

HIV and Diabetes Mellitus

2015-2020 Prevalence in California

The Medical Monitoring Project

- MMP is a surveillance activity funded by the Centers for Disease Control and Prevention and implemented by state and local health departments. It collects behavioral and medical data from interviews and chart abstractions for PLWDH in the United States.
- From 2015 to 2020, MMP interviewed and performed medical record abstractions for 3,275 adults living with HIV in California. Their responses reflect their experiences during the 12 months before their interview, unless otherwise noted, and medical records reflect medical care two years prior to the interview date.

Treatment and Care

Comorbidities can increase challenged related to disease management for PLWDH.

- With multiple medical diagnoses or conditions, pill burden increases and medication management can become more difficult.⁴
- After a diabetes diagnosis, additional considerations for HIV medication, diabetes medication, and integrated care are needed.⁵
- Social support and assistance for coping with multiple chronic conditions should also be considered.⁶



Diabetes Prevalence

- **1 in 10 PLWDH in California receiving HIV care between 2015 and 2020 had diabetes in their medical record.**
- This prevalence, 10%, is similar to the prevalence of diabetes among the general adult population. In 2017, 10.5% of adults in California had diagnosed diabetes¹ and in 2018, 10.2% of US adults had diagnosed diabetes.²
- Overall, 12.6% of adults receiving HIV care in the US have diagnosed diabetes based on the national MMP data from the 2016, 2017, and 2018 survey cycles.³

