Online-Only Supplemental Material

Approaches

Data analysis

Analyses of individual studies

Cross-sectional studies

We assessed the ability of the one-hour plasma (1-hPG) alone or in combination with covariates such as age, sex, ethnicity, and BMI to detect a two-hour plasma glucose (2-h PG) ≥ 11.1 mmol/L using logistic regression analyses. For Botnia Family Study (BFS) and Botnia Prospective Study (BPS), we used the Huber-White method to adjust the variance-covariance matrix for correlated errors. We considered the thresholds of 1-h PG to detect (2-h PG) ≥ 11.1 mmol/L at the maximum Youden's index and the minimum distance for each study, if they differed. We used Receiver Operator Characteristic (ROC) curve analyses to assess the ability of the 1-h PG to discriminate between cases of type 2 diabetes and non-cases. On a ROC curve, maximum Youden's index is the maximum vertical height above the chance line and the minimum distance is the point from the left-upper corner of the unit square. Further, at these indices, the sensitivity and specificity of a test are equal. We performed bootstrapping resampling to validate our model in order to prevent over-interpretation of the study data. We utilized R version 3.6.3 for the analyses of following studies; BFS, BPS, CATAnzaro MEtabolic RIsk factors, DIAbetes GENetic, Public School Worker, Public School Worker Prospective, and San Antonio Heart Study. Additionally, we used SAS version 9.4 for following studies; Diabetes Prediction and Screening Observational Study, Israel Study of Glucose Intolerance, Obesity and Hypertension, Madras Diabetes Research Foundation, and Pima Indian Biennial Study. Further, we employed SPSS version 23 for Genetic Physiopathology and Evolution of Type 2 Diabetes, SPSS version 25 for Helsinki Policemen Study, and SPSS version 24 for Oulu45.

Longitudinal studies

For participants with diabetes, we considered the value of 1-h PG at the first visit when they had a 2-h PG ≥11.1 mmol/L. In addition, for persons without diabetes, we considered the 1-h PG value at the last visit.

Meta-analysis

Quality assessment of diagnostic accuracy studies-2 (QUADAS-2) is a standardized evidence-based tool to assess quality of primary diagnostic accuracy studies. We applied it to this meta-analysis to understand how differences in design and conduct of studies might affect the accuracy of 1-h PG. It assesses two major areas, risk of bias and concerns regarding applicability. The "risk of bias" assesses the degree to which the estimates of diagnostic accuracy avoided risk of bias that might occur due to systemic flaws in the design and conduct of studies. The "concerns regarding applicability" assess the extent to which studies are applicable to the research question, e.g. regarding clinical and demographic features, the definition of target condition etc. It has four key domains: patient selection, index test, reference standard, and flow and timing. Patient selection aims to assess how studies recruited participants and their demographic and clinical characteristics, index test the conduct and interpretation of index test, reference standard the conduct and interpretation of reference test, and flow and timing the difference in the number of participants recruited to the number used in analyses. Each study underwent assessment of every domain in terms of risk of bias and the first three domains in terms of concerns regarding applicability.

