

Diabetes & People Living with Diagnosed HIV in California 2015 - 2020

Diabetes mellitus is a common chronic condition among people living with diagnosed **HIV** (PLWDH). This infographic was derived from analyzing California Medical Monitoring Program data from 2015-2020 to provide an estimated prevalence of diabetes mellitus in PLWDH in California, and to characterize the population in terms of demographics and clinical characteristics.



1 in 10
PLWDH had
diagnosed
diabetes

18%



of PLWDH
aged **60+** have
diagnosed diabetes

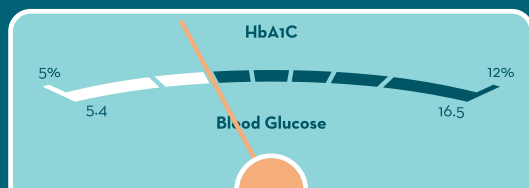


A1C Test
in Previous
2 Years:

89%
of those with
diagnosed
diabetes had
at least one.



Of those
without diagnosed
diabetes,
44%
aged 45+ were
screened with one.



60% of those with diagnosed diabetes had
a most recent **A1C test value less than 7%**
which is an indicator of **well-controlled diabetes**.

Note: The hemoglobin A1C test is a simple blood test that measures a person's average blood sugar levels over the past three months.

Questions?

California Department of Public Health, Office of AIDS
California Medical Monitoring Project
1616 Capitol Avenue, Suite 616 (MS 7700), Sacramento, CA 95814
MMPSurveillance@cdph.ca.gov



HIV and Diabetes Mellitus

2015-2020 Prevalence in California

Executive Summary

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. A representative sample of PLWDH in the United States participate in a survey and medical record abstraction to collect behavioral and medical information, including co-occurring chronic conditions such as diabetes mellitus.

The purpose of this analysis was to provide an estimated prevalence of diabetes mellitus in PLWDH in California and to characterize the population in terms of demographics and clinical characteristics.

Prevalence of Diagnosed Diabetes by Selected Factors

- Of PLWDH in California who received HIV care between 2015 and 2020:
 - 1 in 10 had diagnosed diabetes.
 - 18% of PLWDH age 60 years or older had diabetes.
 - 21% of obese PLWDH, by body mass index [BMI], had diabetes.
 - 16% of PLWDH who were hospitalized and 13% of PLWDH who had an emergency room visit in the 12 months prior to their interview also have diabetes.

Diabetes Medication and Management

- 60% of PLWDH in CA with diabetes had a most recent A1C value less than 7%, an indicator of well controlled diabetes.
- 89% of PLWDH with diabetes had an A1C test performed in the previous 2 years.
- The three most prescribed medications for diabetes were metformin, insulin, and glipizide.

