



Diet, diabetes and brain function: some quick wins from UKB data

Naveed Sattar

Professor of Metabolic Medicine

University of Glasgow

Background

- Doctor: heart risk clinic / diabetes, obesity research
 - **Blantyre and proud of it 😊**
- Multiple trials: weight loss, diabetes reversal (recent Lancet DiRECT)
- Guidelines:
 - European Diabetes and Heart prevention guidelines 2013, 2016, 2019
 - Chair Heart / stroke prevention guideline Scotland
 - JBS3 Editorial Board: co-wrote DM section 2014



UK Biobank

- Fabulous resource to answer big & small questions with power, and considering mitigating factors
 - Small studies cannot answer questions well
 - Choose questions to address
 - May not be new or may be badly addressed
- Also opens up many new ways to answer questions
 - Gets diff types of researchers together
 - Combines genes, diets, outcomes, images in new ways



Low hanging fruit



1. A weighty question: sugar or fat as cause of obesity?
2. Who gets most diabetes, men or women?
3. Waist circumferences and diabetes risks
4. Is there an optimal weight for health? Is being too thin also bad for you?
5. Brain function, diabetes and heart disease

Sugar vs. fat vs. weight



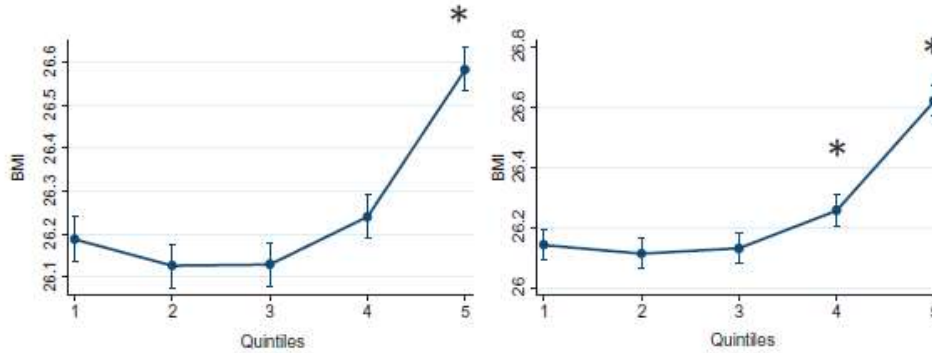
- Diet questionnaires
- Worked out patterns (fat, protein, sugars etc) of calorie intake in each person
- Related to rising weight levels and corrected for total calories



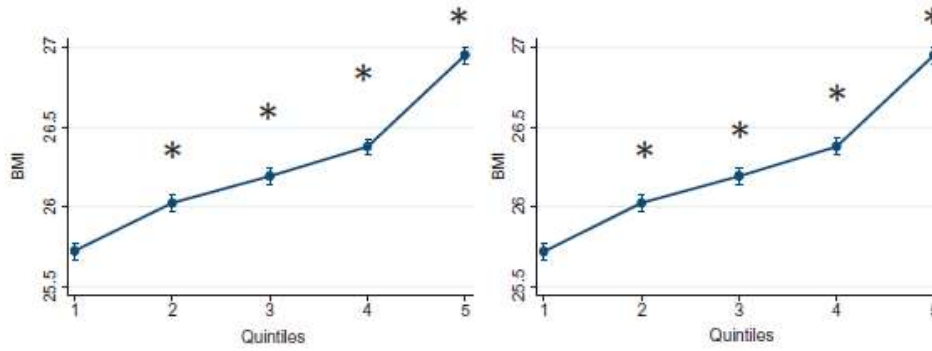
Adjusted for age,
sex, ethnicity

Adjusted for age,
sex, ethnicity and
physical activity

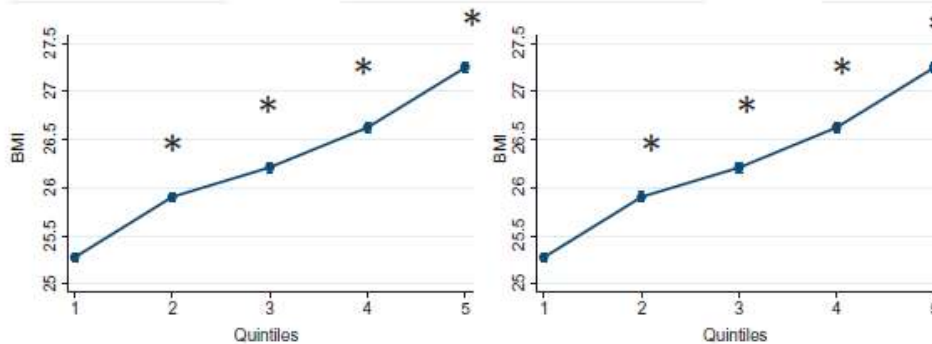
Sugar



Starch



Fat



What did we conclude?