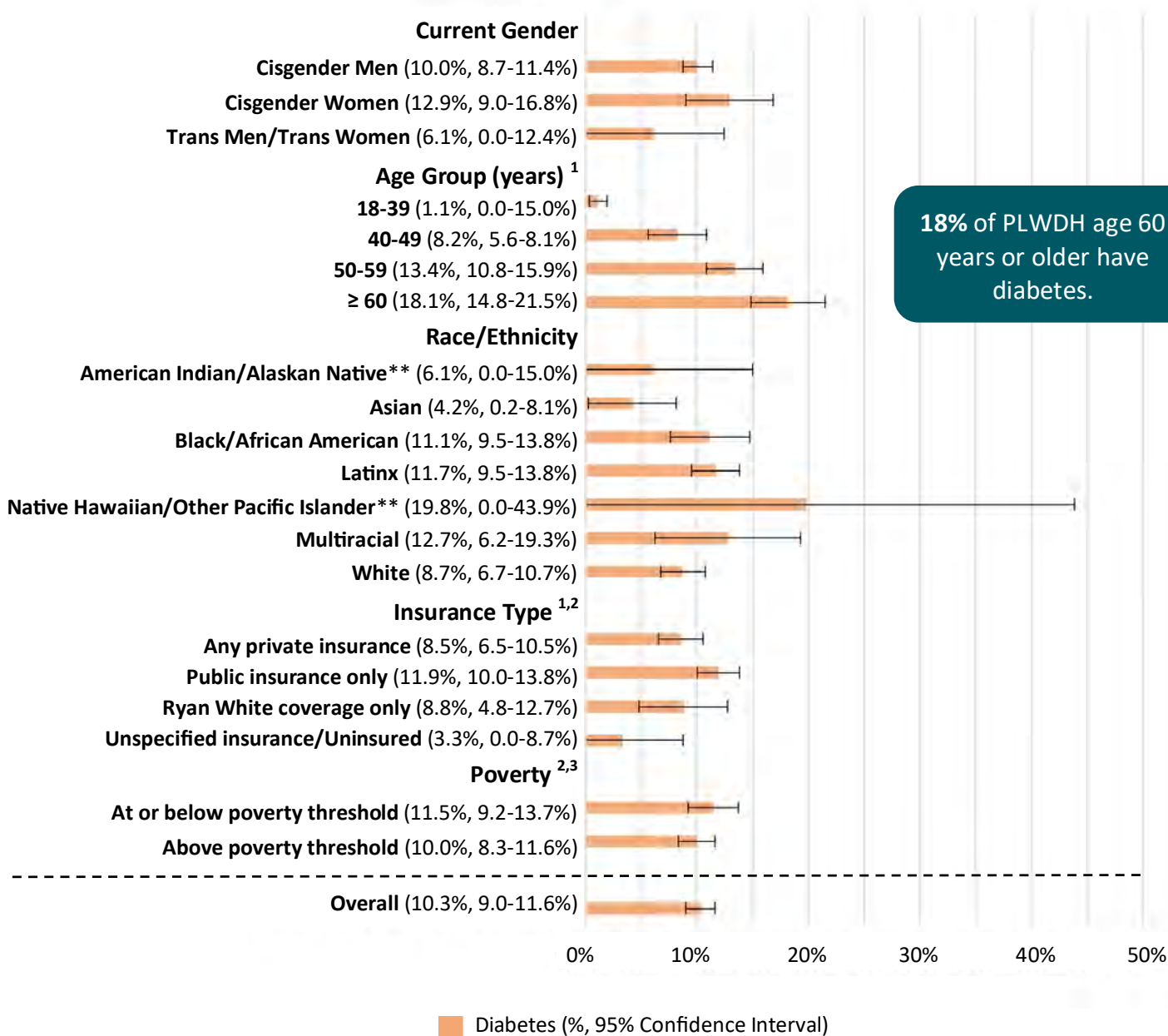
Health Effects

Living with both HIV and diabetes may increase risk for other undesirable health outcomes.

- Individually, HIV and diabetes both increase risk of cardiovascular disease,^{4, 7} and together HIV and diabetes may result in an even greater increase in risk of poor cardiovascular health.^{8, 9}
- Living with both HIV and diabetes also increases risk of kidney disease.^{7, 9, 10}
- A large cohort study of adults living with HIV in the United States examined survival rates between PLWDH, PLWDH with diabetes, and PLWDH with diabetes and chronic kidney disease (CKD). They found that mortality increased almost three times for PLWDH with diabetes and increased roughly 10 times in PLWH with diabetes and CKD compared with PLWH only.¹¹

The following tables provide the weighted* prevalence and 95% confidence intervals of diagnosed diabetes among PLWDH in California by demographic and clinical characteristics.

