



Racial and Socioeconomic Disparities in Pediatric Type 1 Diabetes: Time for a Paradigm Shift in Approach

Terri H. Lipman^{1,2,3} and Colin P. Hawkes^{2,3}

Diabetes Care 2021;44:14–16 | <https://doi.org/10.2337/dci20-0048>

Advancements in diabetes technology have improved quality of life and glycemic control in children with type 1 diabetes. However, a subset of children is being left behind. Those from low-income families and non-Hispanic Black (NHB) children are not experiencing these benefits of technology (1,2) and continue to be at higher risk for complications and adverse outcomes through ongoing poor glycemic control (3). As Addala et al. have demonstrated in a study reported in this issue of *Diabetes Care* (4), this is a serious problem in the U.S., and there has been no sign of improvement in recent years. These data should be a trigger for all of us to reflect on the factors contributing to these disparities and consider our roles in driving meaningful change.

In this study, Addala et al. have compared technology use and socioeconomic status (SES) in children aged <18 years in the Type 1 Diabetes Exchange (T1DX) registry in the U.S. and the Diabetes Prospective Follow-up (Diabetes-Patienten-Verlaufsdokumentation [DPV]) registry in Germany (4). They sought to assess disparities in diabetes outcomes in technology use and glycemic control in both populations in 2010–2012 and 2016–2018 and have shone a light on a major problem. As expected, both registries demonstrated an overall increase in technology use over an 8-year period, but the

differences between those in the highest and lowest SES categories across both populations highlight the magnitude of disparities in the U.S. In 2016–2018, there was a much larger gap between those of higher and lower SES in the U.S. in comparison with Germany for insulin pump use (39% vs. <6%), continuous glucose monitor use (37.3% vs. 8.6%), and hemoglobin A_{1c} (HbA_{1c}) (1.3% vs. 0.3%). Of particular concern is the almost identical disparity seen in the U.S. in 2010–2012 of 42% for insulin pump use and 1.2% for HbA_{1c}. As the rate of continuous glucose monitor use has increased exponentially over the same time frame, the disparity has widened from 8% to 37.3%, highlighting that the introduction of new technology has the potential to add an additional disparity for children with type 1 diabetes. This is likely to continue unless the underlying etiologies of these disparities are addressed.

Through analyzing two large population registries, Addala et al. describe diabetes management and outcomes and provide a temporal context to assess progress in mitigating disparities. There are challenges in comparing the two populations given that the DPV is an inclusive population-based registry whereas the T1DX includes registry data from recruited subjects, an approach that may

introduce selection bias to disparity analysis. Furthermore, SES was defined differently for the two registries, and this may have complicated comparisons between populations. Despite these limitations, there is little doubt that the disparities described in the U.S. are much wider than in Germany and are not improving.

Although the disparities highlighted in this article are not surprising, they clearly demonstrate that much work is required to address the factors that impede diabetes care and outcomes in marginalized children in the U.S. Measures of social determinants of health (SDOH) are associated with suboptimal glycemic control in children with type 1 diabetes (5). Despite this, clinical centers in the U.S. often do not incorporate screening for SDOH into routine diabetes care (6). In the absence of routine SDOH screening, we are often unaware of the challenges faced by many of our families. In 2018, more than 11 million children in the U.S. lived in households with food insecurity (7). The need to cope with poor access to food or with housing insecurity understandably takes priority over intensive diabetes management or attending frequent outpatient appointments (Fig. 1). Interventions focused on diabetes education, without screening for and addressing SDOH, have not improved diabetes control

¹University of Pennsylvania School of Nursing, Philadelphia, PA

²Division of Endocrinology and Diabetes, Children's Hospital of Philadelphia, Philadelphia, PA

³Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA

Corresponding author: Terri H. Lipman, lipman@upenn.edu

© 2020 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. More information is available at <https://www.diabetesjournals.org/content/license>.

See accompanying article, p. 133.