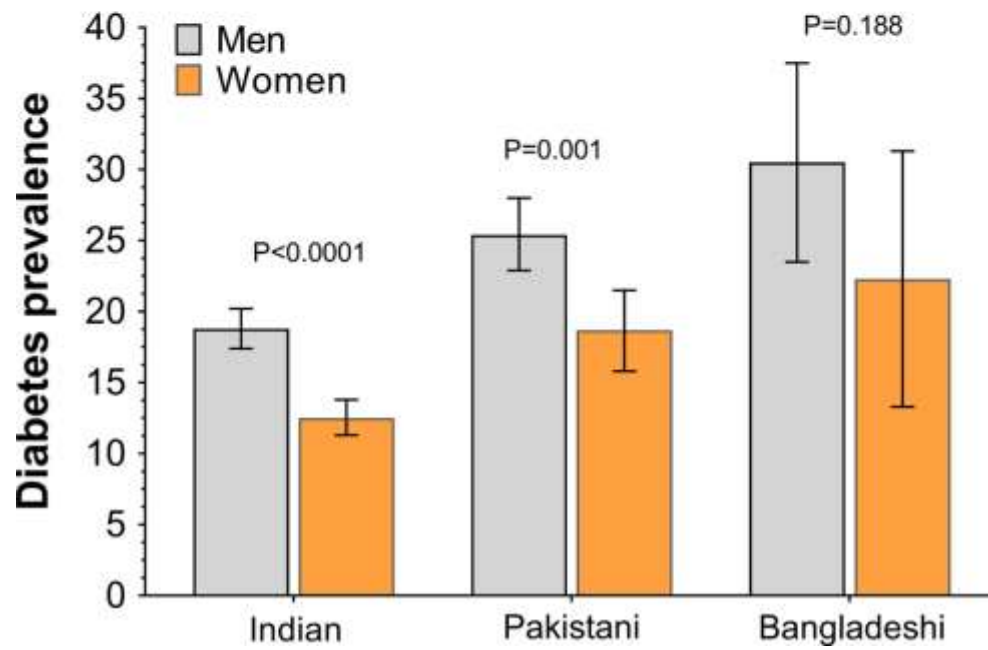
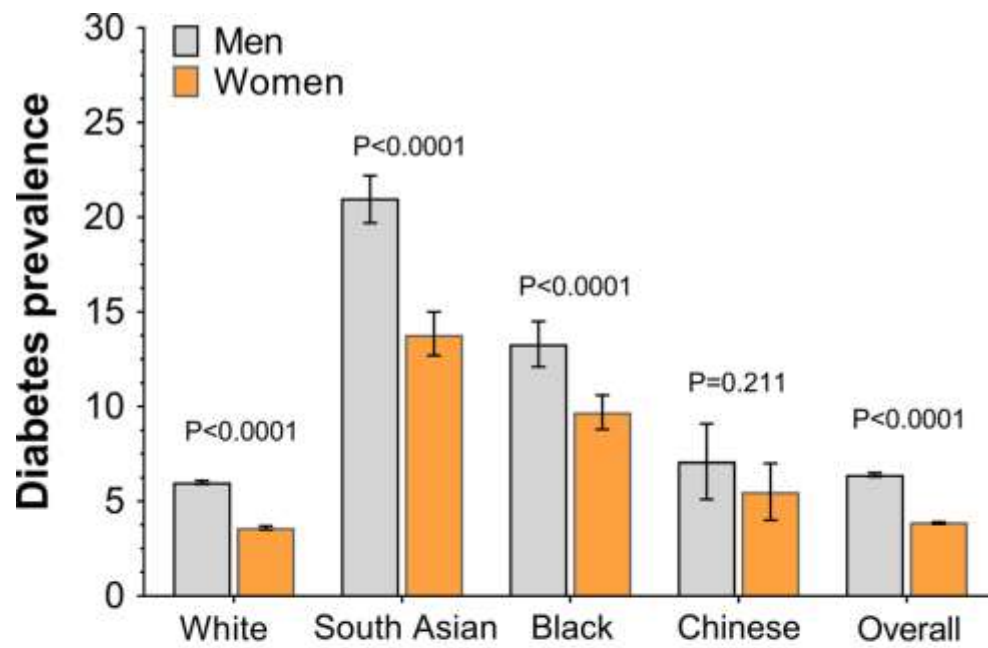
- Fat is largest contributor to overall energy
- % energy from fat, but not sugar, is higher among overweight / obese individuals
- Public health messages on sugar may mislead on the need to reduce fat and overall energy consumption



