

Frequency and phenotype of type 1 diabetes in
Adult onset type 1 diabetes: trying to find the
the first six decades of life: a cross sectional,
needle in the haystack, my Biobank story
genetically stratified survival analysis from UK

Biobank

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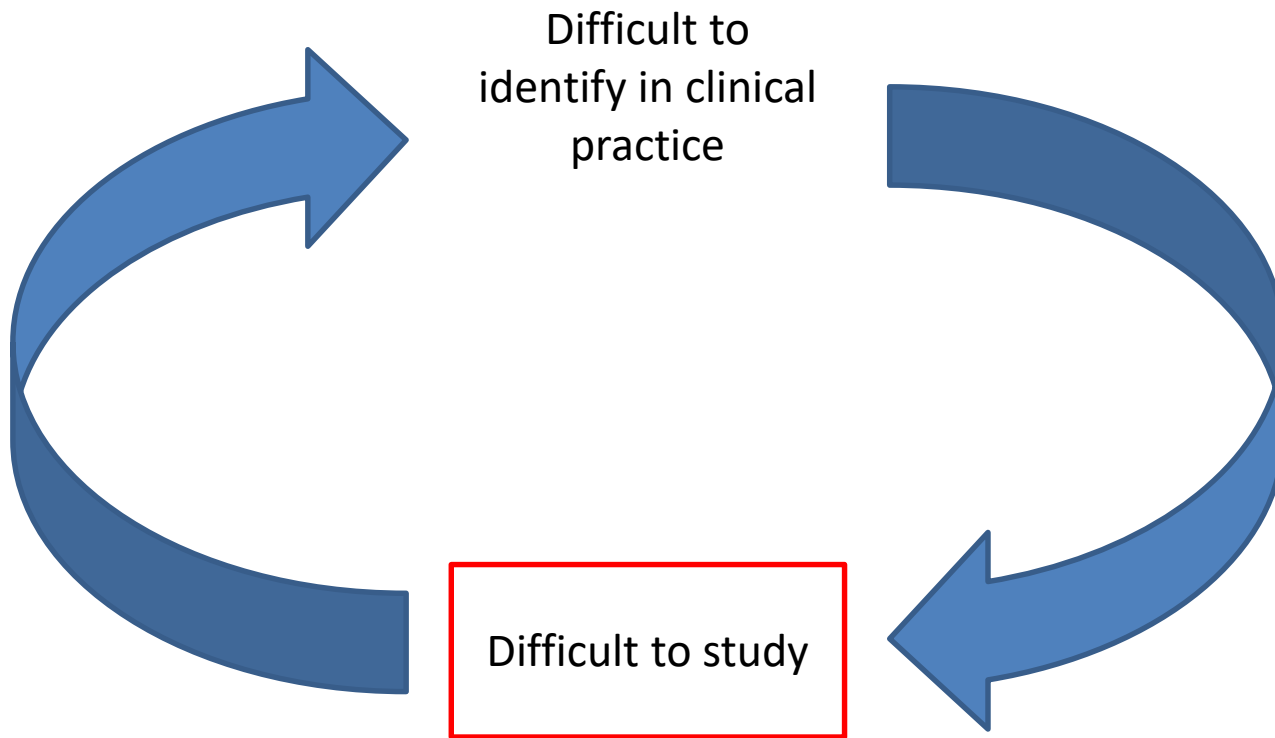
Background

- “Type 1 diabetes predominantly affects children and young adults”.
- Can affect patients of all ages –how common over 30years of age? Characteristics?
- Epidemiological data on Type 1 diabetes in later life limited
- Most studies focus on childhood

Current limitations

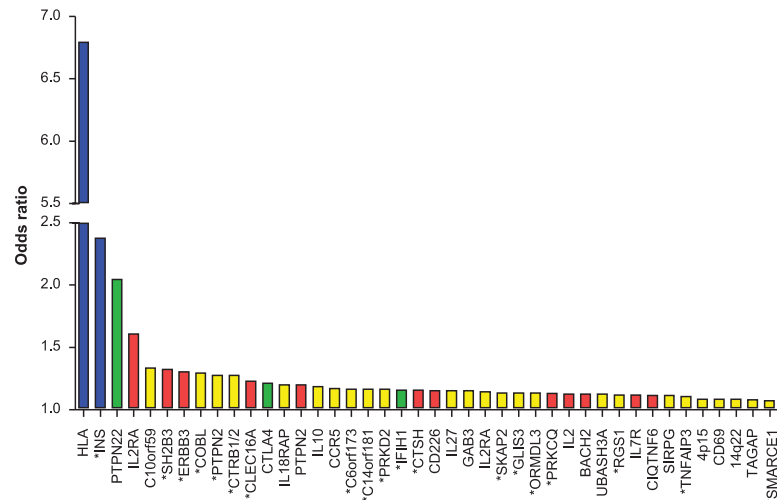
- **Age is a key predictor for diabetes type**
 - In childhood Type 1 predominates so cases “**stand out**”
 - In older age the sea of type 2 diabetes means cases “**drowned out**”.
- **Cases difficult to identify**
 - Clinicians classification and prescribing insulin therapy is not systematic
 - No defined clinical criteria

