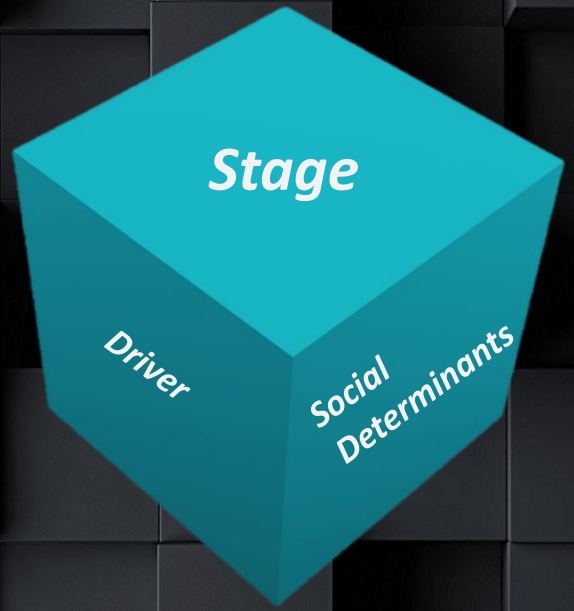
# Validation of the Cardiometabolic-Based Chronic Disease (CMBCD) Model in U.S. Adults.




Juan P. Gonzalez-Rivas, Iuliia Pavlovska, Ramfis Nieto-Martinez, María M. Infante-Garcia, Ota Hlinomaz, José R. Medina-Inojosa, Jan Broz, Geraldo A Maranhao Neto, Jeffrey I. Mechanick

Czechia & Venezuela

Prague 21.11.23

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HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH

ICRC INTERNATIONAL CLINICAL RESEARCH CENTER

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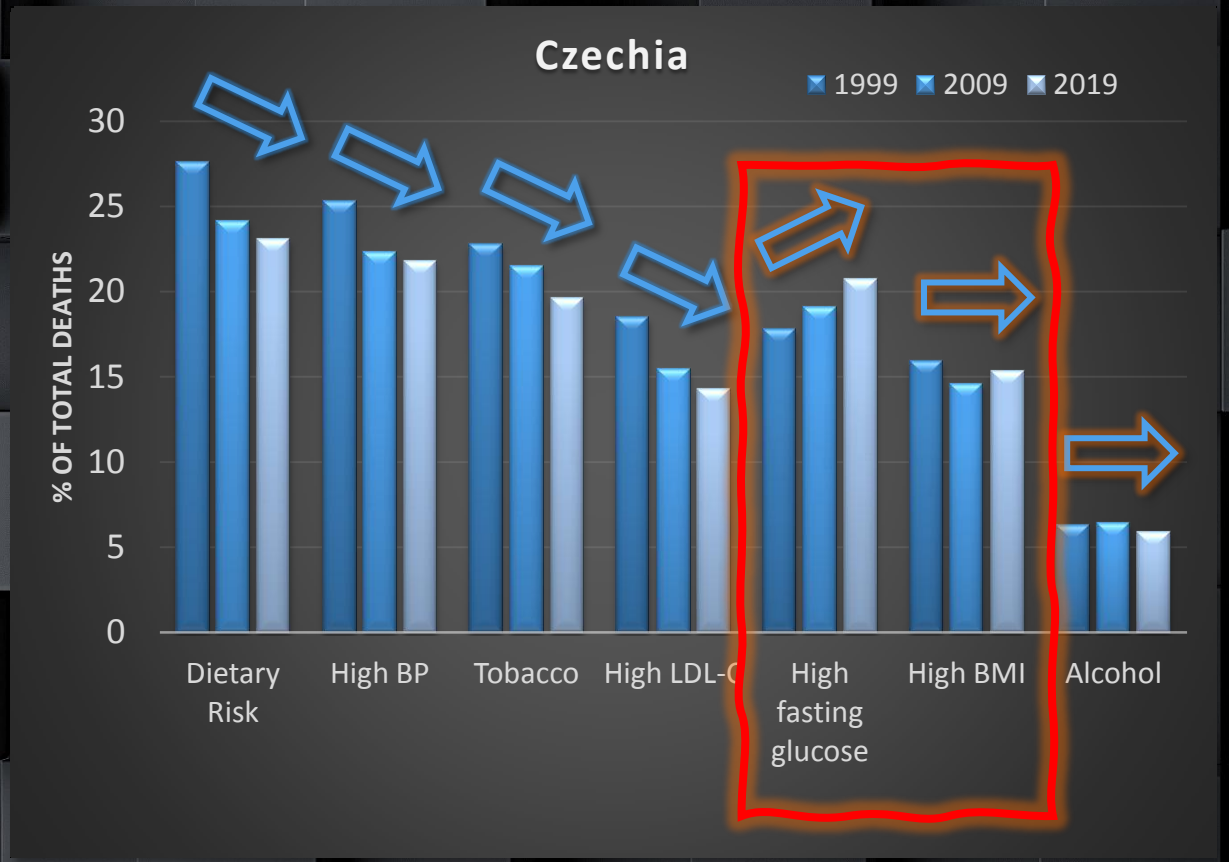
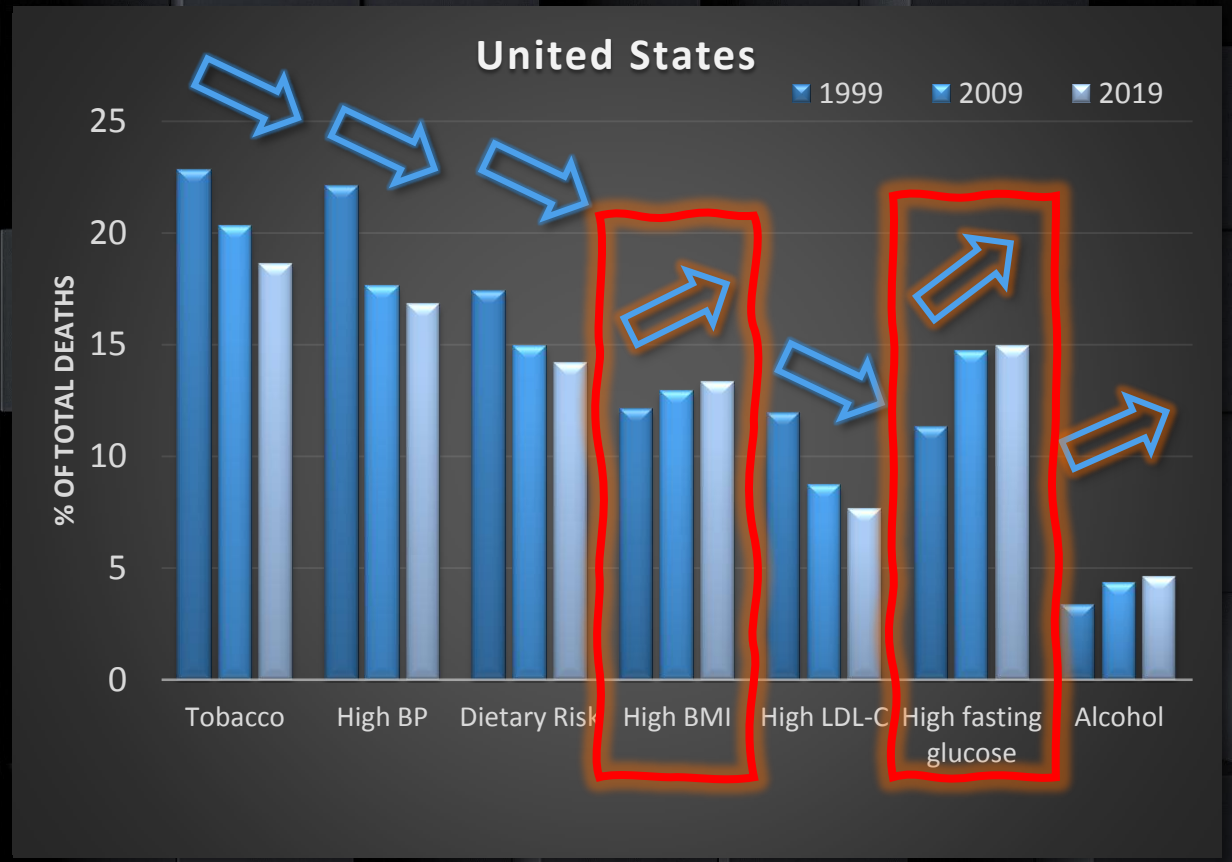
ST. ANNE'S UNIVERSITY HOSPITAL BRNO