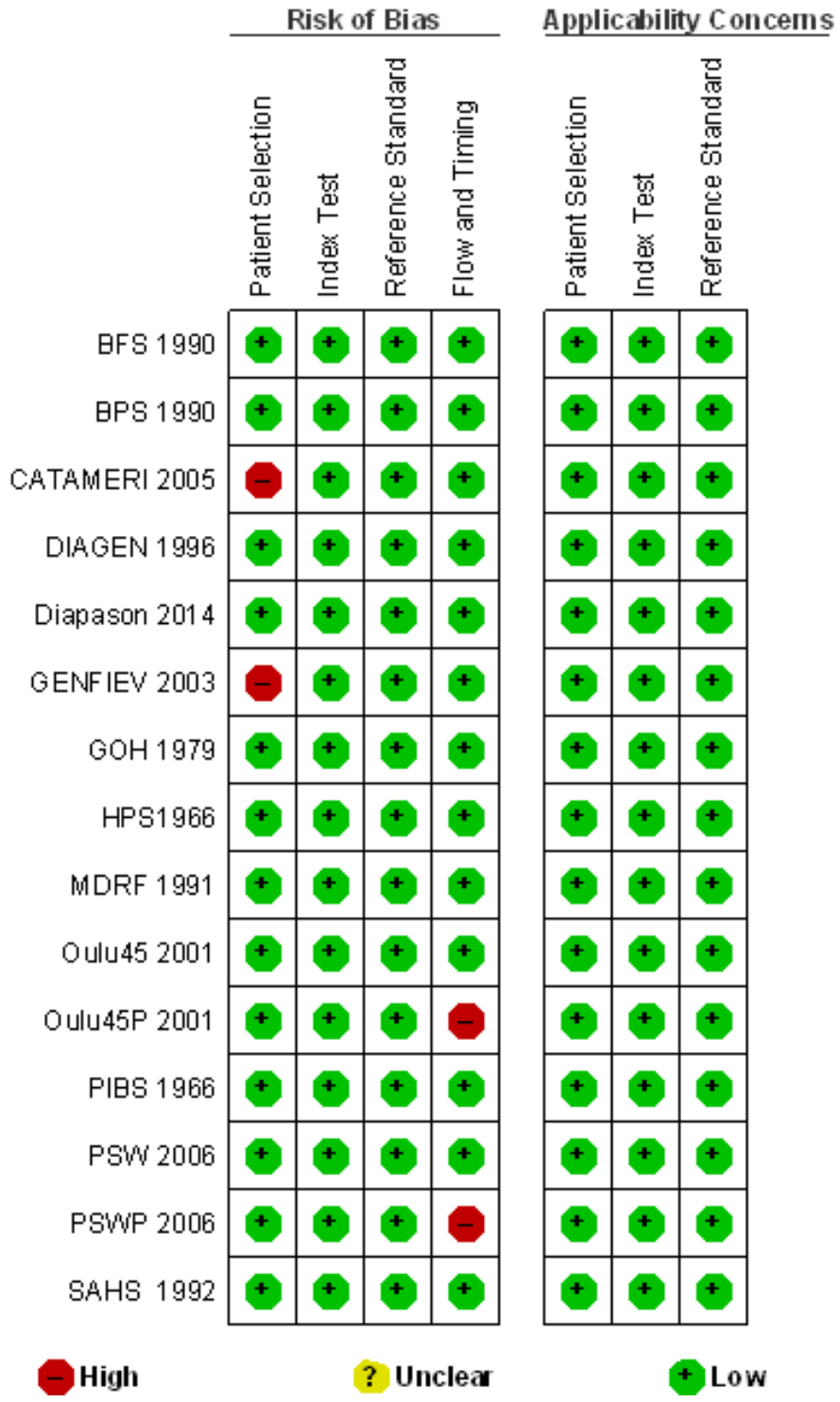

Figure S1. QUADAS-2 methodological assessment summary
BFS, Botnia Family Study; BPS, Botnia Prospective Study; CATAMERI, CATAnzaro MEtabolic RIsk factors; DIAGEN, DIAbetes GENetic study; GENFIEV, Genetic PHYsiopathology, and Evolution of Type 2 Diabetes; DIAPASON, Diabetes Prediction and Screening Observational Study; GOH, Israel Study of Glucose Intolerance, Obesity and Hypertension study; HPS, Helsinki Policemen Study; MDRF, Madras Diabetes Research Foundation study; Oulu45P, Oulu45 Prospective study; PIBS, Pima Indian Biennial Study; PSW, Public School Worker study; PSWP, Public School Worker Prospective study; SAHS, San Antonio Heart Study

