NEIGHBORHOOD HEALTH PARTNERSHIPS PROGRAM

Part of: Institute for Clinical and Translational Research, University of Wisconsin–Madison

Placing Social Determinants of Health in Context: Diabetes

Physical Environment

Commute <25 Min	• Longer commuting distance led to lower levels of physical activity, which can lead to increased risk of obesity, hypertension, and poor overall physical health. (Hoehner, 2012) • Increased commute time is associated with fewer daily servings of fruit and vegetables and an increase in purchasing food prepared outside of the home. Sub-optimal diet had an impact on type 2 diabetes, obesity and heart disease. (Osstenbach, 2022)
Affordable Housing/ Year Structure Built/ Owner Occupied Housing	• Housing insecurity had an influence on diabetes care and self-management due to people prioritizing needs for food and shelter above health when time and resources are scarce. (Mosley-Johnson, 2022) • Federally subsidized housing was associated with a reduced likelihood of uncontrolled diabetes, suggesting that affordable housing programs may be associated with improved diabetes outcomes. (Fenelon, 2022) • Unstable housing is common among those with diabetes and strongly associated with greater odds of hospital or emergency department use. (Berkowitz, 2018)

Economic & Work Environment

Graduated High School	• Lower education level increased the risk for type 2 diabetes consistently in high income countries. (Agardh, 2011) • Type 2 diabetes was found to be significantly higher and concentrated in areas that had populations with lower high school graduation rates. (Hill-Briggs, 2021)
Employed	• Job insecurity was found to be associated with a 19% increased risk of diabetes. (Ferrie, 2016) • Long-term unemployment was found to increase the risk of prediabetes and type 2 diabetes in middle-aged men. (Rautio, 2017)

Economic & Work Environment (continued)

Household Income	• There is increasing diabetes prevalence at lower levels of income compared to higher levels of income for both type 1 and type 2 diabetes. (Hill-Briggs, 2021)
Above Poverty Level	• Living in poverty was associated with worse blood sugar control for individuals with diabetes. (Houle, 2016) • The rate of type 2 diabetes was found to be significantly higher and concentrated in areas with lower incomes. (Hill-Briggs, 2021)
Children Above Poverty Level	• A large proportion of young people with type 2 diabetes live in poverty or socially disadvantaged households. (McGavock, 2017) • In a study of African Americans living in rural areas, family poverty during adolescence (ages 11-18) was associated with higher levels of insulin resistance in adulthood. (Barton, 2022) • Low maternal income was associated with development of childhood type 2 diabetes. (Halipchuck, 2017)

Service Environment

Health Insurance	• Stable insurance coverage was associated with improved diabetes outcomes for all racial and ethnic groups. (Brown, 2021)
Employer-Based Health Insurance	• Patients with diabetes enrolled in private insurance plans had better outcomes compared to those on Medicare plans. (Lee 2021)
Internet Coverage	• Telemedicine can be effective for improving overall diabetes control (Eberle, 2021), but barriers to using telehealth technology include limited availability to broadband internet access, patient concerns about confidentiality, digital health literacy, and language for non-English speakers. (Agarwal, 2022) • Pre-pregnancy care education provided through electronic health had a positive effect on women with diabetes. (Nwolise, 2016)

References

Physical Environment

- **% With Commute <25 Min**
  - Hoehner CM, Barlow CE, Allen P, Schootman M. Commuting distance, cardiorespiratory fitness, and metabolic risk. *Am J Prev Med*. 2012 Jun;42(6):571-8. https://doi.org/10.1016/j.amepre.2012.02.020
  - Oostenbach LH, Lamb KE, Crawford D, Thornton L. Influence of work hours and commute time on food practices: a longitudinal analysis of the Household, Income and Labour Dynamics in Australia Survey. *BMJ Open*. 2022 May 6;12(5):e056212. https://doi.org/10.1136/bmjopen-2021-056212

- **% Affordable Housing/Year Structure Built/% Owner Occupied Housing**
  - Mosley-Johnson E, Walker RJ, Thakkar M, Campbell JA, Hawks L, Pyzyk S, Egede LE. Relationship between housing insecurity, diabetes processes of care, and self-care behaviors. *BMC Health Serv Res*. 2022 Jan 13;22(1):61. https://doi.org/10.1186/s12913-022-07468-7.
  - Fenelon A, Lipska KJ, Denary W, Blankenship KM, Schlesinger P, Esserman D, Keene DE. Association Between Rental Assistance Programs and Hemoglobin A1c Levels Among US Adults. *JAMA Netw Open*. 2022 Jul 1;5(7):e2222385. https://doi.org/10.1001/jamanetworkopen.2022.22385.
  - Seth A. Berkowitz, Sara Kalkhoran, Samuel T. Edwards, Utibe R. Essien, Travis P. Baggett; Unstable Housing and Diabetes-Related Emergency Department Visits and Hospitalization: A Nationally Representative Study of Safety-Net Clinic Patients. *Diabetes Care* 1 May 2018; 41 (5): 933–939. https://doi.org/10.2337/dc17-1812.

Economic & Work Environment

- **% Graduated High School**
  - Agardh E, Allebeck P, Hallqvist J, Moradi T, Sidorchuk A. Type 2 diabetes incidence and socio-economic position: a systematic review and meta-analysis. *Int J Epidemiol*. 2011 Jun;40(3):804-18. https://doi.org/10.1093/ije/dyr029/.
  - Felicia Hill-Briggs, Nancy E. Adler, Seth A. Berkowitz, Marshall H. Chin, Tiffany L. Gary-Webb, Ana Navas-Acien, Pamela L. Thornton, Debra Haire-Joshu; Social Determinants of Health and Diabetes: A Scientific Review. *Diabetes Care* 1 January 2021; 44 (1): 258–279. https://doi.org/10.2337/dci20-0053.