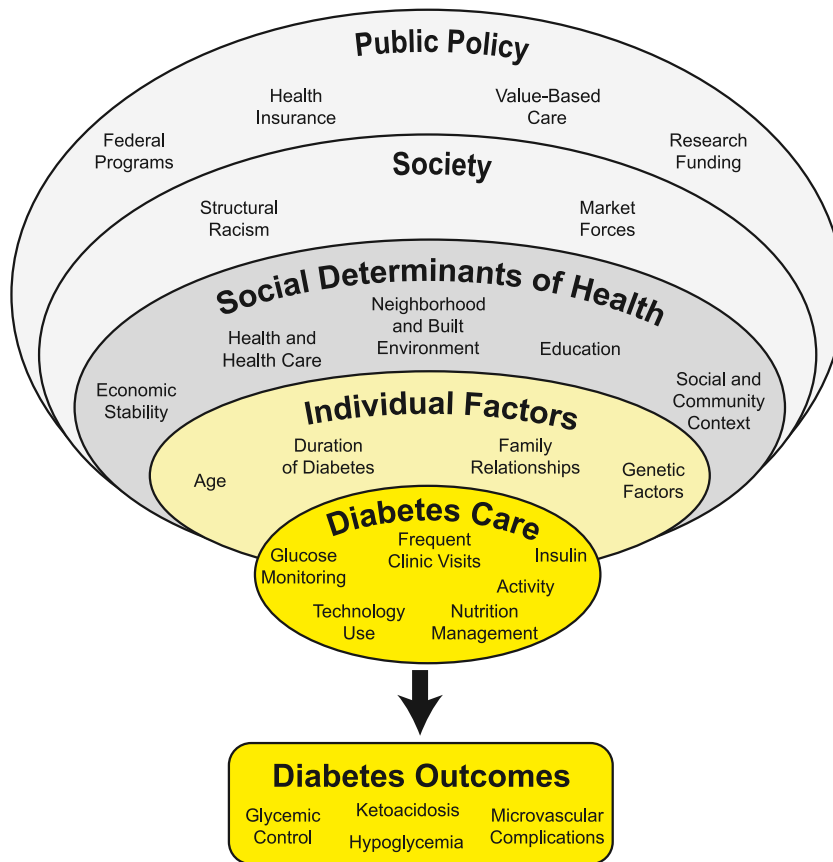


Figure 1—The standard approach to caring for children with type 1 diabetes is focused on individual factors, components of diabetes care, and outcomes (highlighted in yellow). Key factors contributing to patient outcomes are often unknown or unaddressed (highlighted in gray). To address the disparities in outcomes, an approach to screening for, and addressing, these factors is needed.

in marginalized patients (8). As a comparison, routine depression screening has been adopted in children with type 1 diabetes and increased the rate of referral to mental health services (9–11). A similar approach to SDOH screening is needed and would represent a necessary paradigm shift in our care for vulnerable children with type 1 diabetes.

In the absence of a structured approach to screening for, and addressing, SDOH, health systems are reliant on health care professionals (e.g., physicians, nurses, dietitians, social workers) attending to community needs outside of their scope of practice and influence. In fact, we often do not understand the SDOH barriers to appointment attendance or disease management. Clearly, this model is inefficient, and a major change is required to empower marginalized populations to achieve optimal outcomes. Community-based interventions, including the integration of community health workers (12), may be more

effective in addressing these challenges. Although studies are required to demonstrate the efficacy of these interventions in improving outcomes in type 1 diabetes, there are data to suggest that a community-based approach will be more effective than the current hospital-based and education-focused model of care. A previous randomized controlled study including 171 children aged 10–15 years with type 1 diabetes focused on “care ambassadors” assisting patients with appointment scheduling and attendance, as well as providing very basic support for diabetes care (13). Attendance at routine clinic visits increased by 50%, and there were 40% fewer hospitalizations and emergency department visits (13).

Racism is an SDOH (14) that has a profound impact on the health status of children (15). Given the long history of structural racism in the U.S. (16) and the racial disparities that have been demonstrated in children with diabetes (1), how does racism explain disparate diabetes

care? Insofar as SES and race are inextricably linked and NHB children are overrepresented in lower SES groups, it is often proposed that disparities in diabetes care are not due to racism but to decision-making based on parental income and education. However, data have demonstrated that racial disparities persist when controlling for socioeconomic factors. Results from the T1DX showed that 68% of White children whose parents had college or graduate degrees were treated with an insulin pump compared with 34% of NHB children whose parents had college or graduate school degrees (1). When using type of insurance as a proxy for SES, non-Hispanic White children with government insurance were 1.4 to 1.7 times more likely than NHB children with commercial insurance to be prescribed insulin pumps from 2011 to 2019 (2). Thus, the NHB child of lower SES is at particularly high risk, and, alarmingly, the risk for diabetes mortality is twice as high in this group (17).