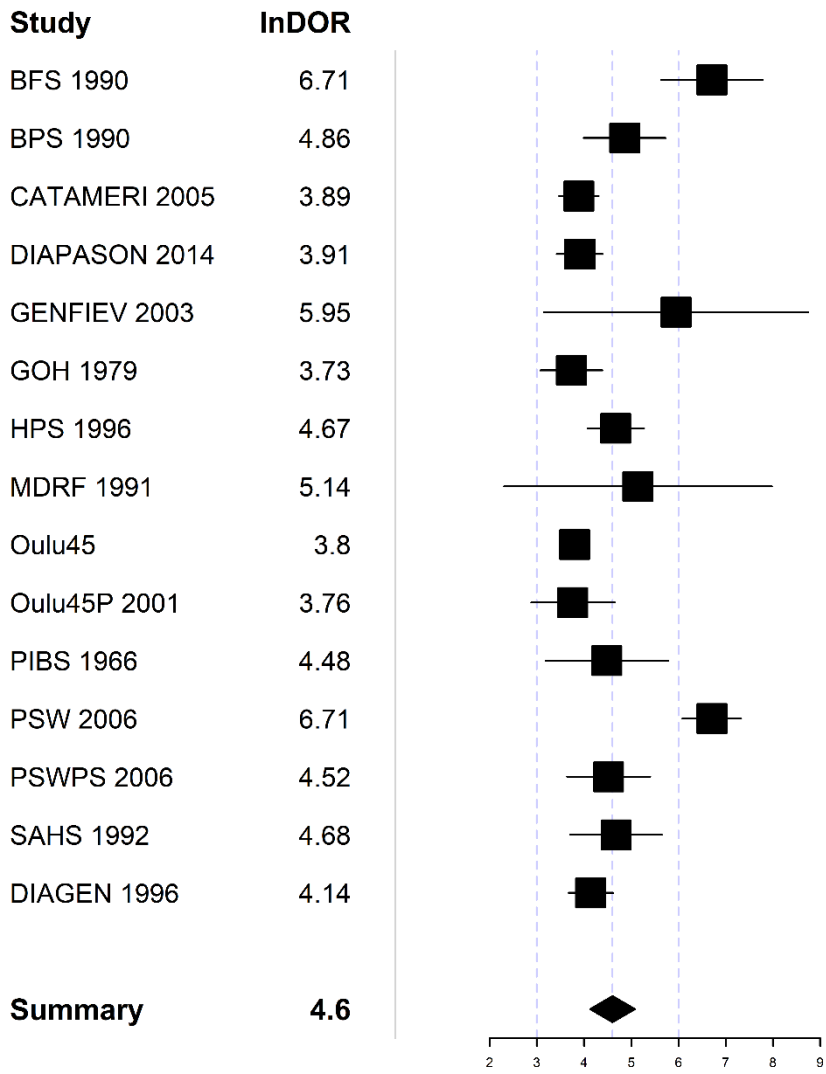

Figure S2. Forest plot of the log diagnostic odds ratio (DOR) of the individual studies with the summary DOR
BFS, Botnia Family Study; BPS, Botnia Prospective Study; CATAMERI, CATAnzaro MEtabolic RIsk factors; DIAGEN, DIAbetes GENetic study; GENFIEV, Genetic PHYsiopathology, and Evolution of Type 2 Diabetes; DIAPASON, Diabetes Prediction and Screening Observational Study; GOH, Israel Study of Glucose Intolerance, Obesity and Hypertension study; HPS, Helsinki Policemen Study; MDRF, Madras Diabetes Research Foundation study; Oulu45P, Oulu45 Prospective study; PIBS, Pima Indian Biennial Study; PSW, Public School Worker study; PSWP, Public School Worker Prospective study; SAHS, San Antonio Heart Study