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

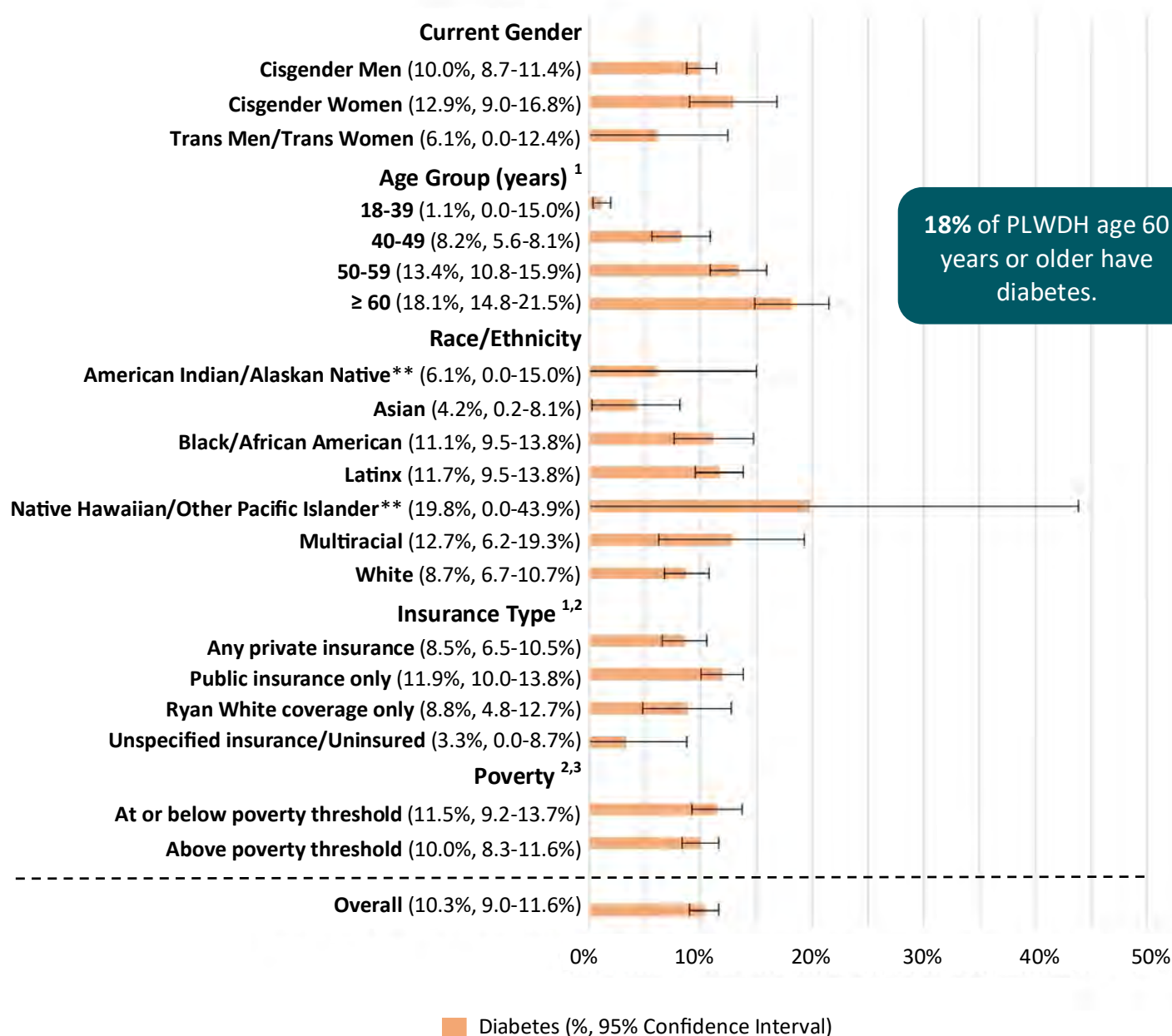
Health Effects

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.

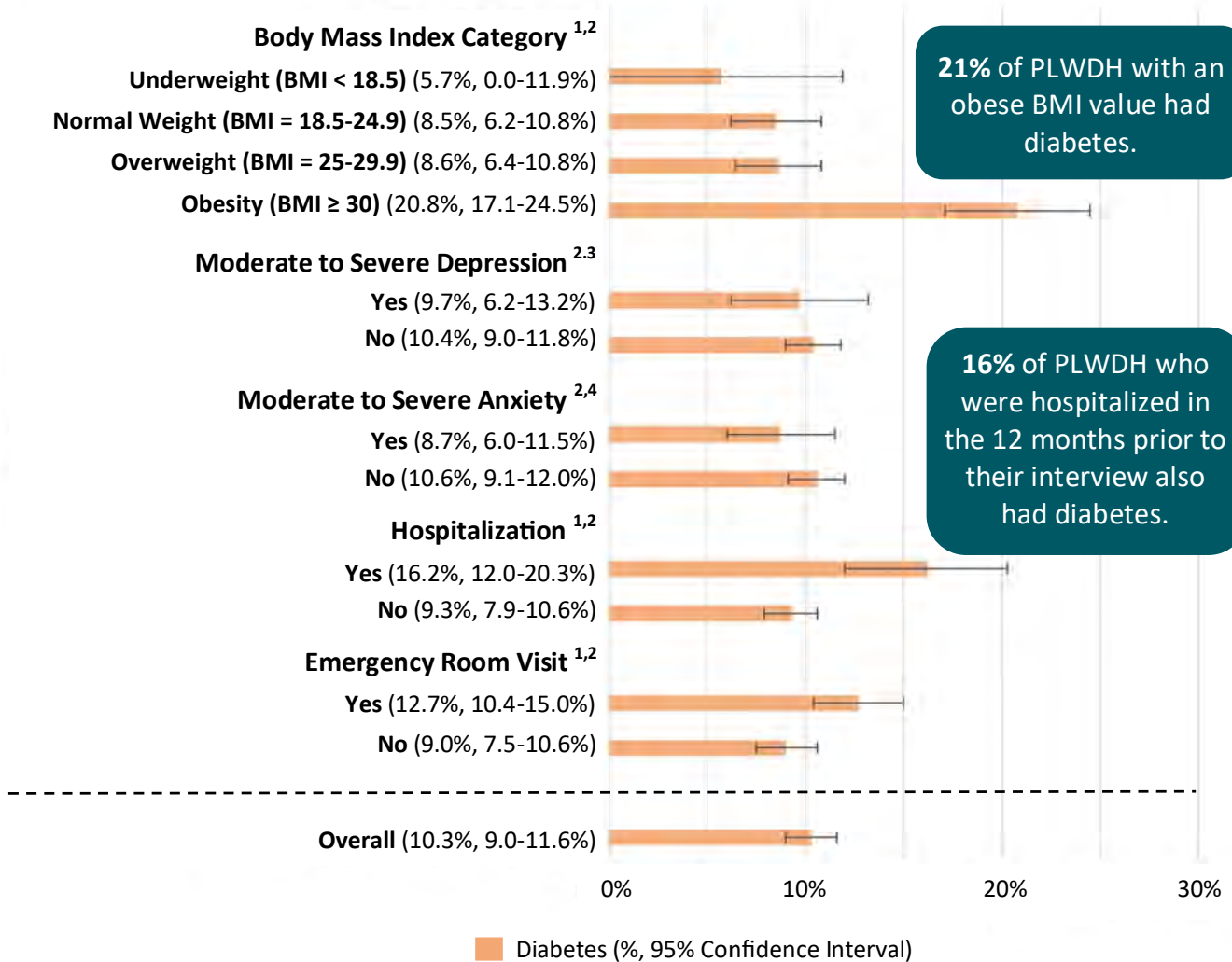
Diabetes Mellitus Prevalence in PLWDH Stratified by Demographic Characteristics



