

SUPPLEMENTARY DATA

Calculation of ceBMI:

BMI was calculated as weight (kg)/height(m²). The CDC 2000 growth charts (www.cdc.gov/nccdphp/dnpao/growthcharts/resources/sas.htm) were used to obtain the value for 85th percentile for age- and sex- adjusted BMI for each subject at the time of each study visit. Cumulative excess BMI, hereby referred to as ceBMI, has been used previously as a measure of persistent elevation of BMI beyond the overweight threshold(1; 2). The weighted sums of the differences between the actual BMI and corresponding 85th BMI percentile for the sex and age at that evaluation were calculated using the method described by Lee et al (1) and Bouchard et al (2). Briefly, a ceBMI score was calculated by summing the difference calculated at each BMI assessment while accounting for the irregular timing between evaluations (equation 1):

$$ceBMI_{yrs_j} = \sum_{i=0}^m \frac{(BMI_{t_i} - 85^{th} \text{ percentile } BMI_{t_i}) + (BMI_{t_{i+1}} - 85^{th} \text{ percentile } BMI_{t_{i+1}})}{2} \times \left(\frac{\text{number of days between } t_i \text{ and } t_{i+1}}{362.25} \right) \quad (1)$$

where $ceBMI_{yrs_j}$ = ceBMI-years for subject j in units kg/m²*years, and m = the number of BMI evaluations for subject j . We further annualized ceBMI_{yrs} to accommodate the irregular timing of BMI assessment in relation to time type 1 diabetes outcome or censoring in some subjects of our cohort (equation 2).

$$ceBMI_j = \frac{ceBMI_j}{\frac{t_m - t_0}{365.25}} \quad (2)$$

where $ceBMI_j$ is a value representing the annual average ceBMI in kg/m² for subject j over the number of years subject j had m BMI evaluations, t_m is time in days at the last BMI measurement, and t_0 is the time of first BMI evaluation.

To avoid confounding by weight loss that frequently precedes diagnosis of type 1 diabetes, for individuals who progressed to diabetes, the last BMI used was ≥ 6 months prior to the date of diagnosis

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REFERENCES

1. Lee JM, Gebremariam A, Vijan S, Gurney JG: Excess body mass index-years, a measure of degree and duration of excess weight, and risk for incident diabetes. *Arch Pediatr Adolesc Med* 2012;166:42-48
2. Bouchard DR, Porneala B, Janssen I, Langlois MF, Baillargeon JP, Fox CS, Meigs JB, D'Agostino RB, Sr., Pencina M, Hivert MF: Risk of type 2 diabetes and cumulative excess weight exposure in the Framingham Offspring Study. *J Diabetes Complications* 2013;27:214-218

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Supplementary Table 1. Demographics and baseline characteristics of PTP subjects included in the study.

Characteristic	Overall cohort (n=1117)	Females (n=534)	Males (n=583)	p value*
Age at 1 st BMI evaluation (years)				
Median (IQR)	10.1 (6.7; 13.3)	9.6 (6.4; 13.3)	10.5 (7.1; 13.2)	0.24
Range	2.0 to 17.96	2.0 to 17.94	2.0 to 17.96	
Progressed to type 1 diabetes				
No	897	437	460	
Yes	220	97	123	
# of BMI evaluations/subject				
Median (IQR)	4 (3; 6)	4 (3; 6.75)	4 (3; 6)	0.84
Range	2 to 21	2 to 21	2 to 21	
Total follow-up time in study (years)				
Median (IQR)	2.51	2.52	2.49	0.13
Range	0.49 to 10.5	0.49 to 10.5	0.50 to 10.2	
Follow up time for BMI eval (years)				
Median	2.0	2.0	2.0	0.30
Range	0.39 to 10.2	0.39 to 9.99	0.49 to 10.2	
Race				
Caucasian	954	446	508	0.55
African American	27	13	14	
Asian	13	7	6	
American Indian/AK native	3	1	2	
Native HI/Pac.Islander	3	3	0	
Missing/unknown	117	65	53	
Ethnicity				
Non-Hispanic	914	436	478	0.15
Hispanic	161	87	74	
Missing/unknown	42	11	31	
BMI Percentile at 1 st BMI eval				
Median (IQR)	63.8 (36.6; 84.6)	63.9 (38.8; 84.6)	63.5 (34.2; 84.8)	0.76
Range	0.0 to 99.9	0.2 to 99.7	0.0 to 99.9	
BMI Category at 1 st BMI eval				
Underweight	47	25	22	0.84
Normal Weight	795	378	417	
Overweight	151	74	77	
Obese	124	57	67	
Cumulative excess BMI (ceBMI)				
Median (IQR)	-1.88(-3.6; -0.04)	-1.95 (-3.5;-0.2)	-1.8 (-3.7; 0.032)	0.54
Range	-10.0 to 15.1	-9.2 to 15.1	-10.0 to 14.7	
<0	844	407	437	0.67

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>0	273	127	146	
HLA DR3/4 status				
Neither	161	80	81	0.74
DR3 and/or DR4	787	377	410	
Missing	169	77	92	
Antibody status at 1 st BMI eval				
Single Ab+	367	193	174	0.03
Multiple Ab+	750	341	409	
OGTT result at 1 st BMI eval				
Normal	769	371	398	0.34
Abnormal [†]	250	111	139	
Missing	98	52	46	

* p-values reflect differences by sex. [†]Abnormal OGTT defined as fasting blood glucose 100-125mg/dl and/or 2-hour glucose 140-199mg/dl.

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