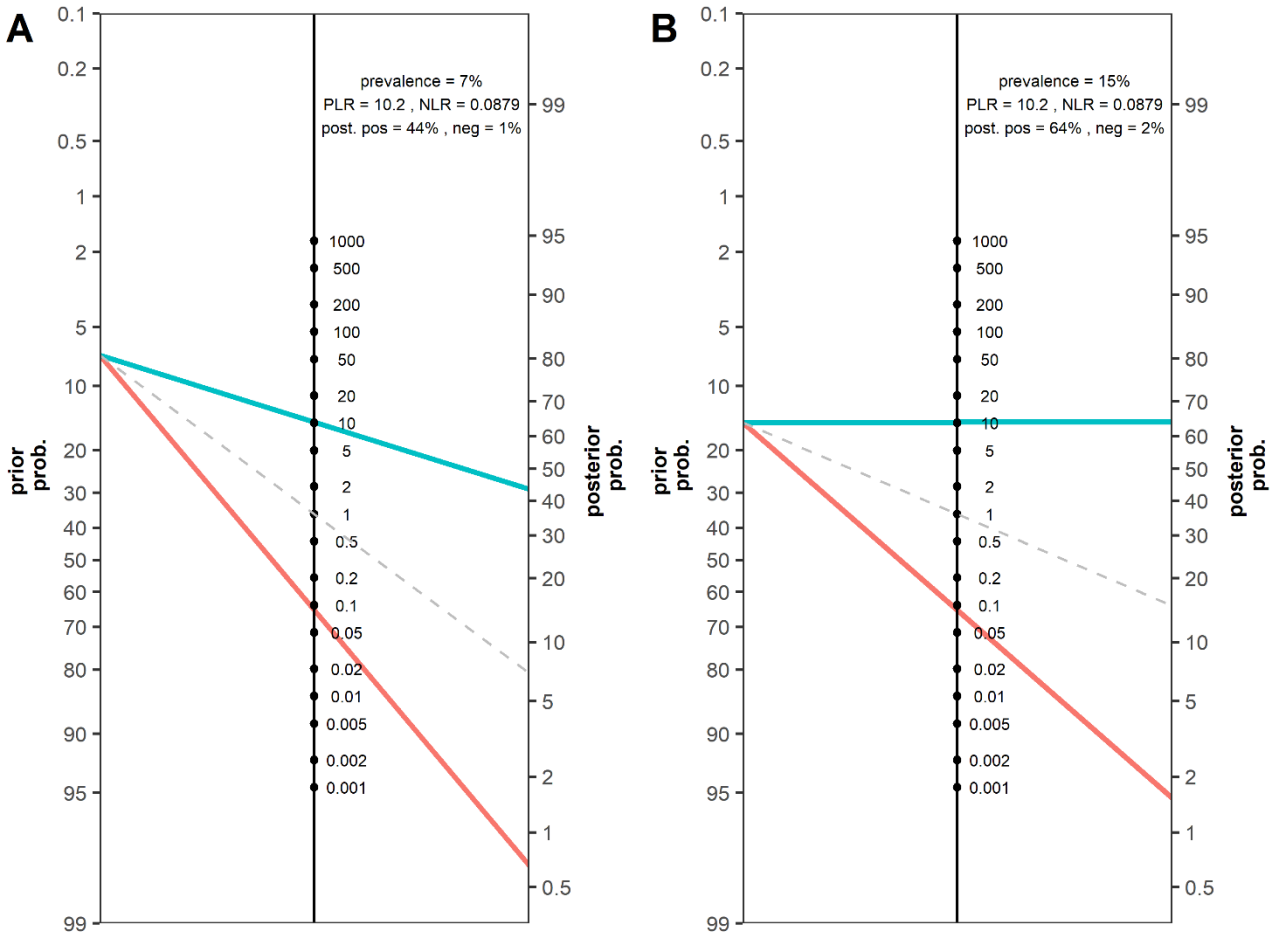

Figure S3. Fagan's nomogram displaying pre and post-test probabilities of 1-h PG at the 7% prevalence of diabetes in the meta-analysis (A) and at 27% prevalence in the Genetic PHYsiopathology, and Evolution of Type 2 Diabetes Study (B)

Prior prob., prior probability or prevalence; PLR, positive likelihood ratio; NLR, negative likelihood ratio; post. pos; posterior positive predictive value; post. neg, posterior negative predictive value

Upper line = positive predictive value, middle dashed line = null line; lower line = negative predictive value

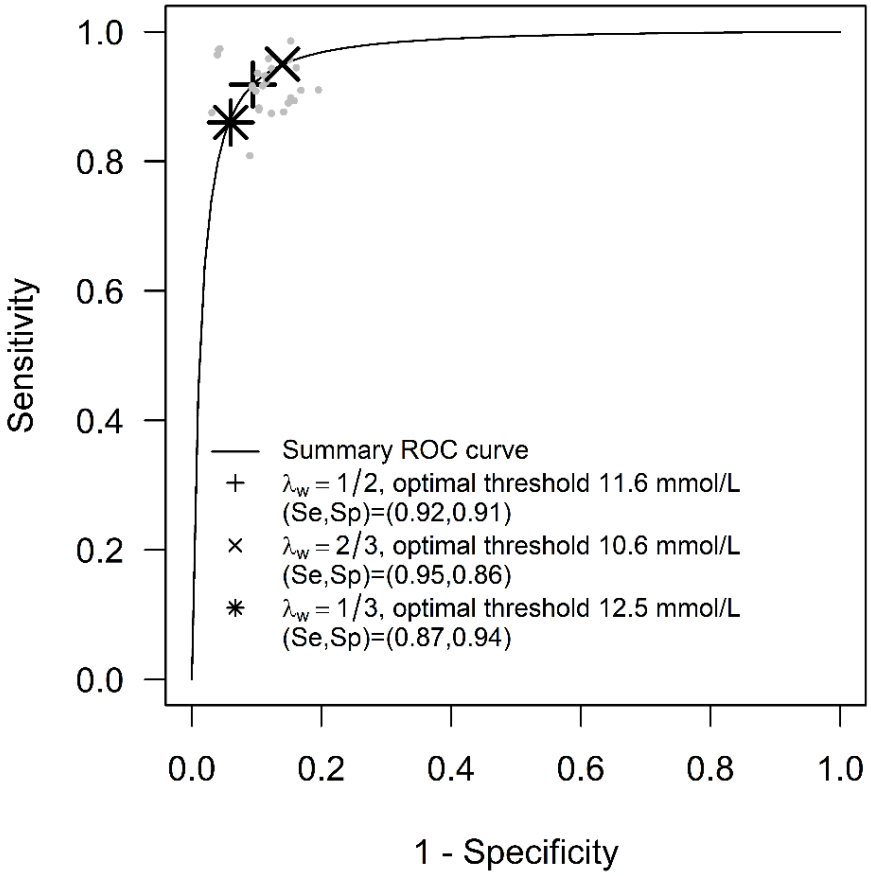

Figure S4. The Summary Receiver Operator Characteristic (SROC) curve displays three different 1-h plasma glucose cut-offs to detect 2-h plasma glucose of ≥11.1 mmol/L and associated sensitivities and false positive rates from the different random slope models (DS) with different weight ratios (λ) for sensitivity (Se) and specificity (Sp)
Grey circles = estimate of individual studies