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



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.

HIV and Diabetes Mellitus

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.

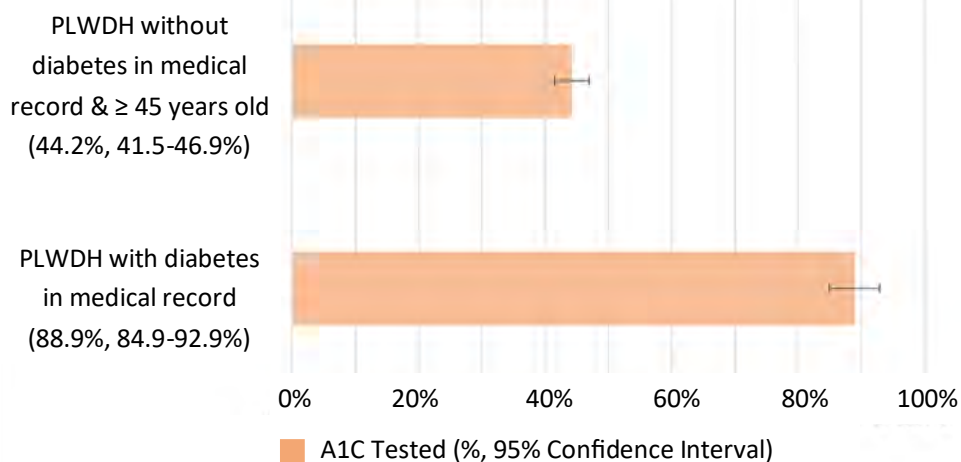
A1C Test for Diabetes Screening and Monitoring

CDC A1C Testing Information: [All About Your A1C \(cdc.gov\)](https://www.cdc.gov/diabetes/data/adult-glycemic-control/a1c.html)

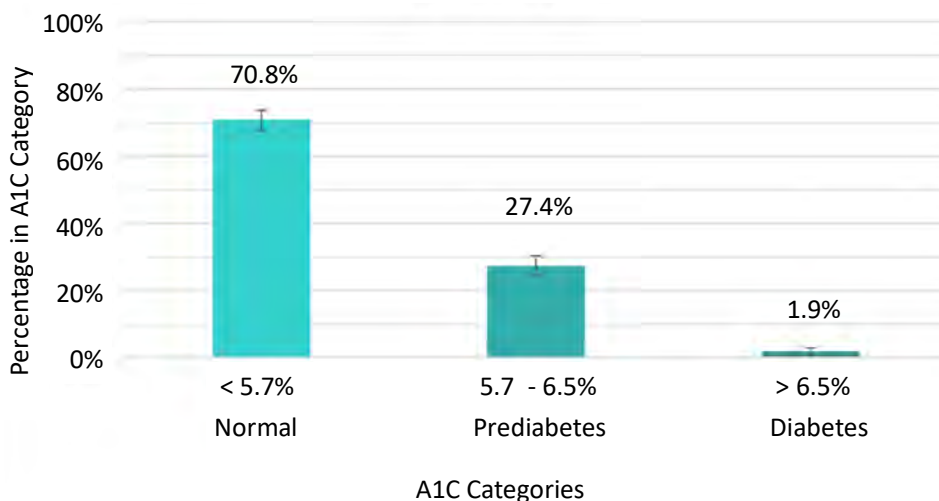
44% of PLWDH without diabetes and 45 years or older had a recorded A1C test in the previous 2 years.