# Trend of Percentages of Deaths – Czechia and US



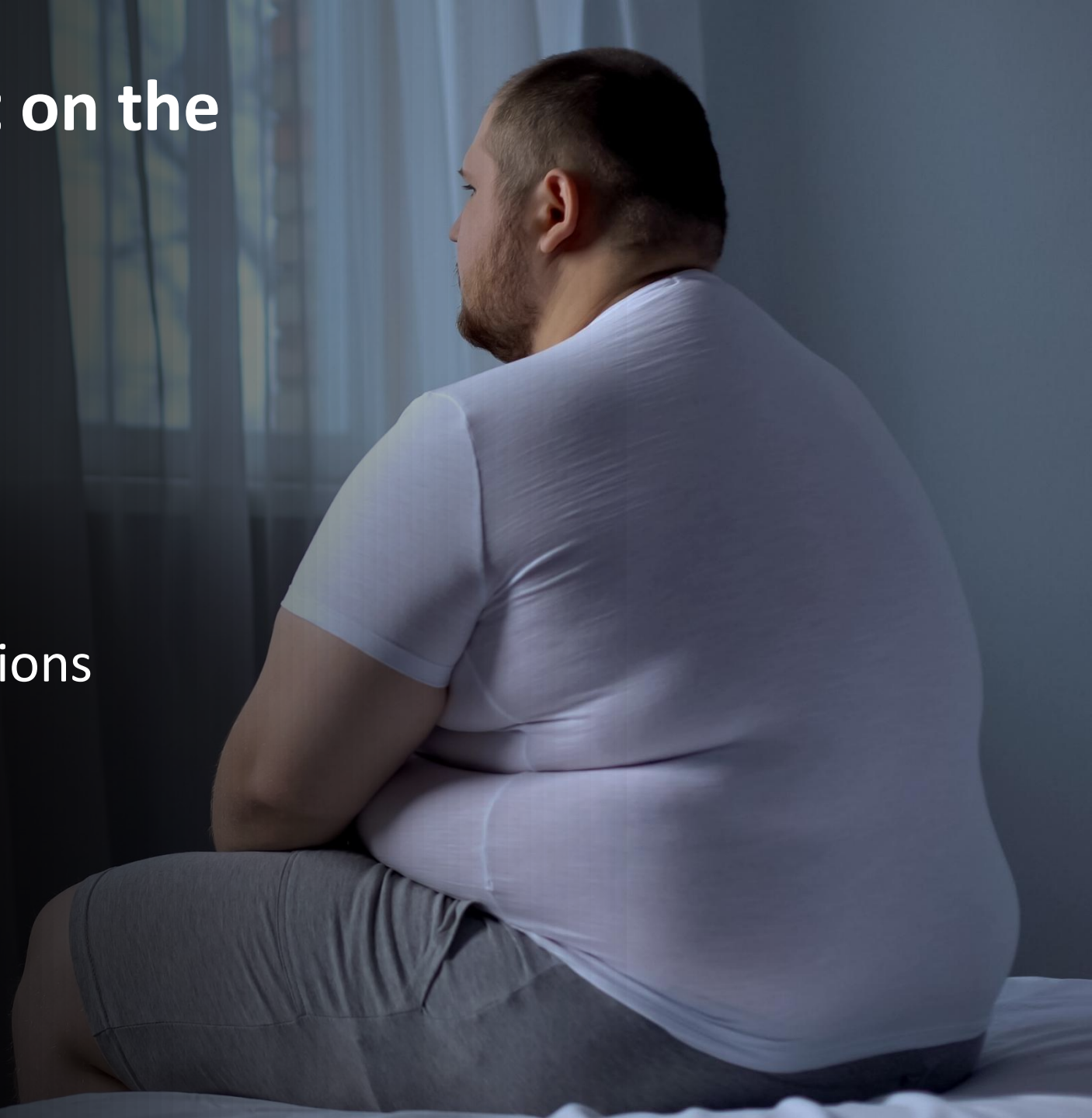




GBD Compare group https://vizhub.healthdata.org/gbd-compare/

# Need for the Improvement on the Approach

**Obesity** is BMI-centric

- Clinical Inertia
- Stigma
- Controversy related to limitations
- Not considered a disease