Diabetes Mellitus Prevalence in PLWDH Stratified by Demographic Characteristics

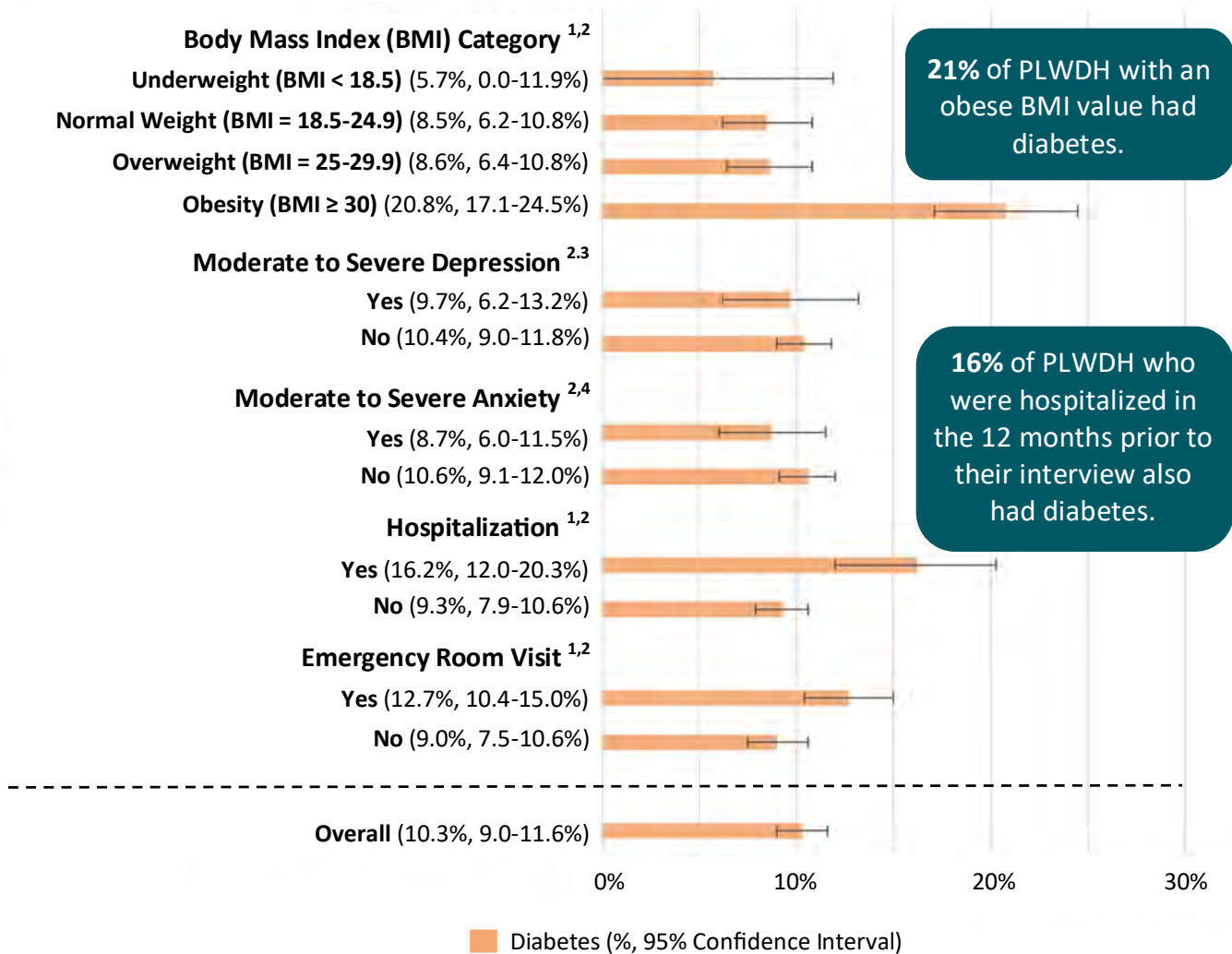


18% of PLWDH age 60 years or older have diabetes.

Note: *Percentages are weighted values, non-response weights and post-stratification weights for sex at birth, age at interview, and race/ethnicity were applied; Characteristic categories underwent Rao-Scott chi-square tests, which are design-adjusted and use weighted values; Diabetes mellitus status was collected through medical record abstraction data.

¹Chi-square *p*-value < 0.05, significant difference in percentage of diabetes mellitus between categories; ²Observations were incomplete for characteristic; ³Poverty was based on yearly income, number of household dependents, and federal poverty level for the year the survey participant was interviewed; ** = less than 5 observations for diabetes in record category.

Diabetes Mellitus Prevalence in PLWDH Stratified by Clinical Characteristics



21% of PLWDH with an obese BMI value had diabetes.

16% of PLWDH who were hospitalized in the 12 months prior to their interview also had diabetes.

Note: Percentages are weighted values, non-response weights and post-stratification weights for sex at birth, age at interview, and race/ethnicity were applied; Characteristic categories underwent Rao-Scott chi-square tests, which are design-adjusted and use weighted values; Diabetes mellitus status was collected through medical record abstraction data.

¹Chi-square p -value < 0.05, significant difference in percentage of diabetes mellitus between categories; ²Observations were incomplete for characteristic; ³Anxiety was determined using responses to the Generalized Anxiety Disorder 7-item scale (GAD-7), a score ≥ 10 = moderate/severe anxiety; ⁴Depression was determined using responses to the Patient Health Questionnaire 8-item scale (PHQ-8), a score ≥ 10 = moderate/severe depression.

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Diabetes Management

For PLWDH with diabetes, it's important to control diabetes symptoms and maintain stable blood glucose. Making lifestyle changes related to nutrition and exercise, taking diabetes medications, and regularly monitoring blood sugar and A1C levels are necessary steps to stay healthy.

Diabetes Medication

- The three most commonly prescribed medications for diabetes included:
 - Metformin
 - Insulin
 - Glipizide (Sulfonylureas)
- Few PLWDH and diabetes were taking newer diabetes medications, such as GLP-1 receptor agonists and SGLT2 inhibitors

Diabetes Control

- 60% of PLWDH in CA, who had diabetes in their medical record, had their most recent A1C value under 7%, an indicator of well controlled diabetes.
- The A1C test is an important monitoring test for people with diabetes to determine if their diabetes treatment plan is working.
- The A1C test is also an important screening test for anyone over 45 years of age to help detect diabetes early.

