<Supplementary Information>

Article in *Scientific Reports*

Visceral adiposity index (VAI), lipid accumulation product (LAP), and product of triglycerides and glucose (TyG) to discriminate prediabetes and diabetes

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Supplemental table S1. General Distribution of cut-off value with corresponding predictive values of VAI, LAP, and TyG

	Sensitivity	Specificity	PPV	NPV	AUC (95% CI)	P-value	DLR(+)	DLR(-)	YI	Cut-offs
Overall										
VAI	0.645	0.629	0.432	0.802	0.687 (0.662-0.712)	<0.001 †	1.738	0.565	0.274	1.52
LAP	0.698	0.663	0.475	0.834	0.743 (0.720-0.765)	<0.01 ‡	2.073	0.456	0.361	41.30
TyG	0.732	0.658	0.484	0.849	0.762 (0.740-0.784)	<0.001 §	2.142	0.408	0.390	8.60
Men										
VAI	0.433	0.792	0.562	0.693	0.649 (0.613-0.685)	<0.001 †	2.076	0.716	0.224	2.33
LAP	0.595	0.727	0.574	0.744	0.701 (0.667-0.735)	0.025 ‡	2.179	0.558	0.322	56.70
TyG	0.666	0.663	0.550	0.762	0.721 (0.687-0.754)	<0.001 §	1.974	0.504	0.328	8.75
Women										
VAI	0.755	0.582	0.358	0.885	0.720 (0.685-0.755)	<0.001 †	1.807	0.421	0.337	1.32
LAP	0.802	0.613	0.390	0.909	0.760 (0.728-0.793)	0.047 ‡	2.074	0.323	0.415	30.40
TyG	0.720	0.705	0.429	0.891	0.782 (0.751-0.814)	<0.001 §	2.438	0.398	0.425	8.53
Age≥ 65										
VAI	0.525	0.702	0.676	0.555	0.639 (0.580-0.699)	0.142 †	1.762	0.676	0.227	1.87
LAP	0.592	0.675	0.684	0.583	0.665 (0.607-0.723)	0.052 ‡	1.825	0.604	0.268	49.95
TyG	0.508	0.781	0.734	0.573	0.697 (0.641-0.753)	<0.001 §	2.326	0.629	0.290	8.85
Age<65										
VAI	0.650	0.637	0.384	0.839	0.695 (0.667-0.723)	<0.001 †	1.790	0.549	0.287	1.52
LAP	0.695	0.682	0.432	0.865	0.750 (0.724-0.776)	<0.01 ‡	2.184	0.447	0.377	41.30
TyG	0.752	0.671	0.443	0.886	0.772 (0.747-0.797)	<0.001 §	2.287	0.370	0.423	8.60

DLR, Diagnostic Likelihood Ratio; YI, Youden Index; PPV, positive predictive value; NPV, negative predictive value
† P-value of ROC test between the area under the curve (AUC) value for visceral adiposity index (VAI) and that of lipid accumulation product (LAP).
‡ P-value of ROC test between the area under the curve (AUC) value for LAP and that of the product of triglycerides and glucose (TyG).
§ P-value of ROC test between the area under the curve (AUC) value for TyG and VAI.

Supplemental table S2. Performance of markers for identifying persons with prediabetes/diabetes, according to sex and age

Marker	Population		ROC coefficient	P- value	AUC (95% CI)*
VAI	Overall	40yrs	-0.0089	0.0725	0.702 (0.654-0.745)
		55yrs			0.667 (0.641-0.695)
		70yrs			0.631 (0.591-0.678)
	Men	40yrs	-0.0066	0.3025	0.666 (0.611-0.721)
		55yrs			0.640 (0.604-0.677)
		70yrs			0.613 (0.540-0.676)
	Women	40ysr	-0.0069	0.3750	0.707 (0.629-0.778)
		55yrs			0.681 (0.638-0.721)
		70yrs			0.654 (0.585-0.720)
LAP	Overall	40yrs	-0.0107	0.0250	0.747 (0.702-0.786)
		55yrs			0.709 (0.684-0.734)
		70yrs			0.668 (0.623-0.713)
	Men	40yrs	-0.0060	0.3425	0.699 (0.642-0.755)
		55yrs			0.675 (0.639-0.713)
		70yrs			0.651 (0.581-0.715)
	Women	40yrs	-0.0065	0.4100	0.728 (0.651-0.800)
		55yrs			0.704 (0.664-0.746)
		70yrs			0.679 (0.613-0.741)
TyG	Overall	40yrs	-0.0110	0.0250	0.769 (0.727-0.808)
		55yrs			0.732 (0.709-0.755)
		70yrs			0.692 (0.650-0.734)
	Men	40yrs	-0.0059	0.3750	0.725 (0.670-0.775)
		55yrs			0.703 (0.668-0.738)
		70yrs			0.680 (0.607-0.740)
	Women	40yrs	-0.0100	0.1900	0.762 (0.689-0.832)
		55yrs			0.729 (0.688-0.768)
		70yrs			0.693 (0.630-0.754)
HOMA-IR	Overall	40yrs	-0.0004	0.9475	0.777 (0.735-0.818)
		55yrs			0.776 (0.754-0.799)
		70yrs			0.775 (0.735-0.813)
	Men	40yrs	-0.0020	0.7525	0.770 (0.718-0.819)
		55yrs			0.764 (0.730-0.796)
		70yrs			0.757 (0.696-0.812)
	Women	40yrs	0.0051	0.5675	0.754 (0.675-0.823)
		55yrs			0.772 (0.736-0.808)
		70yrs			0.790 (0.725-0.845)