The circle of difficulty

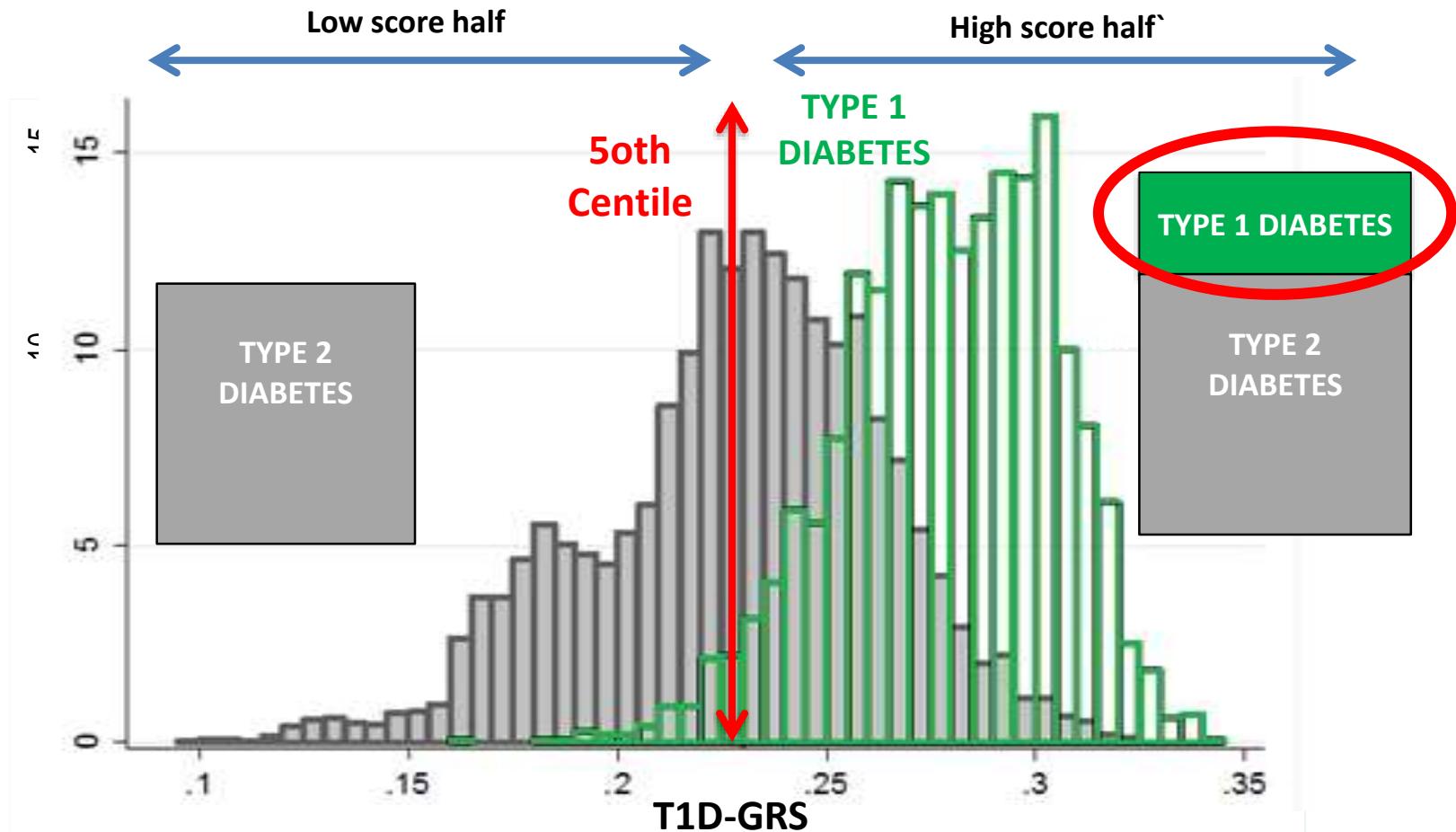


Approach 1:- Genetic predisposition

- T1D strong genetic susceptibility
- Captured 30 SNPS (single nucleotide polymorphisms) as a Type 1 diabetes genetic risk score (T1D–GRS).
- Sum of risk-increasing alleles weighted by risk

