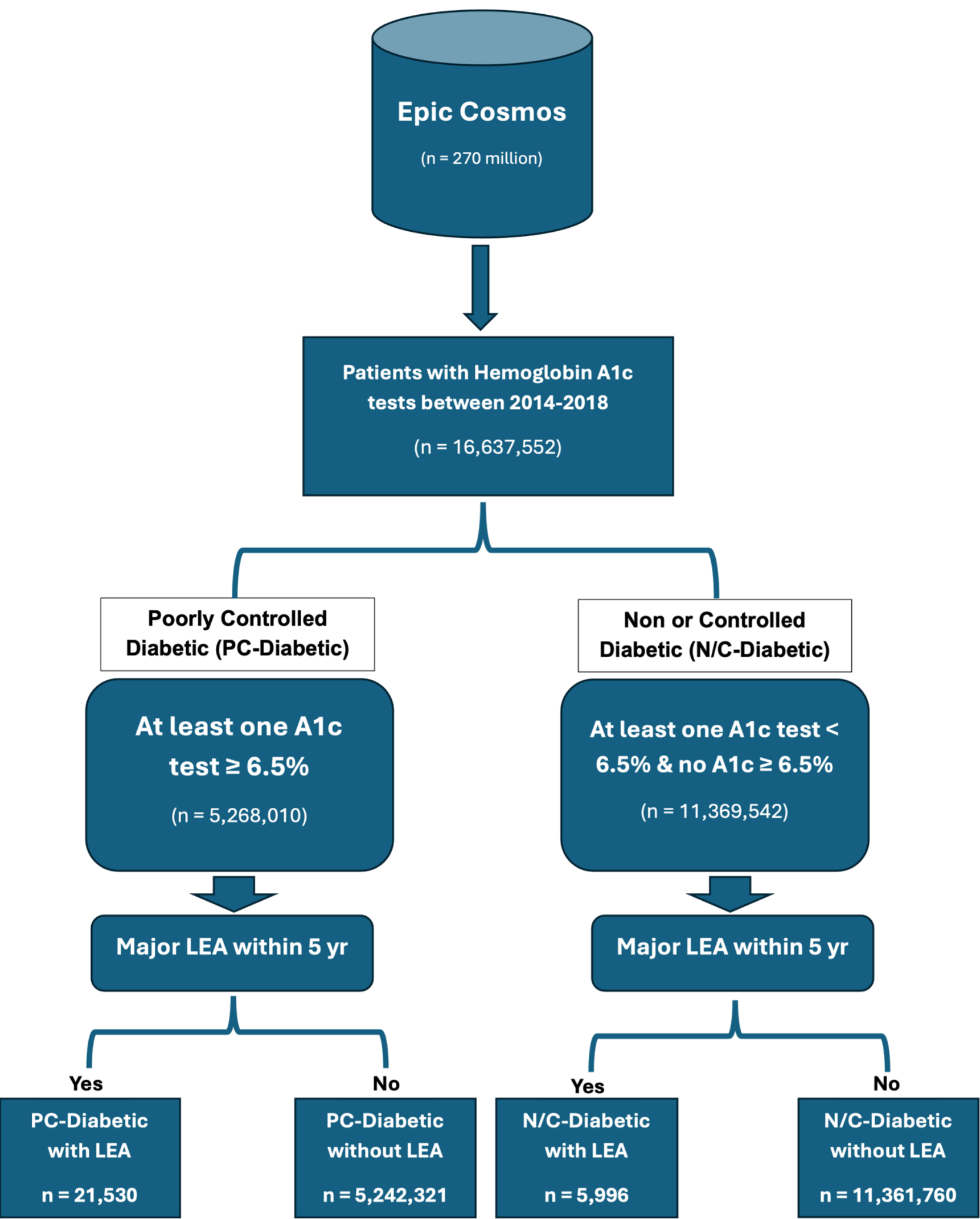


Figure 3. Epic Cosmos Database Extraction Result

- PC-diabetics with LEA are **3.12** times more likely to have **problems related to housing/economic circumstances (Z59)** and **2.59** times more likely to have **problems related to lifestyle (Z72)** when compared to PC-diabetics without LEA (Figure4).

Epic Cosmos Extraction Result

Patient Group	White / Caucasian	Black / African American	Percentage of Total
PC-Diabetic	71.90%	19.61%	
N/C Diabetic	73.19%	17.25	
PC-Diabetic with LEA	70.54%	25.77%	0.41%
N/C Diabetic with LEA	69.05%	28.95%	0.053%

* Patient Group Compositions

Table 2. Race / Ethnicity Breakdown of Patient Groups

Conclusion:

- Our analysis demonstrates the utility of Epic Cosmos to pair ICD-10 and Z-codes to identify SDoH risk factors for PC-diabetics with and without LEA.
- Academic use of large-scale EHR database like Epic Cosmos can supply researcher with powerful insights from a population-health perspective.