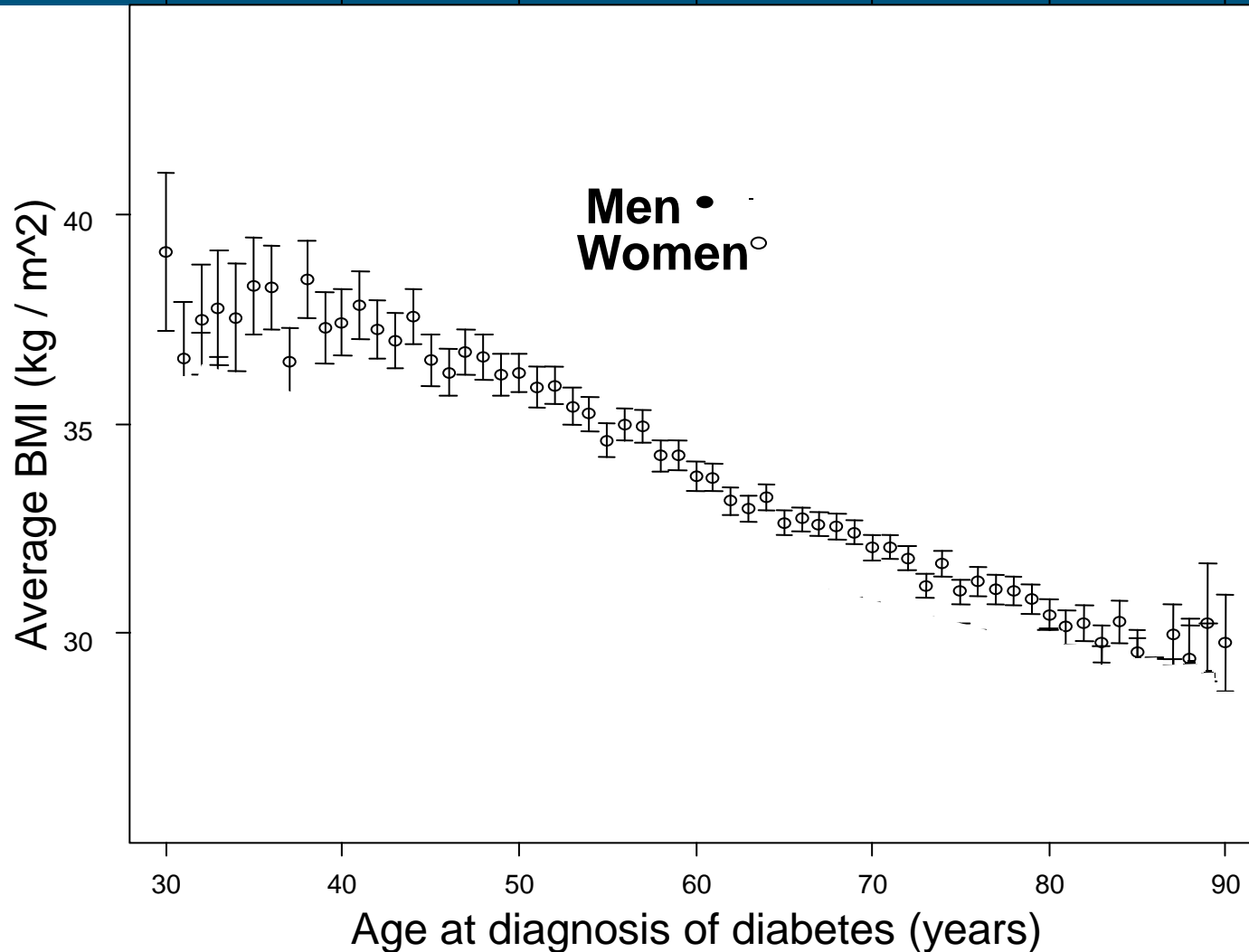
2. Men vs women

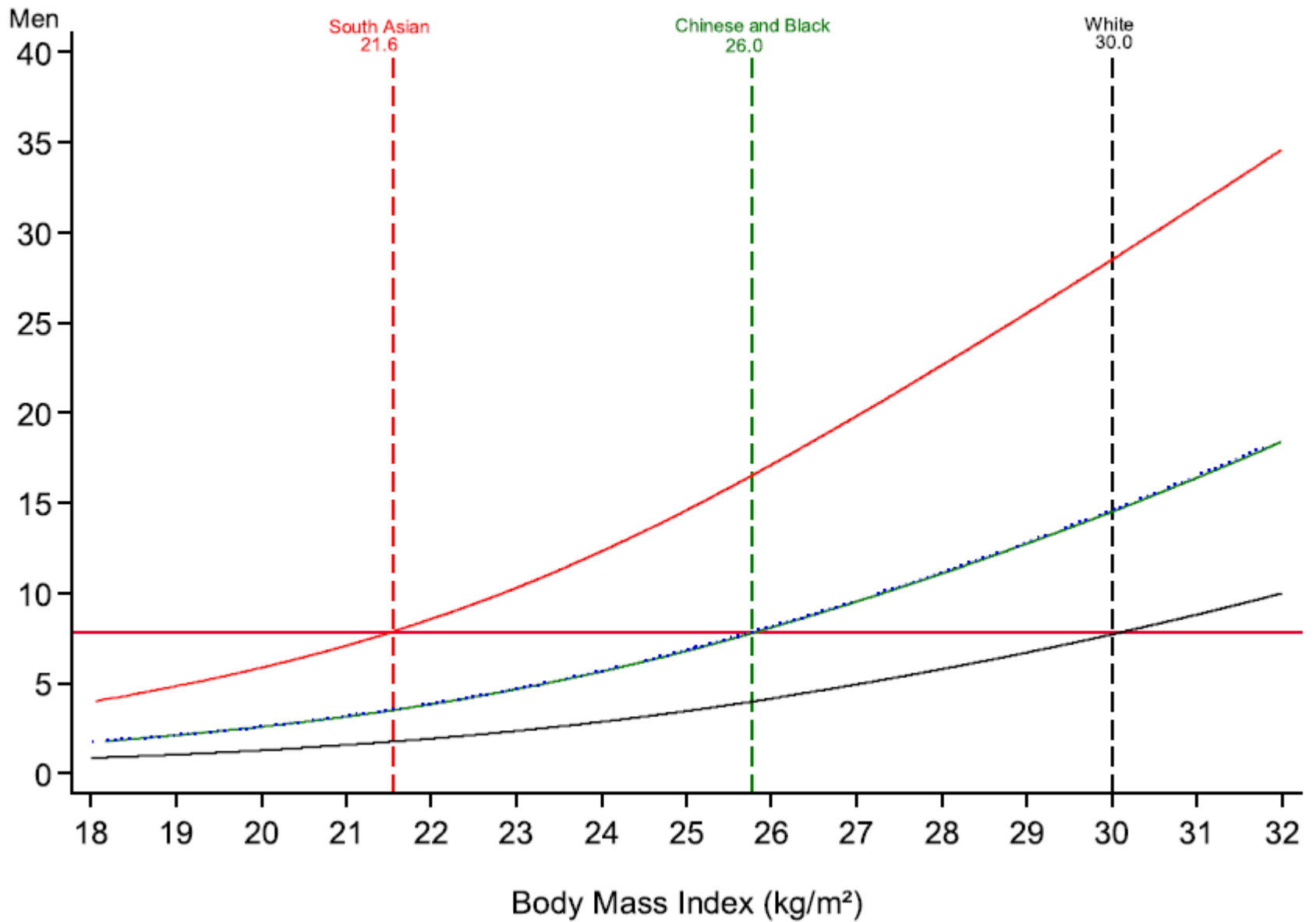
- Who is brighter sex?
- Who gets more heart disease?
- Who gets more diabetes?
- Who carries more fat?





Why more diabetes in men?





