# Assessing Trends in HbA1c Over 4 Years in Phoenix Metropolitan Area Ethnic Populations

celerion Translating Science to Medicine

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## BACKGROUND

- Recent epidemiology data from Arizona demonstrate that the prevalence of type 2 diabetes is highest among American Indians (AI) (21.2%), Black/African Americans (AA) (17.8%), and Hispanic-Latino (HL) (12.0%) racial and ethnic groups [1].
- In addition, rates of type 2 diabetes, increased from 14.6% in 2016 to 17.5% in 2019 for AA; and from 14.5% in 2016 to 15.2% in 2019 for HL [2].
- Moreover, an alarmingly high rate of Arizonans are at risk of type 2 diabetes as the CDC reported that approximately 2.1 million people in Arizona live with prediabetes yet 1.9 million (90%) are unaware of their prediabetes status [3].
- Therefore, there is an unmet need to educate the public about diabetes and prediabetes as well as inform individuals about their HbA1c values.
- To this end, we attended community-partnered events as part of a diabetes education initiative and used point-ofservice HbA1c testing to increase diabetes awareness.
- The aim of the present study was to evaluate the change in HbA1c over 4 years in different ethnicities in the Greater Phoenix Area.

## **METHODS**

- As part of the awareness initiative we attended 46 Outreach events in the Phoenix Metro area from 2016 2020 (Table 1).
- All participants age 18 and over signed an Institutional Review Board approved waiver.
- Basic demographic data was collected i.e. race/ethnicity and date of birth.
- A hand-held HbA1c monitor (PTS Diagnostics, Indianapolis, IN) was used to collect fingerstick blood samples. The HbA1c monitor has a coefficient of variation of 4.59% and 5.31% for a low and high glycated-hemoglobin control solution (Nova-One Diagnostic, Calabasas, CA, USA) [4].
- HbA1c tests were processed within five minute and the results were reported to the participant. Additionally, supplemental resources regarding diabetes prevention and maintenance were provided to all participants.
- Participants were classified based on their HbA1c ranges [5];
- Normal range: <5.7%</li>
- Prediabetes range: 5.7% 6.4%
- Diabetes range: >6.5%
- Results are presented as mean ± standard deviation (SD) or frequency percent (%), and analyzed by One-Way ANOVA followed by Tukey post-hoc test, as appropriate.

#### Table 1. Phoenix Area Community Events and Participant Characteristics

Year	<b>Events Attended</b>	Participants Screened	Participant Age (Years)	Sex (% F/M)
2016	11	788	49.1±15.4	56/44
2017	11	474	49.6±15.1	66/34
2018	6	287	50.2±16.0	69/31
2019	16	805	48.9±15.0	66/34
2020 <sup>a</sup>	2	213	54.6±12.3	44/56
Total	46	2567	50.5±14.8	60/40

<sup>a</sup> Data collection for 2020 is limited as community events were canceled due to the COVID-19 pandemic.

## **RESULTS**

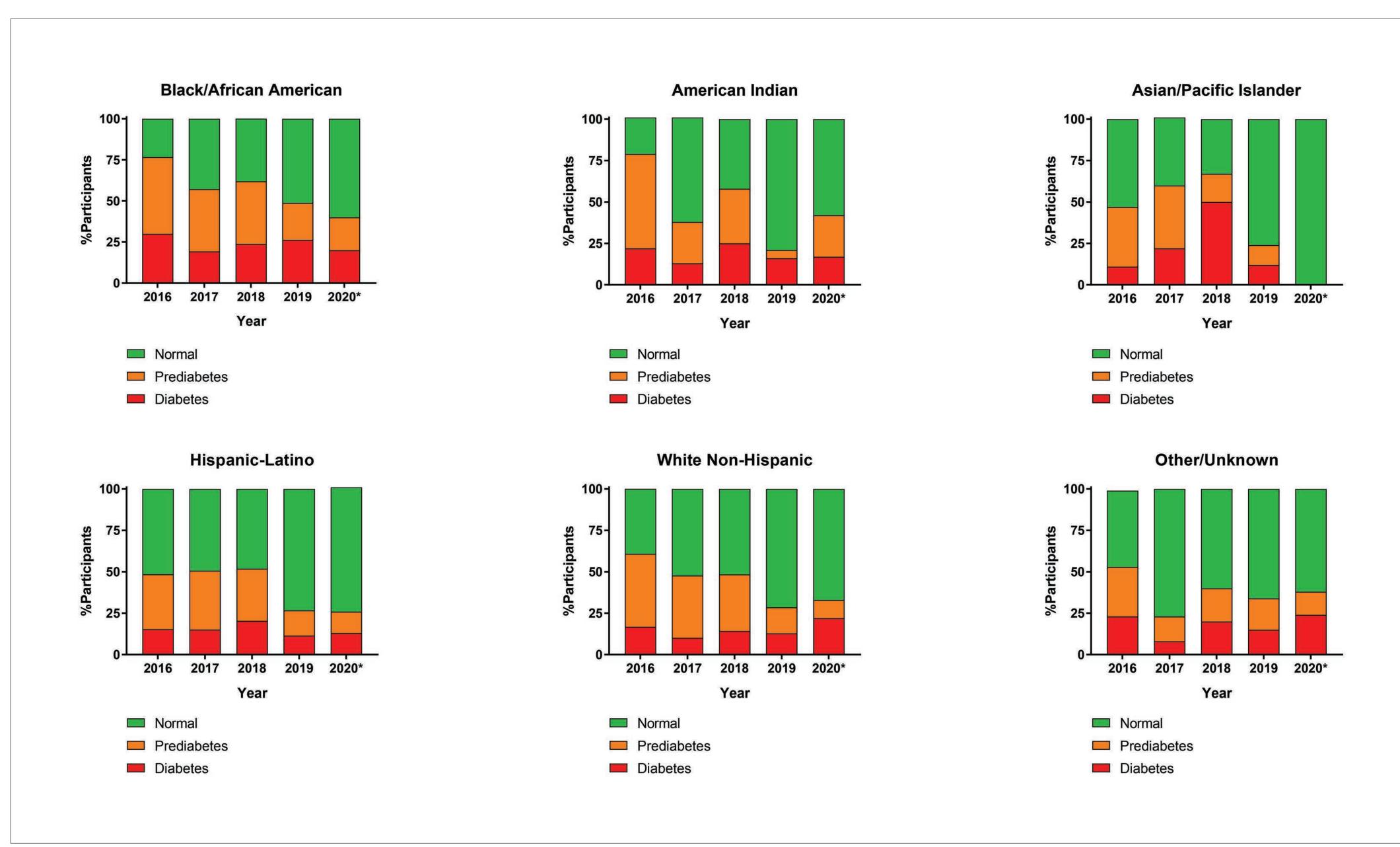
#### Table 2. Mean HbA1c by Race and Ethnicity from 2016 to 2020