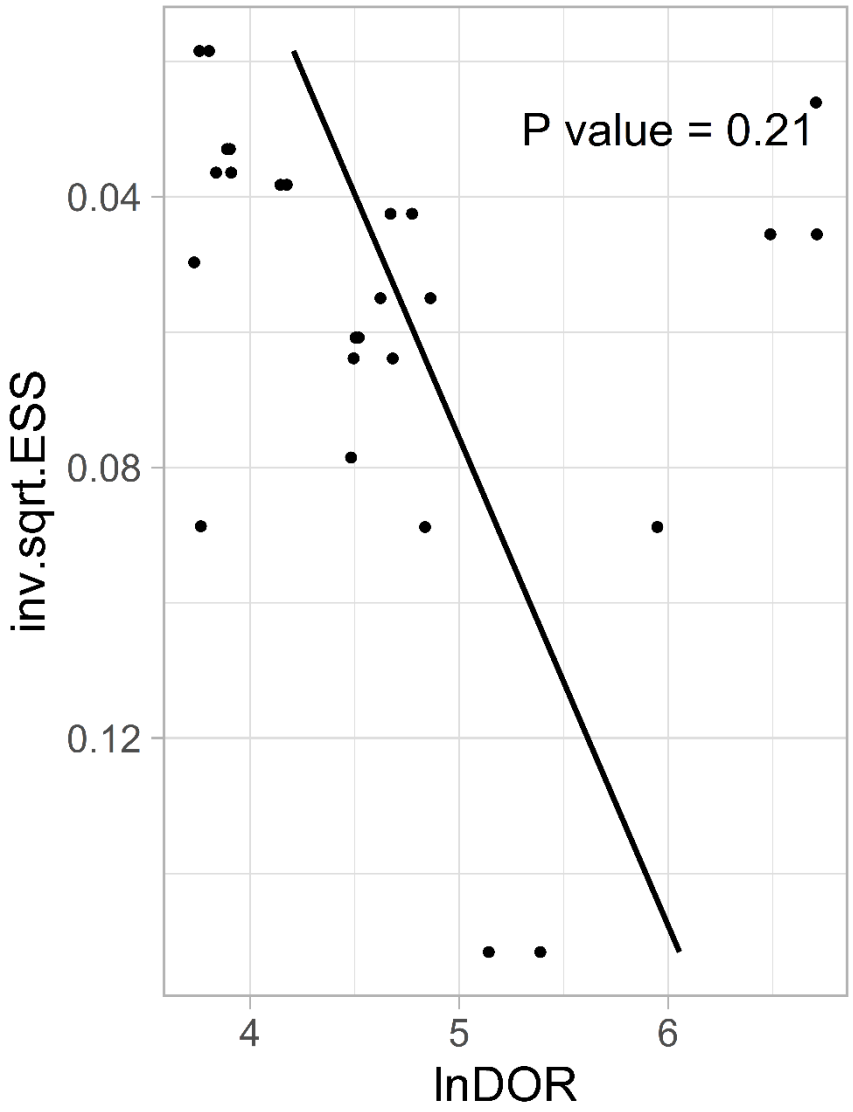

Figure S5. Funnel plot to examine sample size-related effects
lnDOR, log diagnostic odds ratio; inv.sqr.EES, inverse squared effective sample size
Black circles = individual study estimates