- **% Employed**
  - Ferrie JE, Virtanen M, Jokela M, Madsen IEH, Heikkilä K, Alfredsson L, Batty GD, Bjorner JB, Borritz M, Burr H, Dragano N, Elovainio M, Fransson EI, Knutsson A, Koskenvuo M, Koskinen A, Kouvonen A, Kumari M, Nielsen ML, Nordin M, Oksanen T, Pahkin K, Pejtersen JH, Pentti J, Salo P, Shipley MJ, Suominen SB, Tabák A, Theorell T, Väänänen A, Vahtera J, Westerholm PJM, Westerlund H, Rugulies R, Nyberg ST, Kivimäki M; IPD-Work Consortium. Job insecurity and risk of diabetes: a meta-analysis of individual participant data. *CMAJ*. 2016 Dec 6;188(17-18):E447-E455. https://doi.org/10.1503/cmaj.150942.
  - Rautio N, Varanka-Ruuska T, Vaaramo E, Palaniswamy S, Nedelec R, Miettunen J, Karppinen J, Auvinen J, Järvelin MR, Keinänen-Kiukaanniemi S, Sebert S, Ala-Mursula L. Accumulated exposure to unemployment is related to impaired glucose metabolism in middle-aged men: A follow-up of the Northern Finland Birth Cohort 1966. Prim Care Diabetes. 2017 Aug;11(4):365-372. https://doi.org/10.1016/j.pcd.2017.03.010.

References

- **Household Income**
  - Felicia Hill-Briggs, Nancy E. Adler, Seth A. Berkowitz, Marshall H. Chin, Tiffany L. Gary-Webb, Ana Navas-Acien, Pamela L. Thornton, Debra Haire-Joshu; Social Determinants of Health and Diabetes: A Scientific Review. *Diabetes Care* 1 January 2021; 44 (1): 258–279. https://doi.org/10.2337/dci20-0053.

- **% Above Poverty Level**
  - Houle J, LauzierJobin F, Beaulieu M-D, et al. Socioeconomic status and glycemic control in adult patients with type 2 diabetes: a mediation analysis. *BMJ Open Diabetes Research and Care* 2016;4:e000184. https://doi.org/10.1136/bmjdrc-2015-000184.
  - Felicia Hill-Briggs, Nancy E. Adler, Seth A. Berkowitz, Marshall H. Chin, Tiffany L. Gary-Webb, Ana Navas-Acien, Pamela L. Thornton, Debra Haire-Joshu; Social Determinants of Health and Diabetes: A Scientific Review. *Diabetes Care* 1 January 2021; 44 (1): 258–279. https://doi.org/10.2337/dci20-0053.

- **% of Children Above Poverty Level**
  - McGavock J, Wicklow B, Dart AB. Type 2 diabetes in youth is a disease of poverty. *Lancet*. 2017 Oct 21;390(10105):1829. https://doi.org/10.1016/S0140-6736(17)32461-3.
  - Barton AW, Yu T, Gong Q, Miller GE, Chen E, Brody GH. Childhood poverty, immune cell aging, and African Americans' insulin resistance: A prospective study. *Child Dev*. 2022 Sep;93(5):1616-1624. https://doi.org/10.1111/cdev.13795.
  - Halipchuk J, Temple B, Dart A, Martin D, Sellers EAC. Prenatal, Obstetric and Perinatal Factors Associated With the Development of Childhood-Onset Type 2 Diabetes. *Can J Diabetes*. 2018 Feb;42(1):71-77. https://doi.org/10.1016/j.jcjd.2017.04.003.

Service Environment

- **% With Health Insurance**
  - Bailey SR, O'Malley JP, Gold R, Heintzman J, Likumahuwa S, DeVoe JE. Diabetes care quality is highly correlated with patient panel characteristics. *J Am Board Fam Med*. 2013 Nov-Dec;26(6):669-79. https://doi.org/10.3122/jabfm.2013.06.130018.

- **% With Employer-Based Health Insurance**
  - Mahoney S, Bradley A, Pitts L, Waletzko S, Robinson-Lane SG, Fairchild T, Terbizan DJ, McGrath R. Health Insurance Is Associated with Decreased Odds for Undiagnosed Prediabetes and Type 2 Diabetes in American Adults. *Int J Environ Res Public Health*. 2020 Jun 30;17(13):4706. https://doi.org/10.3390/ijerph17134706.
  - Lee SH, Brown SL, Bennett AA. The relationship between insurance and health outcomes of diabetes mellitus patients in Maryland: a retrospective archival record study. *BMC Health Serv Res*. 2021 May 24;21(1):495. https://doi.org/10.1186/s12913-021-06534-w.

- **% with Internet Coverage**
  - Eberle C, Stichling S. Clinical Improvements by Telemedicine Interventions Managing Type 1 and Type 2 Diabetes: Systematic Meta-review. *J Med Internet Res*. 2021 Feb 19;23(2):e23244. https://doi.org/10.2196/23244.
  - Agarwal, S., Simmonds, I. & Myers, A.K. The Use of Diabetes Technology to Address Inequity in Health Outcomes: Limitations and Opportunities. *Curr Diab Rep* 22, 275–281 (2022). https://doi.org/10.1007/s11892-022-01470-3.
  - Nwolise CH, Carey N, Shawe J. Preconception Care Education for Women With Diabetes: A Systematic Review of Conventional and Digital Health Interventions. *J Med Internet Res*. 2016 Nov 8;18(11):e291. https://doi.org/10.2196/jmir.5615.