# Need for the Improvement on the Approach

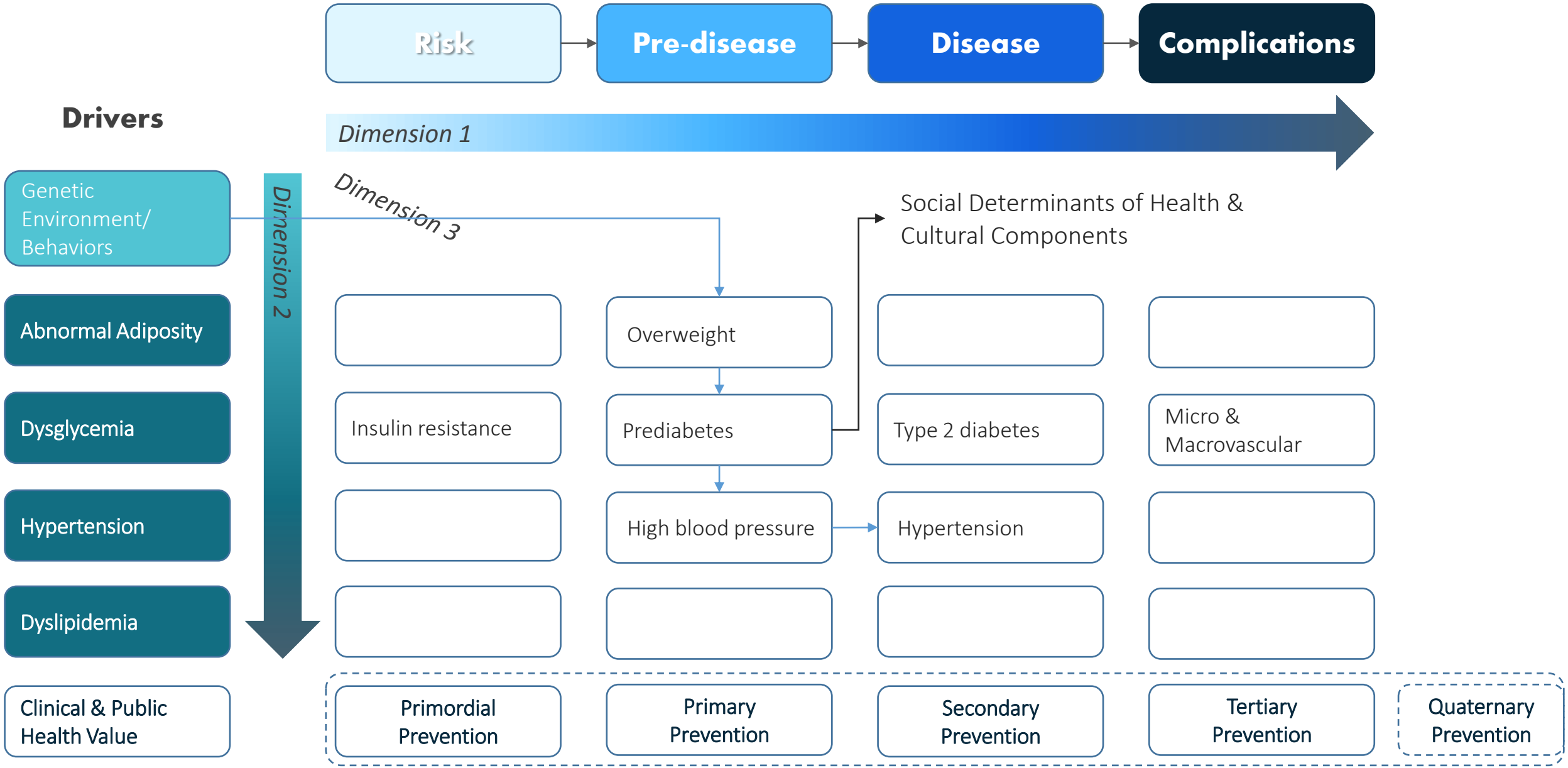
**Diabetes** is gluco-centric

- Prediabetes is not general recognized
- Late management
- Concept of metabolic syndrome is a static approach with limited clinical usefulness

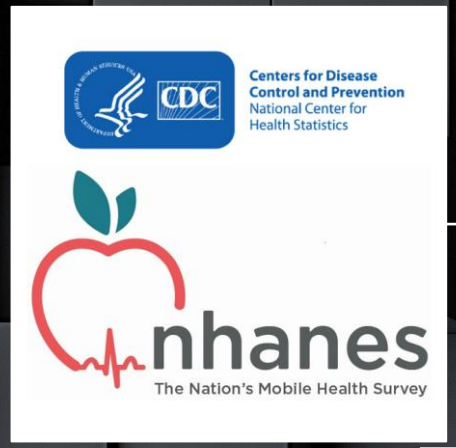
Lack of consideration of cultural and social determinants