*AUC (95% CI), area under the ROC curve (95% Confidence Interval). A direct methodology ROC regression models incorporating age as covariate.
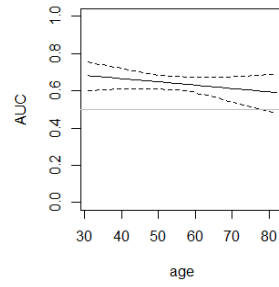
Supplemental figure S3. Influence of sex and age on the area under the ROC curve (AUC) by direct non-parametric ROC regression models.
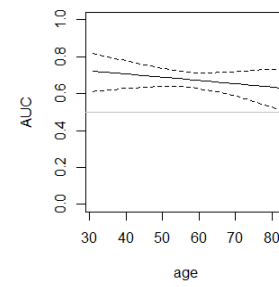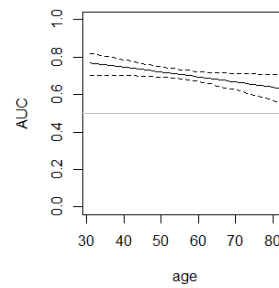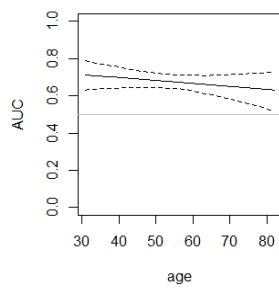
VAI
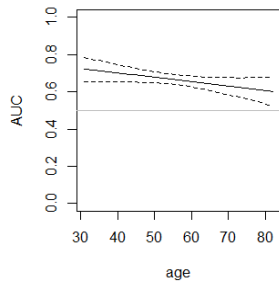
Overall	Men	Women

LAP

Overall	Men	Women
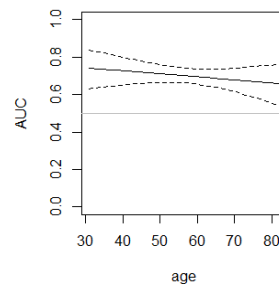
TyG
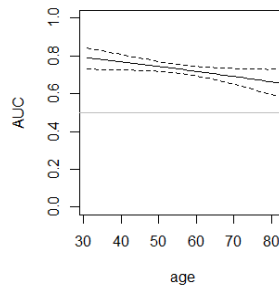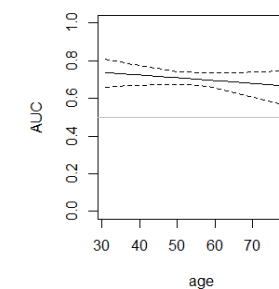
Overall	Men	Women
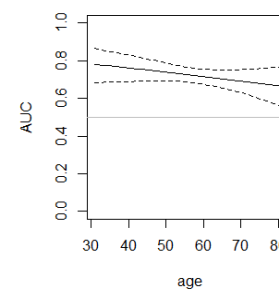
HOMA-IR

Overall

Men

Women

Supplemental table S4. Sensitivity analysis (1) of the discriminatory accuracy and cut-off values for VAI, LAP, TyG, and HOMA-IR