4. Body mass index and heart outcomes

– U – shaped link

- Lots of research suggests low weight can also be bad for you
 - But could be low weight as losing weight, unintentionally
- Some researchers have even suggested lowest risk for death is when overweight



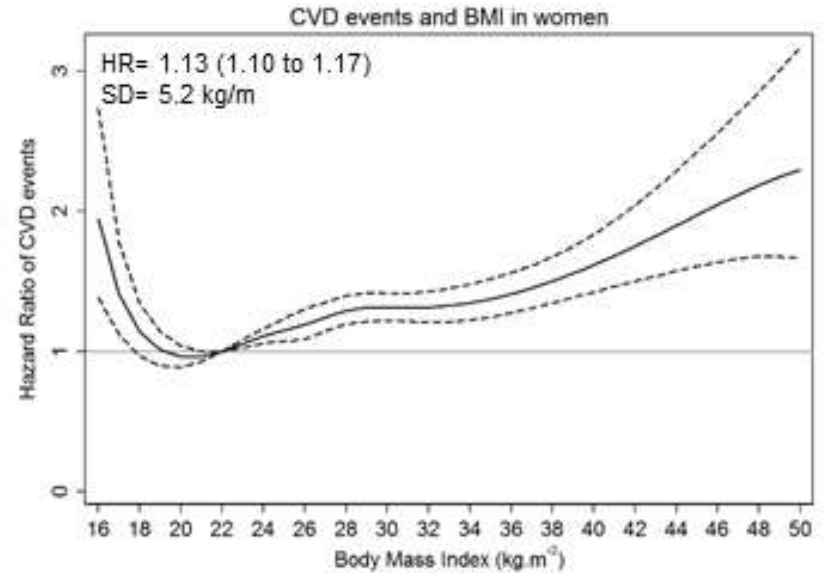
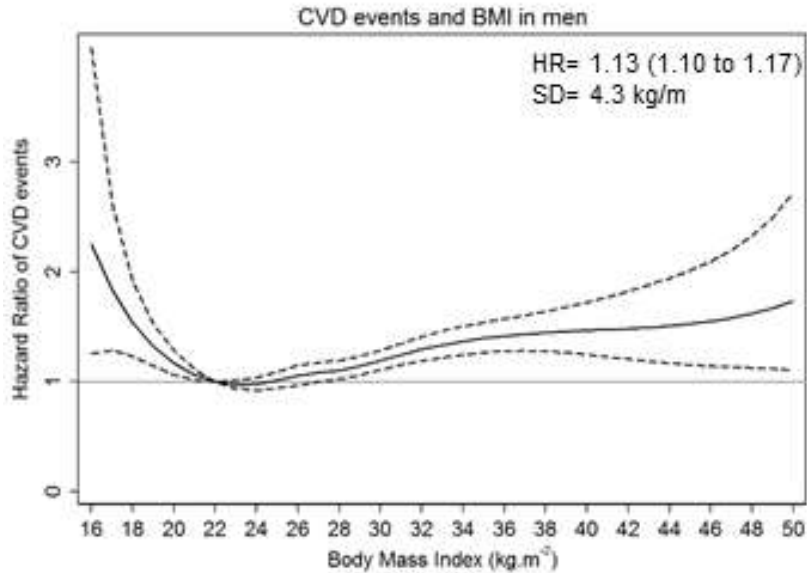
What did we do?

- 296K (58% women) of white European descent without prior heart disease or stroke Hx at baseline
- Five different measures of adiposity
 - BMI, waist circumference, WHR, WHtR, percent fat mass
- Fatal and non-fatal heart attacks / strokes



Adiposity and outcomes: UKB

EHJ in press



Why the difference?



