Burden and Trends in Pediatric Type 2 Diabetes

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Outline

- Burden of T2D in youth in the U.S. and worldwide
- Projections of future burden of T2D in youth to 2050
- Complications & mortality patterns
- Summary

Background

- Increasing prevalence and younger age at onset of overweight/obesity
- Reports of obesity-associated T2D in clinic-based studies
- Limited population-based studies (American Indians and First Nations studies)

Rising Prevalence of Obesity Among US Children and Adolescents



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey

The Changing Face of Diabetes in Youth

PIMA Youth aged 15-19

Dabelea et al., Diabetologia, 1998;41:904

Cincinnati, OH: Pinhas-Hamiel et al., *J Pediatr.*, 1996; 128:608 Little Rock, AK: Scott et al., *Pediatrics*, 1997; 100:84 San Antonio, TX: Hale et al., *Diabetes*, 1998; 47 (suppl 1): A82

SEARCH for Diabetes in Youth

- SEARCH was funded by CDC/NIH in 2000 to do all major elements of a surveillance system:
 - Monitor trends of all types of diabetes in youth < 20 years
 - Develop projections
 - Understand clinical presentation
 - Evaluate risk of complications
 - Provide better data for health care planning

Incidence of T2D (2002-2003) in Youth, by Age and Race/Ethnicity

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EARCH For Diabetes in Youth

Based on 560 youth with T2D in 10 million person-years at risk

SEARCH Study Group, JAMA, 2007

Trends in T2D Prevalence, 2001-2009, by Sex and Age

Statistically significant difference in prevalence between 2001 and 2009

Dabelea, et al. JAMA 2014

Trends in Incidence of T2D 2002-2012, by Race/Ethnicity

Mayer-Davis et al., NEJM, 2017

Where is SEARCH in the Context of T2D Trends in North America?

Incidence per 100,000 (Log base₁₀ 10

Global Burden of T2D in Youth

Prevalence per 1,000

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Projections of Future Burden

Projected Number of Youth < 20 Years of age with T2DM

Imperatore, et al. *Diabetes Care*, 35(12), 2515, 2012

Observed (2010) and Projected (2030, 2050) Distribution by Race/Ethnicity in T2D Youth in the US

Diabetes

Complications patterns

Prevalence of Complications and Comorbidities is Higher in Youth with T2D-W and among Minority Youth

Dabelea D, et al, JAMA, 317(8): 825-835, 2017

Risk Factors are more Common in Youth with Type 2 vs Type 1 Diabetes

EARCH For Diabetes in Youth

Hamman RF, et al. *Diabetes Care*. 2014;37(12):3336-3344.

High Prevalence of low Socioeconomic Indicators in Youth with TD2

Based on 2001-2004 data

Diabetes Care, supplement 2009

Associations Between Diabetes Type and Complications, Exploring the Effect of Potential Risk Factors

Base' adjusted for age, sex, duration of diabetes, clinical site 'Adj' adjusted further for race/ethnic group, and A1c, WHtR, MAP (except HTN), <u>all over time</u>

Dabelea D, et al, *JAMA*, 317(8): 825-835, 2017

Excess Complications in T2D vs. T1D Not Explained by Common Risk Factors

- Adjustment for race/ethnicity, and glycemic control, waist/height ratio, and mean arterial blood pressure over time –
- <u>Did not reduce</u> the more than 2-fold excess of retinopathy, nephropathy and neuropathy among those with T2D compared to T1D
- T2D excess of arterial stiffness and hypertension explained by obesity

Age, Sex and Race-Standardized Mortality Ratios In SEARCH

Reynolds, K, J Diabetes Complications. 2018

Summary/Conclusions

- T2D with onset in youth is present in all race/ethnic groups and increasing in all minority groups in the US.
- Projections suggest substantial further increases health care systems need to be prepared.
- Worldwide, it continues to primarily affect indigenous populations, but data are still limited.
- High burden of chronic complications and comorbidities, suggesting aggressive disease- need for adequate clinical services, access to care.
- Consider systematic surveillance of high risk populations to determine burden, trends, complications.
- Efforts to prevent T2D in youth and its complications are warranted.