# 3D CMBCD Model - Cardiometabolic-Based Chronic Disease

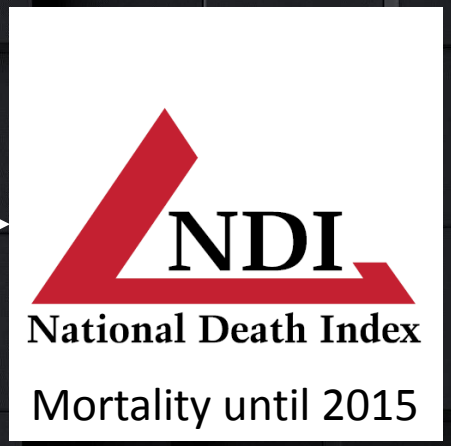
Mechanick, J.I., et al. Cardiometabolic-Based Chronic Disease, Adiposity and Dysglycemia Drivers: JACC State-of-the-Art Review. *JACC* **75**, 525-538 (2020)



# Methods




NHANES
(1999 – 2012)
n= 71916




Mortality until 2015

Exclusions

- Participants under 18 years old or ineligible for obtaining mortality data n = 30698.
- Records without data on fasting blood glucose levels n = 4756.
- Records without HDL-c, LDL-c, triglycerides, or total cholesterol data n = 19439.
- Records without blood pressure measurement data, or medical history
- n = 2201.
- Records with missing questionnaire data n = 730.
- Participants younger than 40, or older than 74 n = 6831