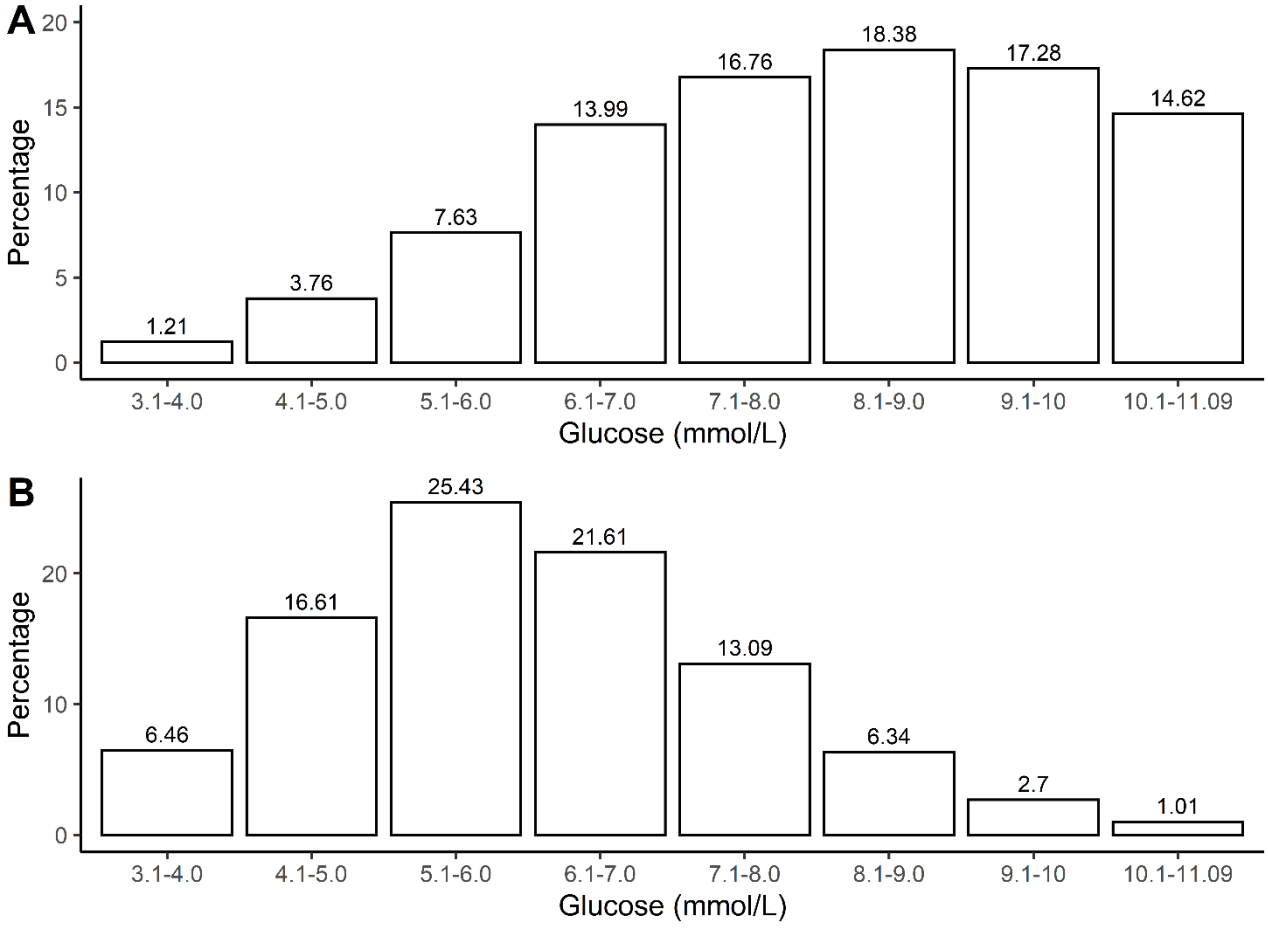

Figure S6. The bar chart shows distribution of 2h-PG values among participants classified as not having diabetes by the 2h-PG (<11.1 mmol/L), who were considered false positive (A) or true negatives (B) by the one-hour plasma glucose cut-off of 11.6 mmol/L in the studies with raw data*

* Botnia Family Study, Botnia Prospective Study, CATanzaro METabolic RIsk factors, DIAbetes GENetic study, Public School Worker Study, Public School Worker Prospective Study, San Antonio Heart Study

Table S1. Characteristics of the included studies

Study*	N without cases on glucose-lowering medications	N, new type 2 diabetes (2-h PG or FPG or HbA_{1c})	Cases by 2-h PG only, N (%)	Cases by 2-h PG and FPG/HbA_{1c}, N (%)	Excluded cases by FPG and/or HbA1c, N (%)	N without cases identified by only FPG/ HbA_{1c}	1-h PG in cases (2-h PG ≥11.1 mmol/L) (mean ± SD)	1-h PG in controls (mmol/L) (mean ± SD)
BFS 1990[15†‡]	3022	193	47 (24.4)	79 (40.9)	67 (34.7)	2995	15.3 ± 3.2	7.6 ± 2.2
BPS 1990[16†‡]	3253	170	49 (28.8)	36 (21.2)	85 (50.0)	3168	14.1 ± 2.3	7.8 ± 2.5
CATAMERI 2005[17]	3340	265	188 (70.9)	61 (23.0)	16 (6.0)	3324	13.5 ± 2.3	8.4 ± 2.4
DIAGEN 1996[18‡]	2770	294	113 (38.4)	91 (31.0)	90 (30.6)	2679	14.2 ± 2.9	8.7 ± 2.4
DIAPASON 2014[19‡]	531	34	34 (100)	0 (0)	0 (0)	531	13.1 ±1.5	8.1 ±2.3
GENFIEV 2003[20]	931	131	86 (65.7)	30 (22.9)	15 (11.5)	916	13.1 ± 1.8	9.2 ± 2.5
GOH 1979[10]	2126	183	77 (42.1)	72 (39.3)	34 (18.6)	2092	15.3 ± 3.8	8.1 ± 2.4
HPS 1966[21†]	1033	18	6 (33.3)	5 (27.8)	7 (38.9)	1026	15.9 ±3.7	7.4 ± 2.2
MDRF 1991[22]	9872	1023	583 (57.0)	219 (21.4)	221 (21.6)	9651	13.4 ± 1.6	9.1 ± 2.2
Oulu45 2001[23†]	959	59	20 (33.9)	13 (22.0)	26 (44.1)	933	13.9 ± 2.9	8.4 ± 2.1
Oulu45 2001[23†]	846	65	35 (4.1)	9 (1.1)	21 (2.5)	825	10.1 ± 1.9	7.9 ± 1.8
PIBS 1966[14]	2644	417	297 (71.2)	102 (24.5)	18 (4.3)	2640	18.5 ± 6.5	7.4 ± 2.3
PSW 2006[24‡]	2157	118	48 (40.7)	22 (18.6)	48 (40.7)	2085	13.5 ± 1.8	8.3 ± 2.4
PSWP 2006[25‡]	2015	83	49 (59.0)	16 (19.3)	18 (21.7)	1997	13.9 ±2.4	8.3 ± 2.4
SAHS 1992[26]	700	329	114 (34.6)	204 (62.0)	11 (3.3)	689	15.5 ±3.5	9.2 ± 2.0
All	36,199	3382	1746	959	677	35,551		