There is no doubt that in the U.S. there are racial disparities in health care across the socioeconomic spectrum. When the U.S. system is compared with other health care systems, and over time, the size and recalcitrant nature of the problem is highlighted. In fact, if left unaddressed, the gap is likely to grow as technological advances continue to be unevenly distributed in favor of the non-Hispanic White child from a higher-income family. The question is whether we as a diabetes care team are ready to stop blaming patients (“noncompliance” with medications, unhealthy lifestyle, poor appointment attendance, etc.) and to start looking at solving the inequities of our current model of care.

It is critical for us to recognize the impact of socioeconomic disparities and structural racism on health care in general, and specifically on children with diabetes. Examining how we are complicit in the process that causes health inequities is painful but necessary. Are we prepared to examine our own biases? What can we do to change societal inequities that are all-encompassing? What resources must we provide to support diabetes technology provision for underresourced children? The American Academy of Pediatrics issued a policy statement advocating for innovative cross-sector partnerships designed to improve

medical, economic, environmental, housing, judicial, and educational equity (14). Aligning diabetes care with this mission is our only hope of eradicating disparities in treatment and outcomes of children with type 1 diabetes.

Duality of Interest. No potential conflicts of interest relevant to this article were reported.

References

- Willi SM, Miller KM, DiMeglio LA, et al.; T1D Exchange Clinic Network. Racial-ethnic disparities in management and outcomes among children with type 1 diabetes. *Pediatrics* 2015;135:424–434
- Lipman TH, Willi SM, Lai CW, Smith JA, Patil O, Hawkes CP. Insulin pump use in children with type 1 diabetes: over a decade of disparities. *J Pediatr Nurs* 2020;55:110–115
- Hamman RF, Bell RA, Dabelea D, et al.; SEARCH for Diabetes in Youth Study Group. The SEARCH for Diabetes in Youth study: rationale, findings, and future directions. *Diabetes Care* 2014;37:3336–3344
- Addala A, Auzanneau M, Miller K, et al. A decade of disparities in diabetes technology use and HbA_{1c} in pediatric type 1 diabetes: a transatlantic comparison. *Diabetes Care* 2021;44:133–140
- Zuijdewijk CS, Cuerden M, Mahmud FH. Social determinants of health on glycemic control in pediatric type 1 diabetes. *J Pediatr* 2013;162:730–735
- American Diabetes Association. 13. Children and adolescents: *Standards of Medical Care in Diabetes—2019*. *Diabetes Care* 2019;42(Suppl. 1):S148–S164
- Save the Children. *The Land of Inopportunity: Closing the Childhood Equity Gap for America's Kids. U.S. Complement to the Global Childhood Report*. Fairfield, CT, Save the Children Federation Inc., 2020
- Hawkes CP, Willi SM, Murphy KM. A structured 1-year education program for children with newly diagnosed type 1 diabetes improves early glycemic control. *Pediatr Diabetes* 2019;20:460–467
- Corathers SD, Kichler J, Jones NH, et al. Improving depression screening for adolescents with type 1 diabetes. *Pediatrics* 2013;132:e1395–e1402
- Gettings JM, Willi SM, Forth E, Hawkes CP. Integrating the Patient Health Questionnaire-2 depression screening tool into the paediatric diabetes clinic. *Diabet Med* 2019;36:1718–1719
- Wolfram P, Zhang L, Simpson P, Fiallo-Scharer R. Clinical associations of quarterly Patient Health Questionnaire-9 depression screening results in adolescents with type 1 diabetes. *Pediatr Diabetes* 2020;21:871–877
- Lipman TH, Smith JA, Hawkes CP. Community health workers and the care of children with type 1 diabetes. *J Pediatr Nurs* 2019;49:111–112
- Laffel LM, Brackett J, Ho J, Anderson BJ. Changing the process of diabetes care improves metabolic outcomes and reduces hospitalizations. *Qual Manag Health Care* 1998;6:53–62
- Trent M, Dooley DG, Douge J; Section On Adolescent Health; Council On Community Pediatrics; Committee On Adolescence. The impact of racism on child and adolescent health. *Pediatrics* 2019;144:e20191765
- Pachter LM, Coll CG. Racism and child health: a review of the literature and future directions. *J Dev Behav Pediatr* 2009;30:255–263
- Bailey ZD, Krieger N, Agénor M, Graves J, Linos N, Bassett MT. Structural racism and health inequities in the USA: evidence and interventions. *Lancet* 2017;389:1453–1463
- Saydah S, Imperatore G, Cheng Y, Geiss LS, Albright A. Disparities in diabetes deaths among children and adolescents—United States, 2000–2014. *MMWR Morb Mortal Wkly Rep* 2017;66:502–505