Eligible records
n= 7261
men and non-pregnant women aged 40-74 years

Median follow-up of 8.1 years

Deathly cases attributed to

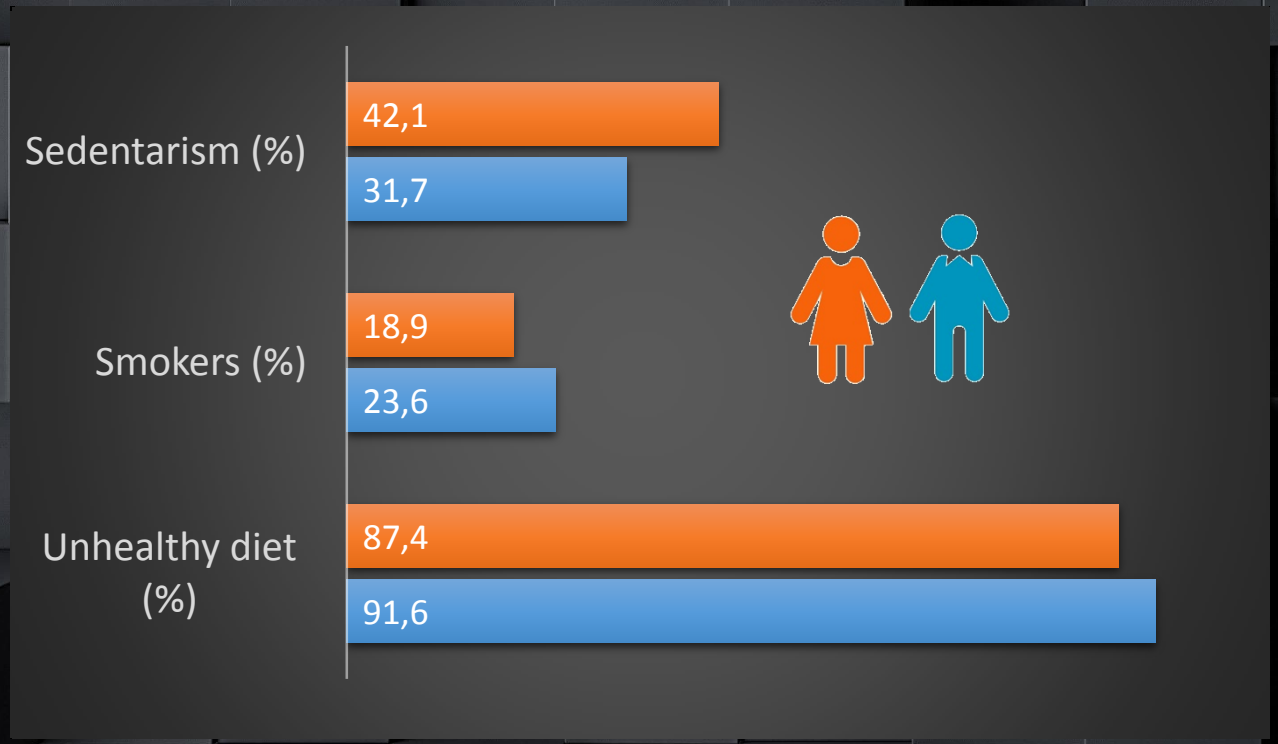
CVD 160 and all-cause mortality 811

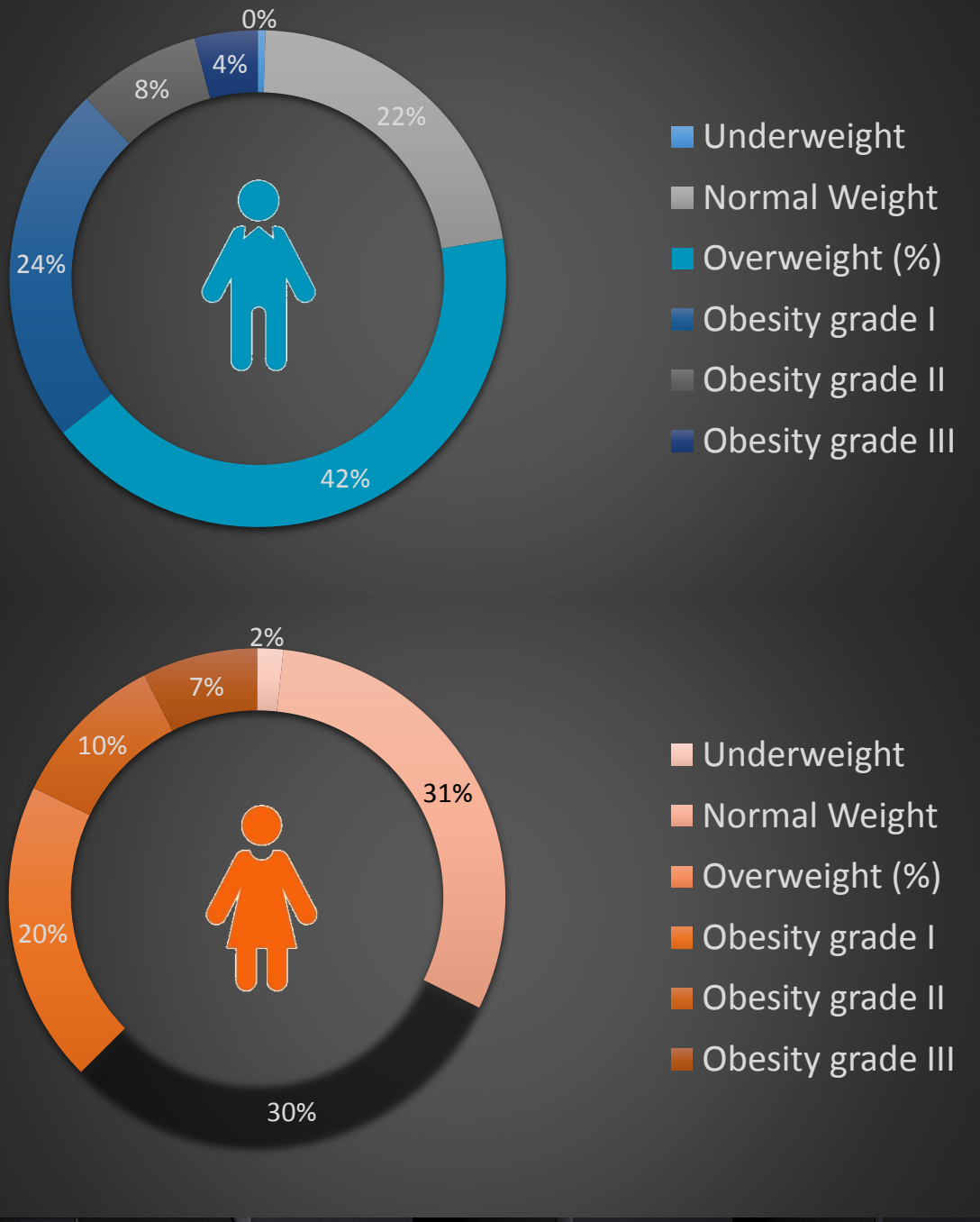
# Characteristics of the Subjects

49.8%

50.2%

53.4 Age 53.6



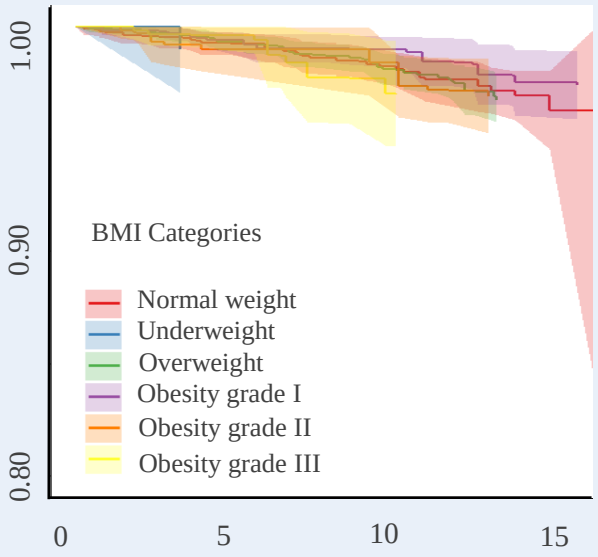