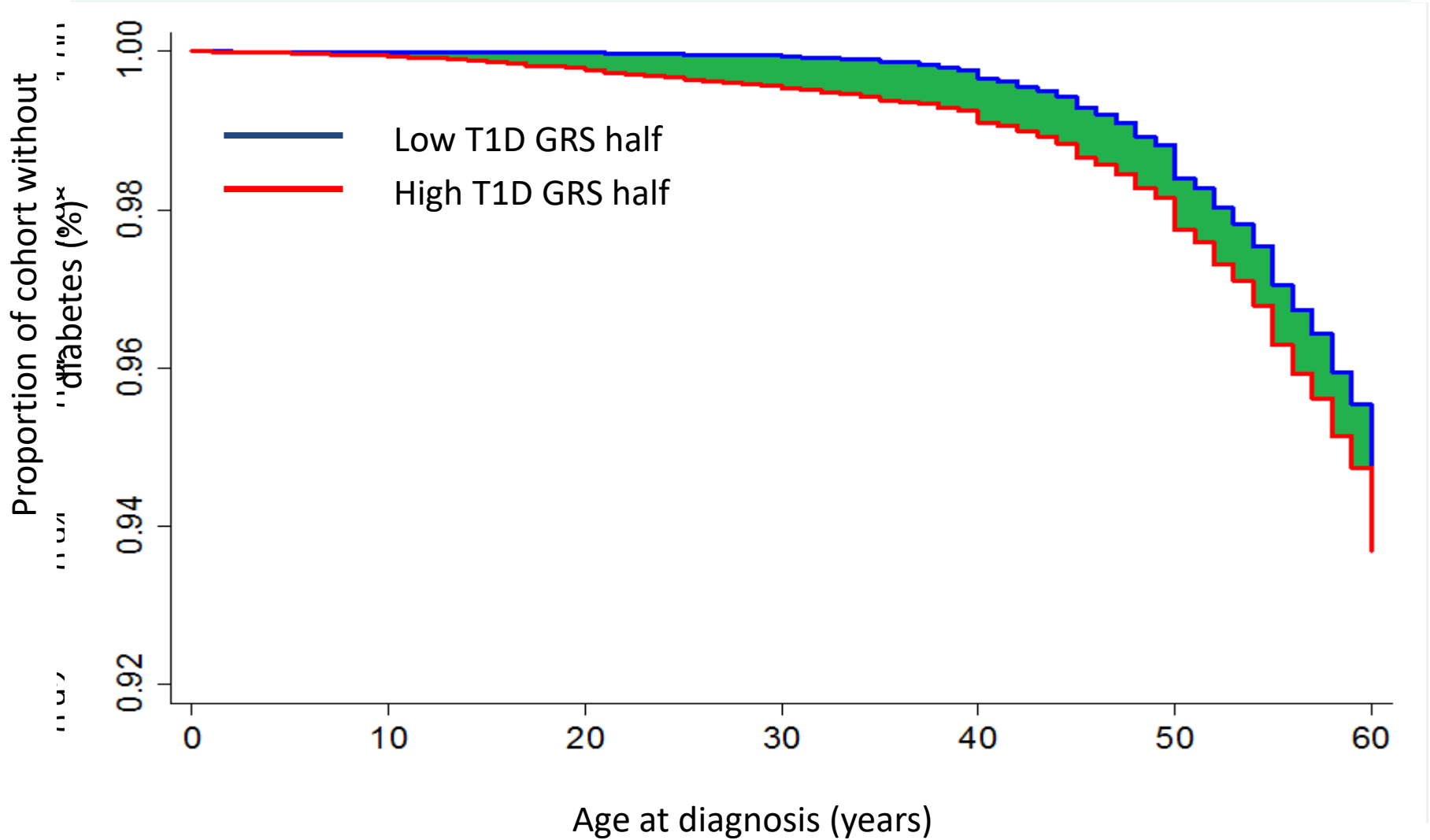


Method

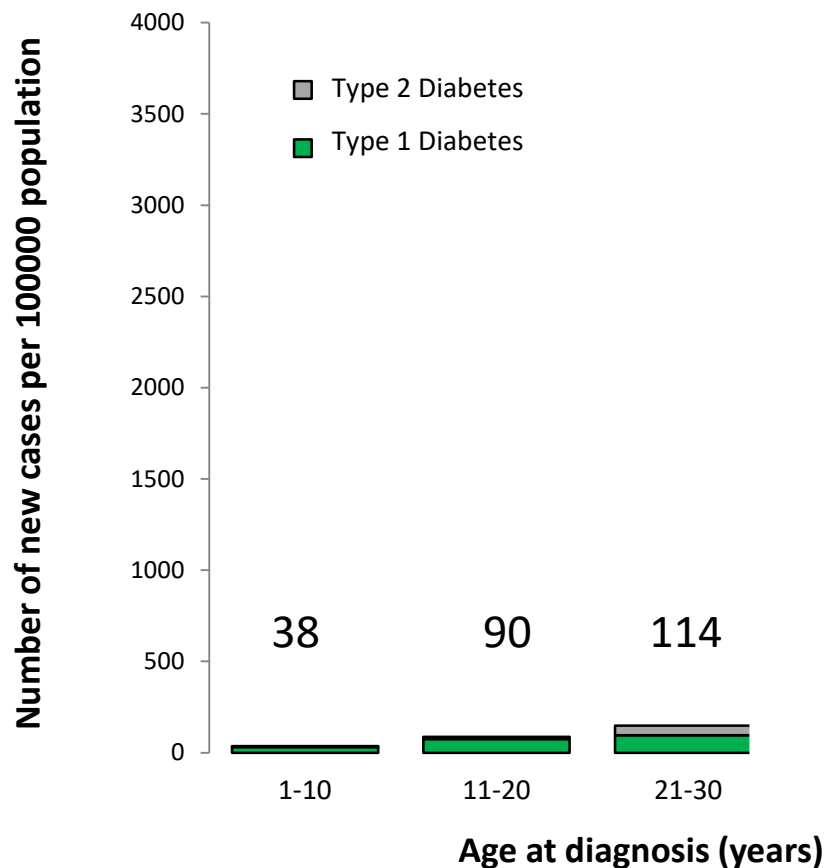


*Thomas NJ, Jones SE, Weedon MN, Shields BM, Oram RA, Hattersley AT: Frequency and phenotype of type 1 diabetes in the first six decades of life: a cross-sectional, genetically stratified survival analysis from UK Biobank. Lancet Diabetes Endocrinol 2017

Kaplan-Meier curve of diabetes free survival in high vs low T1D GRS halves



The number of cases of autoimmune diabetes remains constant from birth to 60 years of age.



Ref:- Thomas NJ, Jones SE, Weedon MN, Shields BM, Oram RA, Hattersley AT (2017) Frequency and phenotype of type 1 diabetes in the first six decades of life: a cross-sectional, genetically stratified survival analysis from UK Biobank. Lancet Diabetes Endocrinol

Calculated clinical characteristics of the of those diagnosed from 31 to 60 years of age

Mean/ Proportion (95% CI)	Type 1 diabetes diagnosed 31-60 years	Type 2 diabetes diagnosed 31-60 years	p value
n	537	11,696	
Current age (years)	56 (55-57)	59 (59-59)	p<0.0001
Age at diagnosis (years)	42 (41-43)	52 (52-52)	p<0.0001
BMI (kg/m ²)	27.4 (26.7-28.0)	32.4 (32.2-32.5)	p<0.0001
Insulin at a year (%)	89 (86-91)	6 (5-6)	p<0.0001
n	476/537	648/11696	
Insulin now (%)	100 (100-100)	16 (15-17)	p<0.0001
n	537/537	1924/11696	
DKA as a discharge diagnosis (%)	11 (9-14)61/537	0.3 (0.1-0.4)	p<0.0001
n		30/11696	

Conclusion

- 42% of type 1 diabetes occurs after 30 years of age
- Difficult to identify as type 2 diabetes predominates later in life
- Similar characteristics when diagnosed above and below 30 years of age
- Only possible because of large population dataset with genetic and linked data which allows novel approach's to answer important questions

Thank you for listening



Andrew Hattersley



Richard Oram



Sam Jones



Mike Weedon



Tim McDonald



Angus Jones



Bev Shields