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.

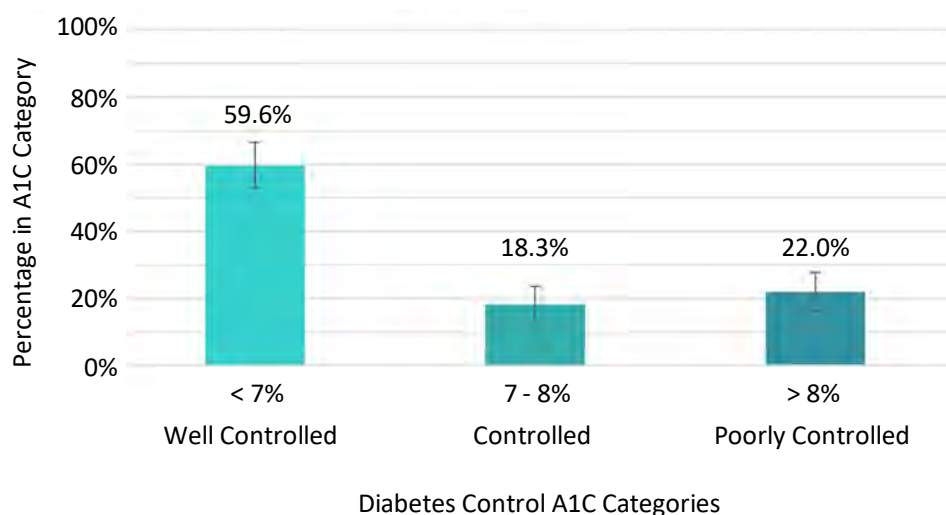
2% had a level considered consistent with diabetes.

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

1. The burden of diabetes in California. American Diabetes Association. Accessed September 2, 2022. https://diabetes.org/sites/default/files/2021-10/ADV_2021_State_Fact_sheets_California.pdf
2. National diabetes statistics report, 2020, Estimates of diabetes and its burden in the United States. Centers for Disease Control and Prevention. Accessed September 2, 2022. <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>
3. Weiser JK, Tie Y, Beer L, Fanfair RN, Shouse RL. Racial/ethnic and income disparities in the prevalence of comorbidities that are associated with risk for severe COVID-19 among adults receiving HIV care, United States, 2014-2019. *J Acquir Immune Defic Syndr*. 2021; 86(3):297-304.
4. Sarkar S, Brown TT. Diabetes in people with HIV. *Curr Diab Rep*. 2022; 21(5):1-13. doi:10.1007/s11892-021-01382-8
5. Monroe AK, Glesby MJ, Brown TT. Diagnosing and managing diabetes in HIV-infected patients: Current concepts. *CID*. 2015; 60(3):453-462. doi: 10.1093/cid/ciu779
6. Kalra S, Kalra B, Agrawal N, Unnikrishnan AG. Understanding diabetes in patients with HIV/AIDS. *Diabetology & Metabolic Syndrome*. 2011; 3(2):1-7.
7. Kamin DS, Grinspoon SK. Cardiovascular disease in HIV-positive patients. *AIDS*. 2005; 19(7):641-652.
8. Kalra S, Agrawal N. Diabetes and HIV Current understanding and future perspectives. *Curr Diab Rep*. 2013; 13:419-427. doi: 10.1007/s11892-013-0369-9
9. Grinspoon S. Diabetes mellitus, cardiovascular risk, and HIV disease. *Circulation*. 2009; 119:770-772. doi: 10.1161/CIRCULATIONAHA.108.835710
10. Medapalli R, Parikh CR, Gordon K. et al. Comorbid diabetes and the risk of progressive chronic kidney disease in HIV-infected adults: Data from the Veterans Aging Cohort Study. *J Acquir Immune Defic Syndr*. 2012; 60(4):393-399. doi:10.1097/QAI.0b013e31825b70d9
11. Park J, Zuñiga JA, Garcia AA. Diabetes negatively impacts the ten-year survival rates of people living with HIV. *Int J STD AIDS*. 2019; 30(10):991-998. doi:10.1177/0956462419857005

Questions? Contact us:

Office of AIDS, California
Department of Public Health
1616 Capitol Avenue, Suite 616
(MS 7700)
Sacramento, CA 95814

Principal Investigator

Neely Kazerouni
MMPSurveillance@cdph.ca.gov

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>