# Cardiovascular Mortality

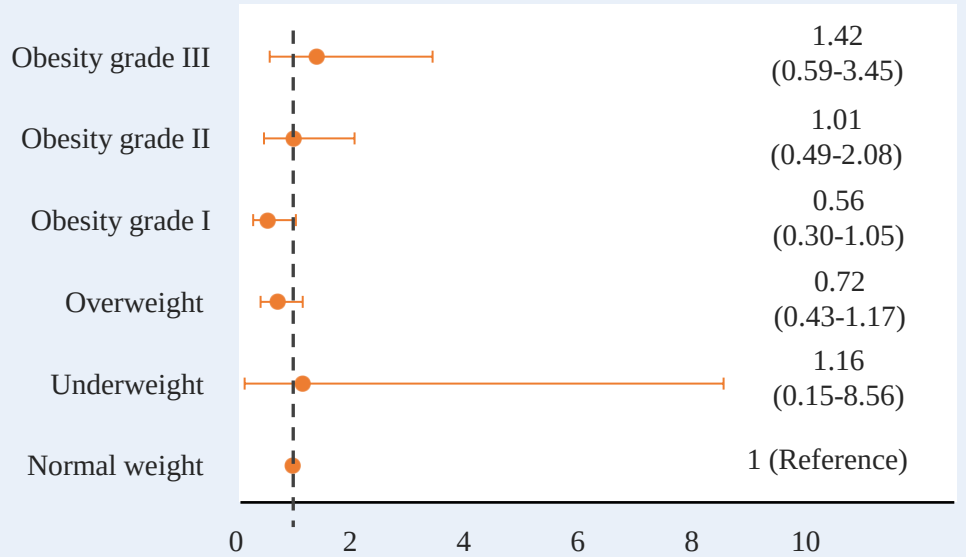
**Survival Probability CVD Mortality**

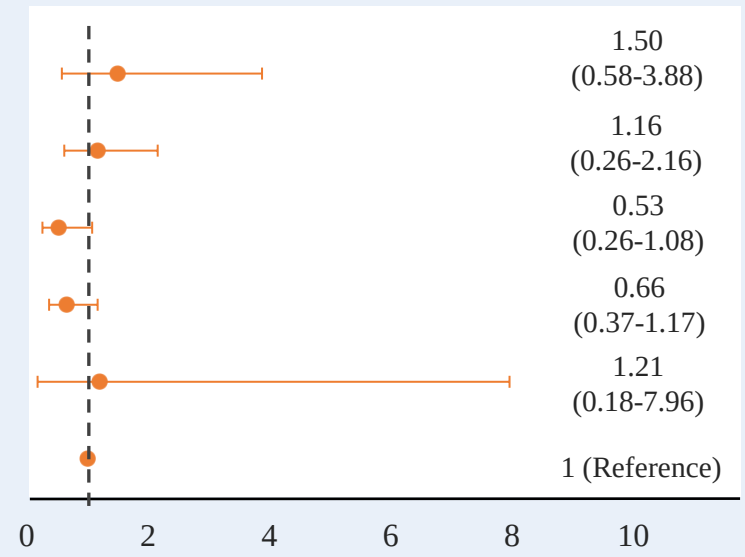
**Hazard Ratio – Age and Sex-Adjusted**

**Hazard Ratio – Fully adjusted**

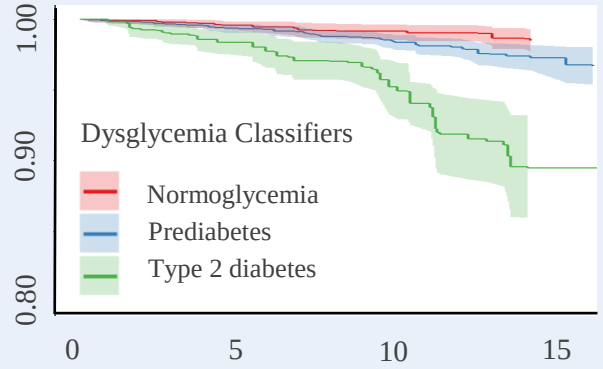
**BMI Categories**

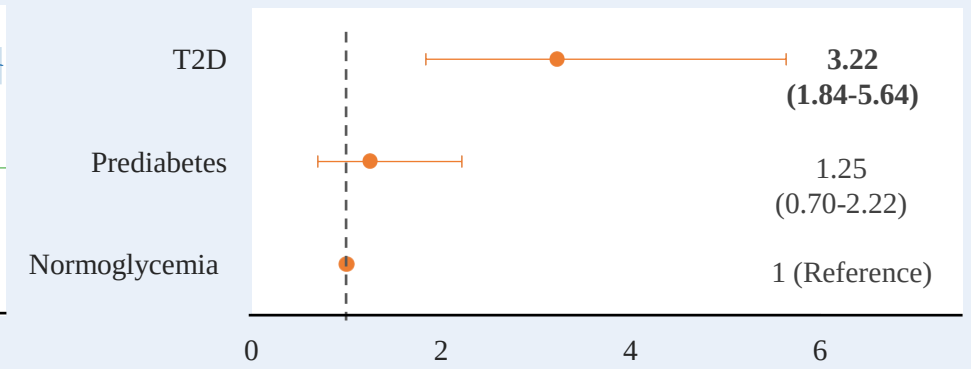


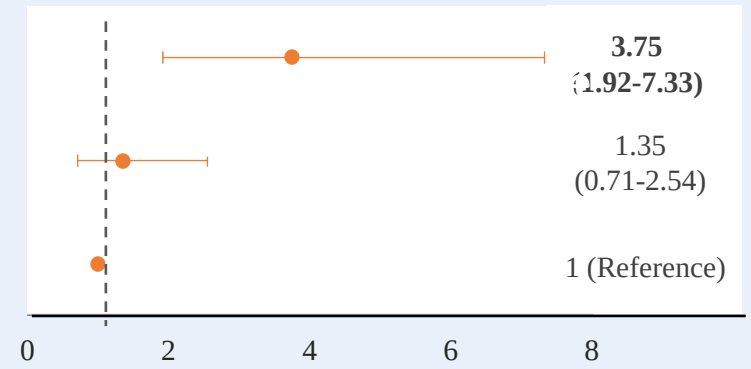