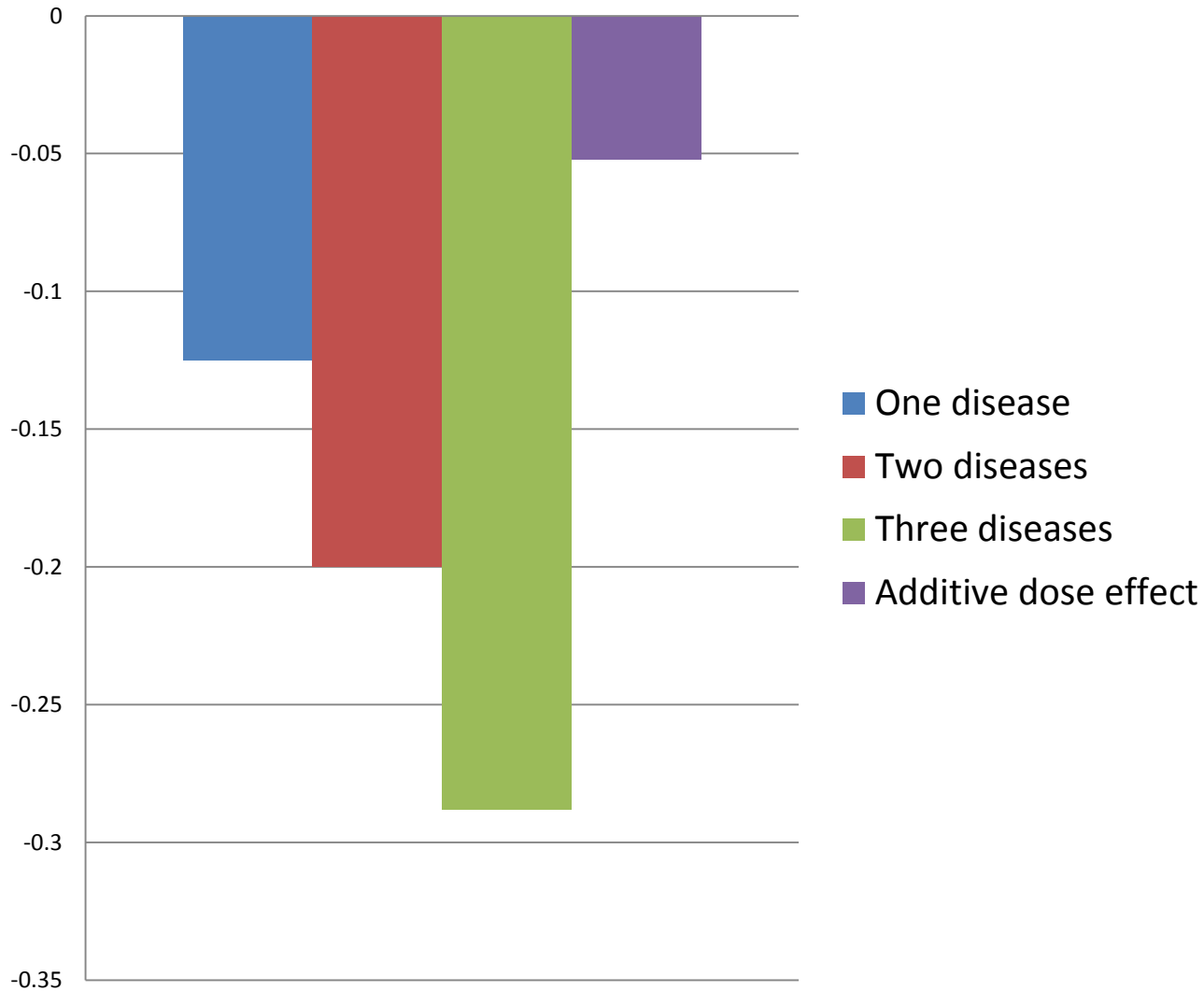
Brain function and diseases

- Is there a link between brain function and diabetes and heart disease
- We checked average brain function tests and compared what happens if also have
 - **Diabetes**
 - **High blood pressure**
 - **Heart disease**



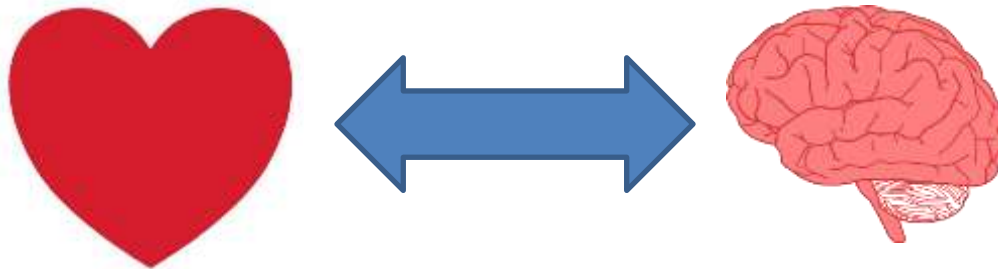
Reasoning differences with disease

diabetes, HBP, heart attacks



What do we think are implications of our work?

- Helping prevent or better treating diabetes, HBP or heart disease should help lessen brain decline
- But more work needed to prove this



Final summary

- UK Biobank delivering some nice answers to important questions
 - BUT only in its infancy
 - Much more to come
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- In meantime, eat well and try to stay active and keep your sense of humour