Diabetes Medication Used by PLWDH with Diagnosed Diabetes

Diabetes Medication Group ¹	% ²	95% Confidence Interval ²
Metformin <i>Glucophage, Fortamet, Riomet, Glumetza, Glucovance</i>	57.1	(50.6-63.7)
Sulfonylureas Glyburide (<i>Micronase, Diabeta, Glynase</i>), Glimepiride (<i>Amaryl</i>), Glipizide (<i>Glucotrol, Glucotrol XL</i>)	24.5	(18.8-30.2)
Insulin	23.0	(17.8-28.2)
Thiazolidinediones (TZDs) Pioglitazone (<i>Actos</i>)	6.4	(2.5-10.2)
Dipeptidyl Peptidase-4 (DPP-4) Enzyme Inhibitors Saxagliptin hydrochloride (<i>Onglyza</i>), Sitagliptin (<i>Januvia</i>)	5.9	(2.6-9.1)
Glucagon-Like Peptide 1 (GLP-1) Receptor Agonists Liraglutide (<i>Victoza</i>)	2.2	(0.5-3.8)
SGLT2 Inhibitors Canagliflozin (<i>Invokana</i>)	0.7	(0.0-1.6)
Other Nateglinide (<i>Starlix</i>)	0.4	(0.0-1.0)

¹Medication information was abstracted from medical records; ²Weighted value.

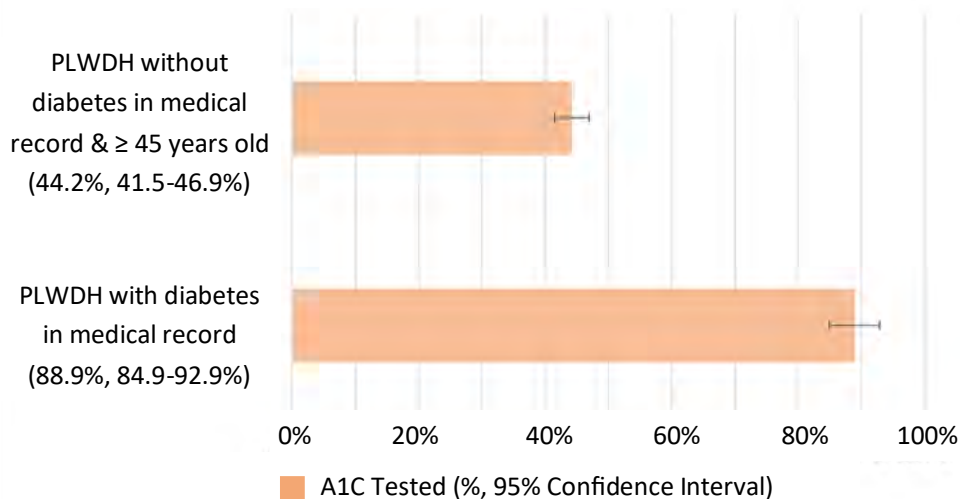
A1C Test for Diabetes Screening and Monitoring

CDC A1C Testing Information: [All About Your A1C \(cdc.gov\)](https://www.cdc.gov/diabetes/data/adult-glycemic-control/)

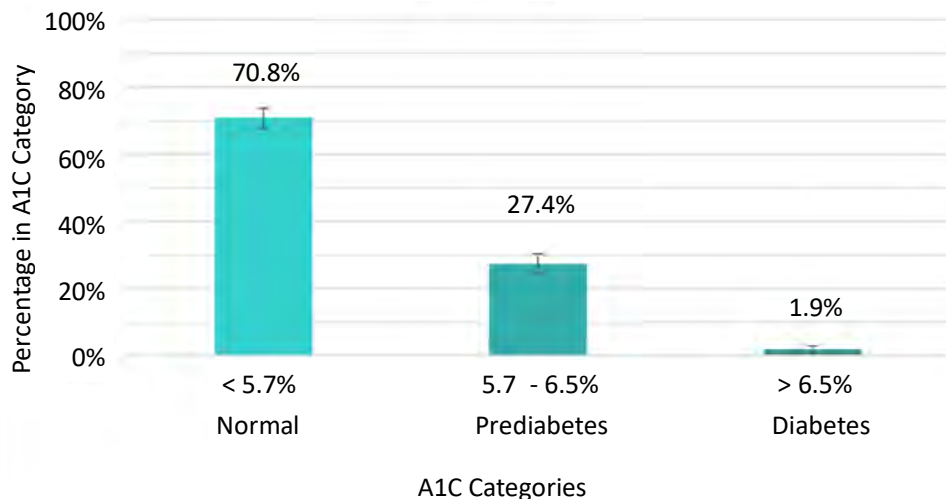
44% of PLWDH without diabetes and 45 years or older had a recorded A1C test in the previous 2 years.