Year	AA	Al	API	HL	WNH	Other
2016	6.3±1.1%	6.6±1.7%	5.7±0.8%	6.0±1.4%	6.1±1.4%	6.1±1.1%
	(90)	(23)	(66)	(410)	(143)	(56)
2017	6.0±1.0%	5.8±0.7%	6.2±1.1%	6.0±1.4%	5.8±1.0%	5.5±0.6%
	(145)	(8)	(93)	(146)	(69)	(13)
2018	6.1±1.3%	6.7±2.4%	6.4±1.2%	6.0±1.3%	6.0±1.4%	5.5±0.8%
	(113)	(12)	(12)	(54)	(91)	(5)
2019	6.1±1.4% (186)	5.4±0.8%*, # (19)	5.3±0.7% (17)	5.5±1.4%***, ++ (296)	5.6±1.1%** (234)	5.7±1.2% (53)
2020 <sup>a</sup>	6.0±1.5%	5.8±1.1%	5.1±0.1%	5.5±1.2%	5.7±1.4%	6.0±1.6%
	(55)	(12)	(2)	(32)	(91)	(21)

the COVID-19 pandemic. AA, African American/Black; AI, American Indian; API, American Pacific Islander; HL, Hispanic-Latino; WNH, White Non-Hispanic; Other = No data recorded and unknown.

- Overall, mean HbA1c fell within diabetes and prediabetes ranges for nearly all ethnicities except for HL and API, whose means were within the normal range in 2019 and 2020.
- The AA group consistently remained in the prediabetes range, while HL and White Non-Hispanic (WNH) had a decrease in mean HbA1c over time.
- The Al group showed a significant decrease from a diabetes range in 2016 to the range of prediabetes in 2019, however a small year-to-year increase in HbA1c was observed in 2018.