**Dysglycemia**




**Follow-up time (years)**

**Hazard Ratio**

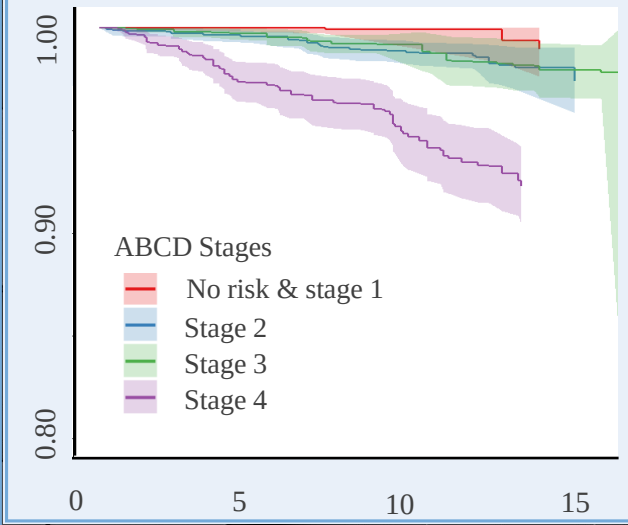
**Hazard Ratio**

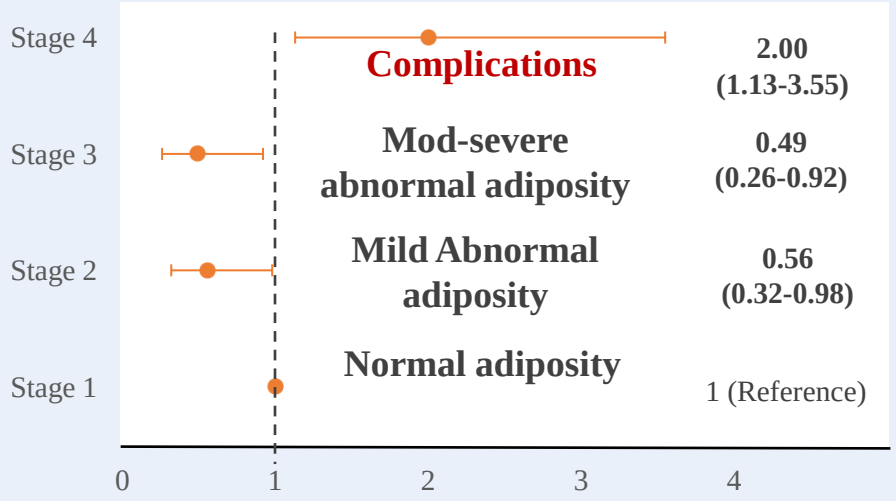
# Cardiovascular Mortality

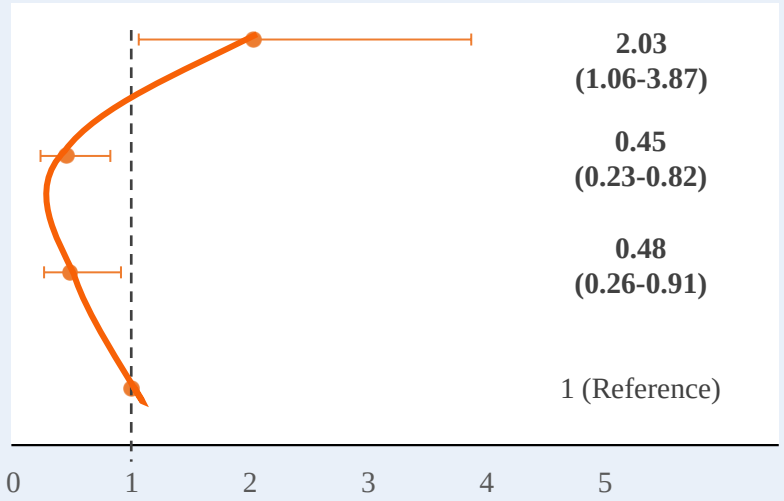
**Survival Probability CVD Mortality** | **Hazard Ratio – Age and Sex-Adjusted** | **Hazard Ratio – Fully adjusted**