89% of PLWDH with diabetes had a recorded A1C test in the previous 2 years.

Any A1C Test in Past 2 Years



A1C Level for PLWDH without Diabetes



71% of PLWDH without a known diabetes diagnoses who had an A1C test in the previous 2 years, had a **normal A1C level**.

27% had a level considered **pre-diabetes** related.

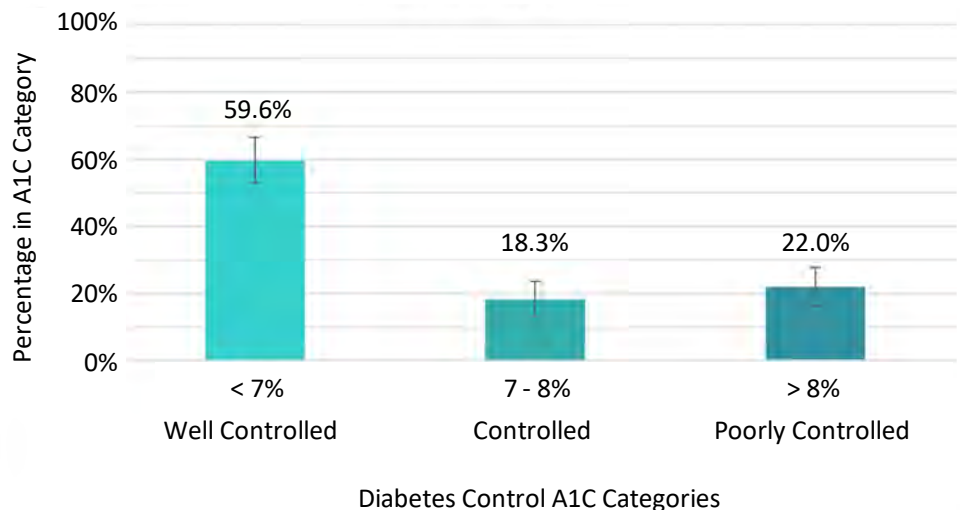
2% had a level considered consistent with **diabetes**.

60% of PLWDH and diabetes had **well controlled diabetes** according to their most recent A1C measurement.

18% had an A1C indicating **controlled diabetes**.

22% had an A1C indicating **poorly controlled diabetes**.

Diabetes Control According to A1C in PLWDH with Diabetes



Technical Notes and References:

Diabetes Mellitus

- An individual was considered to be diagnosed with diabetes if their medical record, including hospitalization records, included a diagnosis of diabetes.
- Any diabetes diagnosis (Type 1, Type 2, and unspecified) was included, as well as the following:
 - Diabetes with any associated condition, long-term insulin use, diverticuli osteopenia, case/care management for diabetes, and steroid induced hyperglycemia and leukocytosis

Statistical Analysis

- Documentation of MMP methods can be found here: [MMP 2018-2020 Protocol](#)
- SAS 9.4 survey procedures were used to find weighted percentages and Rao-Scott modified chi-square test statistics, which provided a design based goodness-of-fit test and used weighted data.
- Non-response weights and post-stratification weights for sex at birth, age at interview, and race/ethnicity were applied to data.
- Survey participants were included if they had both an interview and medical record abstraction.
- 95% confidence interval means the likelihood of the true prevalence falling within the interval is 95%.

References

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CDC MMP: <http://www.cdc.gov/hiv/statistics/systems/mmp/>

Office of AIDS MMP: <https://www.cdph.ca.gov/Programs/CID/DOA/Pages/OAsre.aspx>