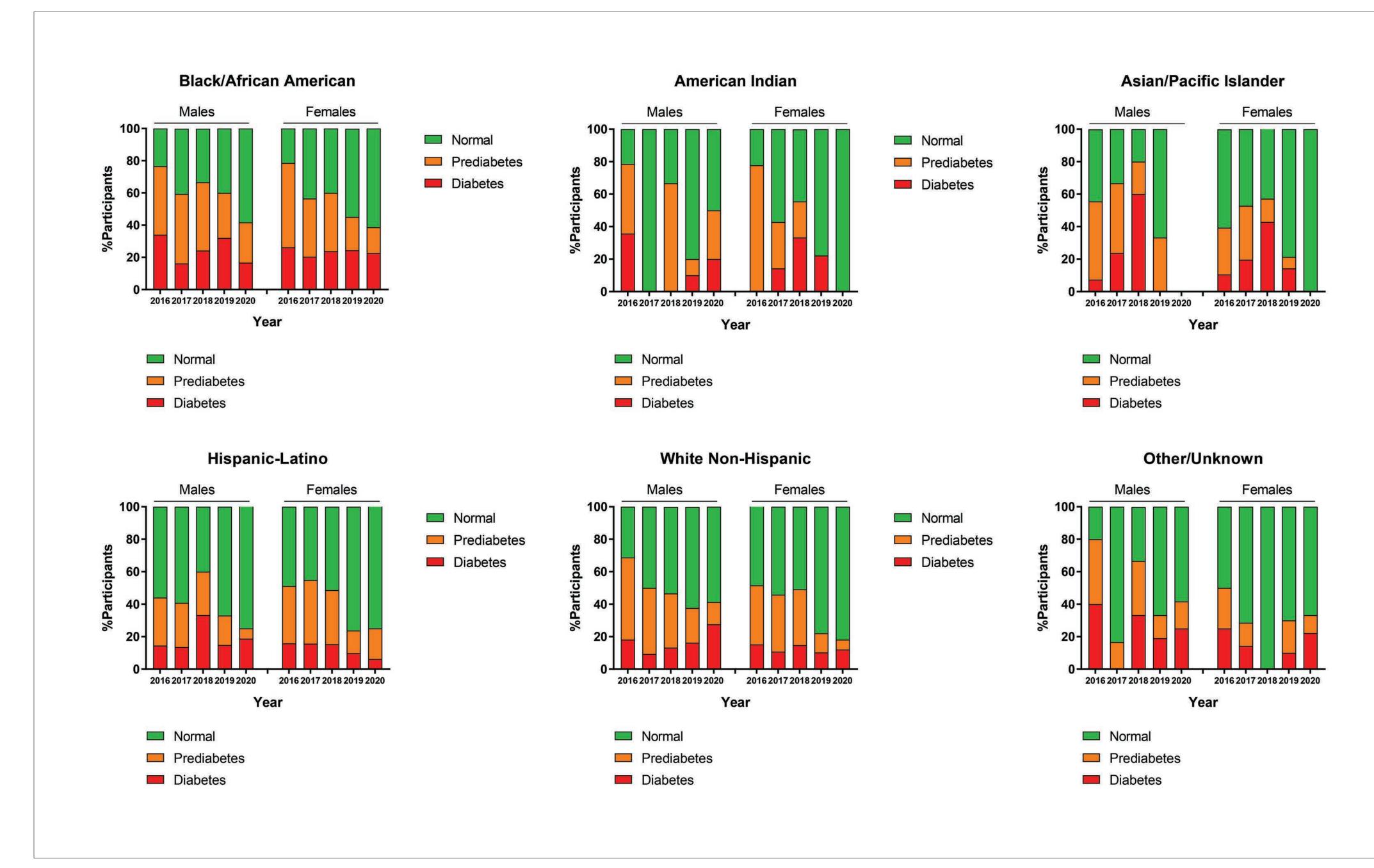
## Figure 1. Increase in Participant with Normal HbA1c Values over Time



\*Data collection for 2020 is limited as community events were canceled due to the COVID-19 pandemic.

- Nearly half of participants had HbA1c values in the diabetes and prediabetes ranges among all ethnicities over the first three years of community outreach events.
- The proportion of AA participants with HbA1c in the diabetes range was highest among all groups and remained consistently high over the study period at 19%-30%.
- Interestingly, a greater proportion of participants with normal HbA1c was observed in all groups in 2019 compared to previous years.

#### Figure 2. Prevalence of Participants by Sex with HbA1c Ranges in Diabetes, Prediabetes and **Normal Ranges over Time**



\*Data collection for 2020 is limited as community events were canceled due to the COVID-19 pandemic.

- A similar trend in diabetes and prediabetes frequency was observed among men and women for AA and HL groups over time.
- Compared to the AA women, AA men consistently demonstrated higher rates for prediabetes.
- Similarly, in 2016, a greater proportion of AI, API, WNH men demonstrated elevated HbA1c values compared to female counterparts. By 2019, these sex differences seemed to have narrowed.

## LIMITATIONS

- Due to the nature of the study design, not all groups were balanced in sample size. The number of Al participants screened were much less than other groups (ex. only 8 participants in 2017).
- Also, limited data was collected in 2020 as we only attended 2 events prior to the COVID-19 pandemic and resulting cancellation of further events that year.
- In addition, we were also unable to confirm if any participants had a diabetes diagnosis and were on glucose lowering medication, which may have affected our classification.
- Finally, as an observational study, we are unable to assess why we observed a decreasing trend in HbA1c in 2019.

## CONCLUSION

- Diabetes was highest among African American/Black, American Indian, and Hispanic-Latino groups; which was consistent with the findings reported by ADHS [1]. We also noted the rates were similar for Hispanic-Latino and White Non-Hispanic.
- Overall, trend in mean HbA1c consistently fell within the prediabetes range for the male and females in all racial/ethnic groups.
- Interestingly, despite reports of increased type 2 diabetes prevalence over the same period, we observed a decreasing trend in mean HbA1c over time among all groups.
- This decline may be encouraging for healthcare providers and other stakeholders, as it may reveal that culturally relevant messaging is necessary to reach people group especially those most affected in Maricopa County Arizona.
- Moreover, targeted efforts may be beneficial in further reducing the rate of prediabetes, obesity, and other diabetesrelated risk factors, especially as we emerge from the COVID-19 pandemic.

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## DISCLOSURES

All author have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

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