## Adiposity-Based Chronic Disease

**ABCD**

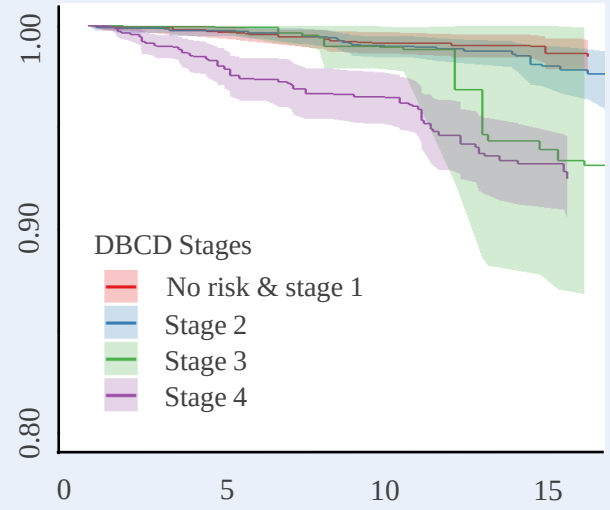


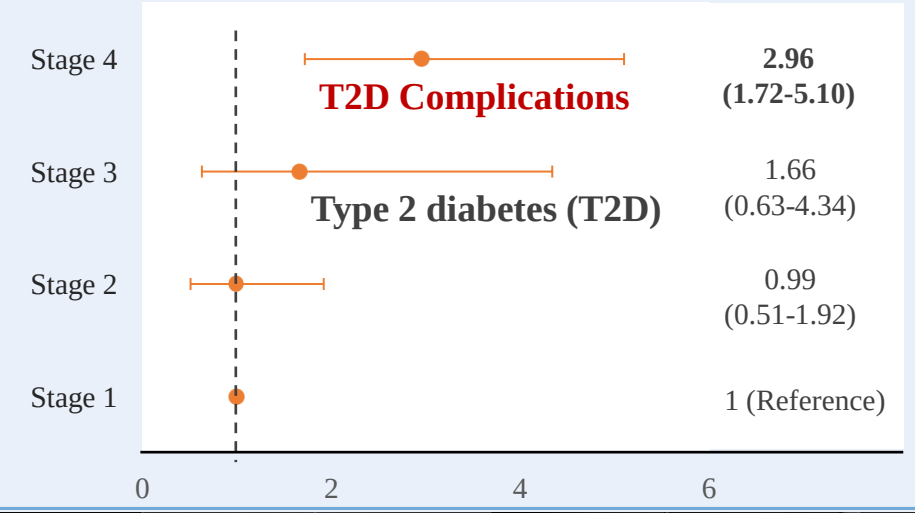



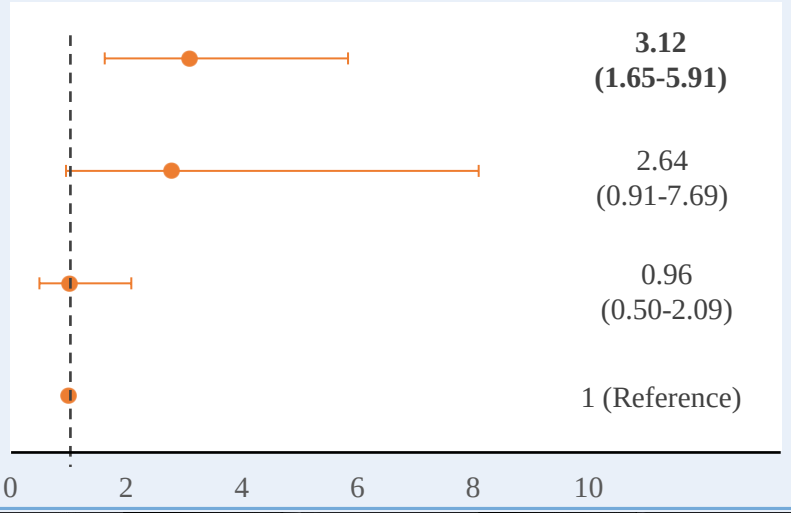




## Dysglycemia-Based Chronic Disease

**DBCD**



# Cardiovascular Mortality

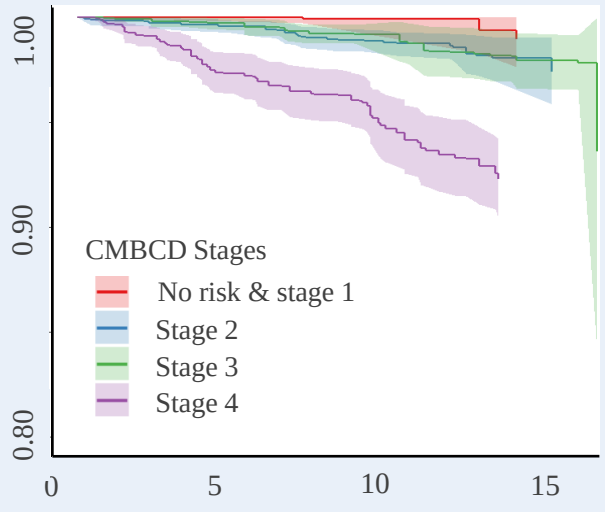
**Survival Probability CVD Mortality**

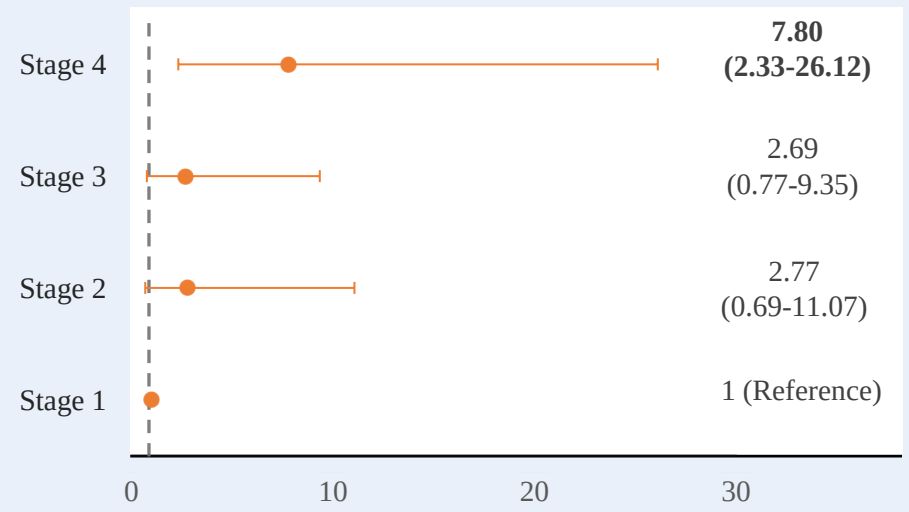
**Hazard Ratio – Age and Sex-Adjusted**

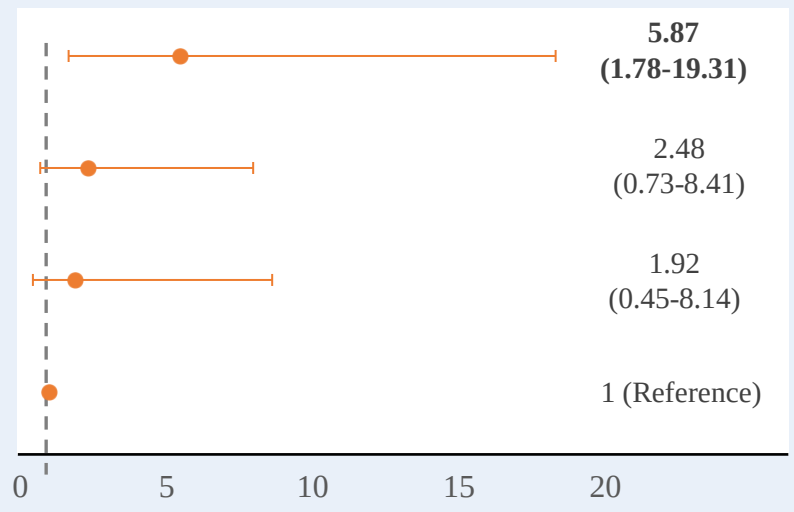
**Hazard Ratio – Fully adjusted**

## Cardiometabolic-Based Chronic Disease

CMBCD



# Conclusions

- A complication-based approach using the natural story of the cardiometabolic disease allows to stratify and determine the subjects with a higher risk of mortality events