



Diabetes and Prediabetes Prevalence by Race and Ethnicity Among People With Severe Mental Illness

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People with severe mental illnesses (SMI) such as schizophrenia and bipolar disorder have an increased risk for diabetes (1), in part due to treatment with both first- and second-generation antipsychotics (2). A large systematic review estimated that 15% of people with SMI have type 2 diabetes, a prevalence double that of age-matched samples from the general population during the same time period (1). Preliminary evidence suggests that racial/ethnic minorities with SMI may be at especially high risk for diabetes compared with whites; unfortunately, similar data regarding prevalence of prediabetes is more limited (2). Understanding of the prevalence of prediabetes and diabetes in a large, racially and ethnically diverse and representative sample is an important first step in reducing diabetes prevalence and related adverse outcomes in this particularly vulnerable population. In this study, we estimate diabetes and prediabetes prevalence among antipsychotic-treated patients within an integrated health care system and determine whether racial/ethnic differences exist.

In this retrospective cohort study of adults with SMI in Kaiser Permanente Northern California (KPNC), our primary outcome was evidence of diabetes. The

cohort used for this study has been previously described (3). To estimate diabetes prevalence, the primary outcome measure was inclusion in the KPNC diabetes registry at any time before 31 December 2014 (4). To estimate our secondary outcome, prediabetes prevalence, we first excluded people who were in the KPNC diabetes registry before 31 December 2015 and then assessed laboratory evidence of prediabetes (glycated hemoglobin [HbA_{1c}] between 5.7 and 6.4% or fasting plasma glucose between 100 and 125 mg/dL as described previously [5]). Since diabetes screening rates are higher over a 2-year period in this cohort (3), we examined laboratory evidence of prediabetes between 1 January 2014 and 31 December 2015.

To determine the completeness of our data and ensure that laboratory results were not being missed, we searched claims data for evidence of external diabetes screening and found that less than 0.4% of laboratory tests were performed outside of KPNC. We also collected additional demographic, diagnostic, medication, and health care utilization data. Poisson models were used to evaluate differences in prevalence by age and race/ethnicity, weighting samples to the age, sex, and race distribution of the U.S. in 2014.

The overall unadjusted diabetes prevalence was 17.3% (4,399/25,422) in the complete sample and 28.1% (4,399/15,629) among those screened. Diabetes prevalence among those screened was higher among racial/ethnic minorities with SMI than among whites with SMI (black 36.3%, Asian Pacific Islander 30.7%, Hispanic 36.9%, white 25.1%; $P < 0.0001$), with disparities emerging at early ages (Fig. 1). For example, compared with whites, diabetes prevalence was higher among Hispanics by age 20 years ($P = 0.018$) and among blacks ($P = 0.037$) and Asians ($P = 0.031$) by age 30 years. Overall unadjusted prediabetes prevalence was 33.0% (6,815/20,658) in the complete sample and 46.9% (6,815/14,536) among those screened. Prediabetes prevalence among those screened was higher among racial/ethnic minorities, with differences evident by age 20 years (Asians, $P = 0.032$; blacks, $P = 0.0003$; Hispanics, $P = 0.013$) (figure available upon request). Participants self-reporting current smoking had higher prevalence of both diabetes (19% vs. 16%, $P < 0.0001$) and prediabetes (34% vs. 32%, $P < 0.0001$) compared with nonsmokers with SMI. Additional tables examining diabetes and prediabetes prevalence among subsamples differing by

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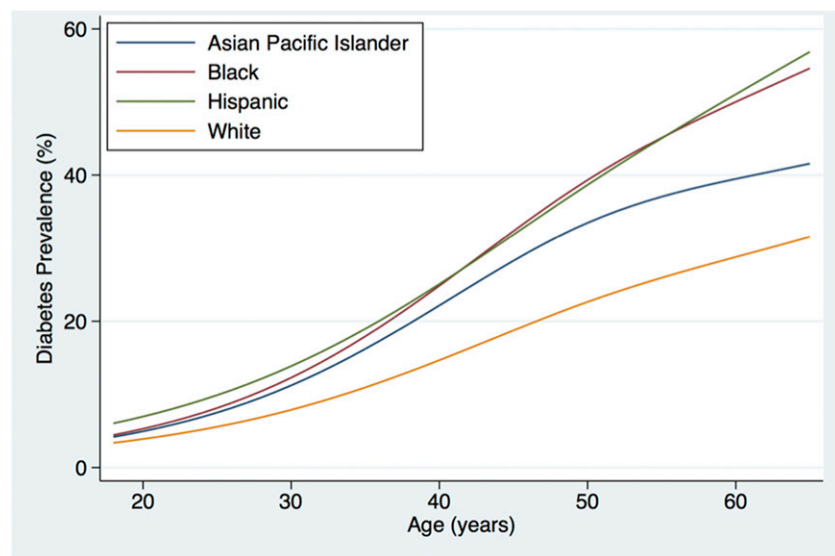


Figure 1—Diabetes prevalence among screened patients with SMI.

demographic characteristics, clinical characteristics, and health care utilization are available upon request.

In summary, this is the first large cohort study examining laboratory-confirmed diabetes and prediabetes prevalence in a racially and ethnically diverse sample of antipsychotic-treated patients with SMI. Our lower (17.3%) and upper (28.1%) bound estimates of diabetes prevalence in antipsychotic-treated patients with SMI were both substantially higher than the rates in the KPNC general population (8.0%) and the U.S. adult population (12.2%) in 2015. Our upper bound estimate of the prevalence of prediabetes in the target population was also higher than in the general U.S. population (46.9% vs. 33.9%). Diabetes and prediabetes prevalence in this antipsychotic-treated SMI population was also higher among racial and ethnic minorities compared with whites, with differences appearing as early as age 20 years. This increased risk of glucose dysregulation in young adults with SMI has been supported by other recent work. Finally, people with SMI with smoking

history were more likely to have diabetes and prediabetes than nonsmokers with SMI. The major limitation of this study is that documented low diabetes screening rates made defining exact prevalence challenging (3). Future research should identify multilevel innovations to improve diabetes screening and treatment. Given the value of prevention and treatment for diabetes, these results suggest that health care systems should implement diabetes prevention strategies that target antipsychotic-treated SMI populations early in their disease course, with a special emphasis on minorities and smokers.

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Author Contributions. C.V.M. oversaw the project, conceived of the study question, analyzed data, and wrote and edited the manuscript. D.S., J.W.N., and S.M.E. analyzed data and edited the manuscript. E.V. oversaw statistical analysis and edited the manuscript. Z.Z. and W.T.D. collected and analyzed data and edited the manuscript. J.A.S. oversaw all collection and data analysis and edited the manuscript. C.V.M. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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