*Studies with their initiation years. †Blood glucose converted to plasma glucose using a conversion factor of 1.13. ‡Studies that determined HbA_{1c}; N, numbers; 2-hPG, two-hour plasma glucose; FPG, fasting plasma glucose; 1-hPG, one-hour plasma glucose; FPG/HbA1c, FPG and/or HbA1c in diabetic range; SD, standard deviation; BFS, Botnia Family Study; BPS, Botnia Prospective Study; CATAMERI, CATAnzaro MEtabolic RIsk factors; DIAGEN, DIAbetes GENetic study; GENFIEV, Genetic PHYsiopathology, and Evolution of Type 2 Diabetes; DIAPASON, Diabetes Prediction and Screening Observational Study; GOH, Israel Study of Glucose Intolerance, Obesity and Hypertension study; HPS, Helsinki Policemen Study; MDRF, Madras Diabetes Research Foundation study; Oulu45P, Oulu45 Prospective study; PIBS, Pima Indian Biennial Study; PSW, Public School Worker study; PSWP, Public School Worker Prospective study; SAHS, San Antonio Heart Study

Table S2. Meta-regression of sources of heterogeneity in the meta-analysis of 1-h PG to detect 2-h PG ≥ 11.1 mmol/L [*]

	Sensitivity		Specificity	
	Q coefficient	***P* value**	**Q coefficient**	***P* value**
Design of study[†]	0.63	0.43	0.02	0.88
Setting[‡]	0.31	0.58	0.54	0.46
Dose of glucose used for OGTT[§]	0.02	0.88	1.39	0.24
Ethnicity[‖]	25.90	<0.0001	355.53	<0.0001
Bias[¶]	1.69	0.19	6.73	0.001

[*]We used the cut-offs at the Youden's index for the meta-regression analyses; [†]Longitudinal vs. cross-sectional studies; [‡]Population-based vs diabetes clinic-based studies; [§]75 g vs 100 g; [‖]Ethnicity (Caucasians vs. South Asians vs. American Indians vs. Japanese vs. Mexican Americans); [¶]Studies with low risk of bias vs. with risk of bias

1-hPG, one-hour plasma glucose; 2-hPG, two-hour plasma glucose; OGTT, oral glucose tolerance test

Table S3. Comparison of 1-h PG cut offs to detect 2-h PG ≥ 11.1 mmol/L among ethnicities*

Ethnicity (study)	1-h PG cut-off†	Sensitivity	Specificity
Caucasians†§	11.7	0.91 (0.84, 0.95)	0.92 (0.89, 0.94)
South Asians‡ (MDRF)	11.5	0.90 (0.87, 0.91)	0.84 (0.83, 0.85)
American Indians‡ (PIBS)	10.8	0.97 (0.95, 0.99)	0.96 (0.95, 0.96)
Japanese† (PSW, PSWP)	11.3	0.92 (0.87, 0.96)	0.89 (0.88, 0.90)
Mexican Americans‡ (SAHS)	11.8	0.88 (0.83, 0.91)	0.90 (0.86, 0.93)

*Statistical test not available to compare cut-offs among different groups; †The cut-off for Caucasians and Japanese obtained after meta-analysing studies with Caucasian and Japanese participants because of availability of sufficient sample size; ‡the cut-off at the Youden's index is displayed for South Asians; American Indians, and Mexican Americans (the cut-offs at the minimum distance were 11.7, 10.8, and 11.8, respectively). § Studies with Caucasian participants (Botnia Family Study; Botnia Prospective Study; CATAMERI, CATAnzaro METabolic RIsk factors; DIAbetes GENetic study; Genetic Physiopathology and Evolution of Type 2 Diabetes study; Diabetes Prediction and Screening Observational Study; Israel Study of Glucose Intolerance, Obesity and Hypertension study; Helsinki Policemen Study; Oulu45P study, and Oulu45 Prospective study); 1-hPG, one-hour plasma glucose 2-hPG, two-hour plasma glucose; MDRF, Madras Diabetes Research Foundation study; PIBS, Pima Indian Biennial Study; PSW, Public School Worker; PSWP, Public School Worker Prospective; SAHS, San Antonio Heart Study