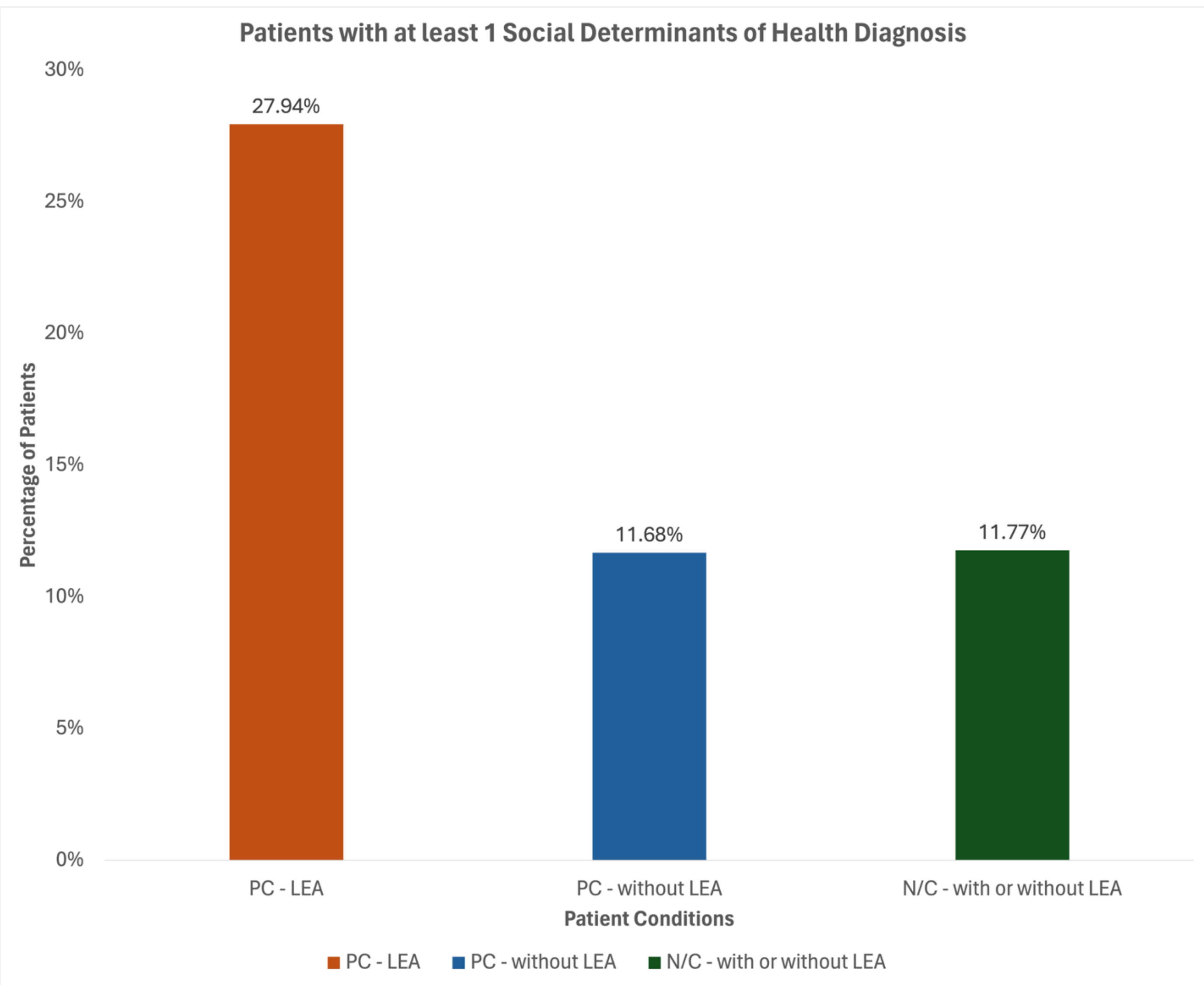


Figure 4. Percentage of Patients with at Least 1 Identified SDoH Risk Factors

References:

- Forouhi NG, Wareham NJ. Epidemiology of diabetes. *Medicine*. 2019 Jan 1;47(1):22–7.
- Wang X, Yuan CX, Xu B, Yu Z. Diabetic foot ulcers: Classification, risk factors and management. *World J Diabetes*. 2022;13(12):1049-1065. doi:10.4239/wjd.v13.i12.1049
- Centers for Disease Control and Prevention. National Diabetes Statistics Report website. <https://www.cdc.gov/diabetes/php/data-research/index.html> Accessed [November 14, 2024].