Table S4. The comparison of cut-offs of the 1-h PG to detect 2-h PG ≥ 11.1 mmol/L to ≤ 13.0 mmol/L with cut-offs to detect a 2-h PG ≥ 11.1 mmol/L in the sensitivity analysis*

		Cut-off in mmol/L (Se, Sp)		
		Studies with raw data		meta-analysis
		2-h PG ≥ 11.1 to ≤ 13.0	2-h PG ≥ 11.1	2-h PG ≥ 11.1
Weight ratio for Se vs. Sp	**lambda (λ)**			
more	2/3	12.6 (0.88, 0.96)	10.7 (0.94, 0.86)	10.6 (0.95, 0.86)
equal	1/2	13.5 (0.87, 0.98)	12.1 (0.90, 0.92)	11.6 (0.92, 0.91)
less	1/3	14.5 (0.86, 0.99)	13.5 (0.85, 0.95)	12.5 (0.87, 0.94)

1-hPG, one-hour plasma glucose; 2-hPG, two-hour plasma glucose; Se, sensitivity; Sp, specificity

Table S5. The comparison of unadjusted and adjusted cut-offs of 1-h PG to detect 2-hPG ≥ 11.1 mmol/L for the studies with raw data*

Weight ratio for Se vs. Sp	lambda (λ)	Unadjusted† cut-off (se, sp)		AUC‡ (CR for se at given sp)		Adjusted cut-off† cut-off (se, sp)		AUC‡ (CR for se at given sp)	
more	2/3	11.0	(0.93, 0.86)	0.962	(0.885, 0.985)	10.4	(0.93, 0.89)	0.973	(0.277, 0.996)
equal	1/2	12.3	(0.89, 0.90)	0.962	(0.885, 0.985)	14.8	(0.90, 0.94)	0.973	(0.277, 0.996)
less	1/3	13.7	(0.84, 0.95)	0.962	(0.885, 0.985)	20.7	(0.86, 0.96)	0.973	(0.277, 0.996)

* Botnia Family Study, Botnia Prospective Study, CATanzaro METabolic RIsk factors, DIAbetes GENetic study, Public School Worker Study, Public School Worker Prospective Study, San Antonio Heart Study; †Unadjusted cut-offs obtained after meta-analyzing unadjusted cut-offs from studies and adjusted cut-offs obtained after meta-analyzing age, sex, body-mass index (BMI; available for five out of seven studies) adjusted cut-offs from studies. ‡Statistical test not available to compare AUC between unadjusted and adjusted cut-offs

1-h PG, 1-h plasma glucose; 2-hPG, 2-h plasma glucose; Se, sensitivity; Sp, specificity; AUC, area under the curve for the summary receiver operator characteristic curve; CR, confidence region

Table S6. The comparison of unadjusted and age, sex, body-mass index adjusted cut-offs of 1-h PG to detect 2-h PG ≥ 11.1 mmol/L in the studies with available raw data*

Study	Unadjusted		Adjusted†		*P* value
	cut-off (se, sp)	AUC	cut-off (se, sp)	AUC	
BFS	11.9 (0.98, 0.96)	0.998	11. 3 (0.98, 0.97)	0.994	0.04
BPS	11.2 (0.94, 0.90)	0.959	10.8 (0.94, 0.90)	0.964	0.03
CATAMERI	10.8 (0.90, 0.85)	0.940	11.2 (0.91, 0.87)	0.944	0.02
DIAGEN	11.2 (0.91, 0.83)	0.941	11.2 (0.96, 0.85)	0.957	0.01
PSW	11.2 (0.93, 0.89)	0.956	11.8 (0.94, 0.89)	0.960	0.70
PSPW	11.3 (0.94, 0.89)	0.963	11.3 (0.92, 0.90)	0.964	0.45
SAHS	11.8 (0.88, 0.90)	0.956	11.5 (0.91, 0.90)	0.964	0.01

*Botnia Family Study, Botnia Prospective Study, CATAMERI, CATAnzaro METabolic RIsk factors, DIAbetes GENetic studyPublic School Worker Study, Public School Worker Prospective Study, San Antonio Heart Study;
†Body-mass index available for five out of seven studies
1-h PG, 1-h plasma glucose; 2-hPG, 2-h plasma glucose; Se, sensitivity; Sp, specificity; AUC, area under curve