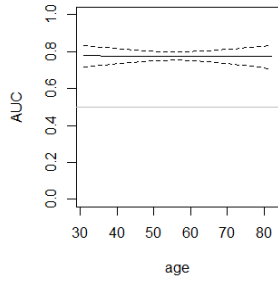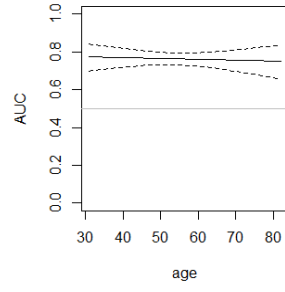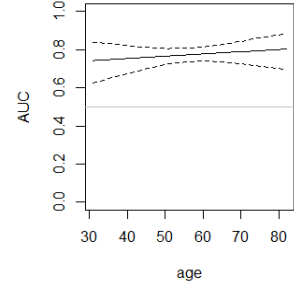|	Sensitivity	Specificity	PPV	NPV	AUC (95% CI)	YI	Cut-offs	P-value†
Overall								
VAI	0.675	0.604	0.415	0.817	0.691 (0.665-0.716)	0.279	1.44	0.853
LAP	0.694	0.673	0.469	0.841	0.746 (0.723-0.770)	0.368	41.30	0.821
TyG	0.734	0.669	0.480	0.858	0.765 (0.742-0.788)	0.402	8.60	0.861
HOMA-IR	0.631	0.796	0.563	0.838	0.789 (0.767-0.812)	0.427	2.37	0.945
Men								
VAI	0.434	0.801	0.565	0.703	0.658 (0.621-0.695)	0.234	2.33	0.190
LAP	0.596	0.734	0.572	0.753	0.706 (0.671-0.741)	0.331	56.70	0.096
TyG	0.657	0.689	0.558	0.771	0.727 (0.693-0.761)	0.346	8.78	0.065
HOMA-IR	0.687	0.722	0.595	0.794	0.779 (0.748-0.810)	0.408	2.27	0.652
Women								
VAI	0.736	0.598	0.347	0.886	0.715 (0.678-0.753)	0.334	1.34	0.354
LAP	0.805	0.608	0.373	0.915	0.760 (0.726-0.794)	0.413	29.60	0.667
TyG	0.714	0.711	0.418	0.896	0.780 (0.747-0.813)	0.425	8.53	0.451
HOMA-IR	0.571	0.861	0.543	0.874	0.786 (0.752-0.820)	0.432	2.57	0.988
Age>=65								
VAI	0.527	0.711	0.693	0.548	0.643 (0.578-0.709)	0.237	1.87	0.283
LAP	0.613	0.678	0.702	0.586	0.669 (0.605-0.733)	0.291	49.95	0.359
TyG	0.513	0.802	0.762	0.571	0.697 (0.635-0.758)	0.315	8.85	0.448
HOMA-IR	0.633	0.860	0.848	0.654	0.793 (0.740-0.847)	0.493	2.65	0.965
Age<65								
VAI	0.644	0.644	0.377	0.844	0.696 (0.667-0.725)	0.288	1.52	0.852
LAP	0.683	0.691	0.425	0.867	0.750 (0.723-0.776)	0.374	41.30	0.807
TyG	0.751	0.751	0.442	0.891	0.773 (0.747-0.799)	0.432	8.60	0.967
HOMA-IR	0.642	0.766	0.479	0.864	0.783 (0.758-0.809)	0.408	2.27	0.905

Sensitivity analysis excluding individuals taking statins (n, (%)); Men: 66 (6.9%), Women: 63 (5.7%)

VAI, visceral adiposity index; LAP, lipid accumulation product; TyG, triglyceride and glucose PPV, positive predictive value; NPV, negative predictive value; YI, Youden Index

† P-value of receiver operating characteristic (ROC) test between AUC of each marker from original dataset and sensitivity analysis dataset, respectively.

Supplemental table S5. Sensitivity analysis (2) of the discriminatory accuracy and cut-off values for VAI, LAP, TyG, and HOMA-IR

	Sensitivity	Specificity	PPV	NPV	AUC (95% CI)	YI	Cut-offs	P-value†
Overall								
VAI	0.678	0.604	0.419	0.816	0.690 (0.664-0.716)	0.281	1.44	0.970
LAP	0.697	0.671	0.472	0.840	0.746 (0.722-0.769)	0.367	41.30	0.964
TyG	0.735	0.668	0.483	0.857	0.765 (0.742-0.788)	0.404	8.60	0.995
HOMA-IR	0.662	0.765	0.544	0.843	0.789 (0.767-0.811)	0.427	2.27	0.999
Men								
VAI	0.433	0.800	0.569	0.698	0.657 (0.620-0.693)	0.233	2.33	0.522
LAP	0.594	0.733	0.575	0.747	0.704 (0.670-0.739)	0.326	56.70	0.600
TyG	0.661	0.688	0.564	0.769	0.726 (0.692-0.760)	0.349	8.78	0.579
HOMA-IR	0.681	0.731	0.607	0.790	0.779 (0.749-0.810)	0.412	2.29	0.928
Women								
VAI	0.737	0.597	0.347	0.887	0.716 (0.679-0.753)	0.334	1.34	0.510
LAP	0.806	0.606	0.373	0.915	0.760 (0.726-0.794)	0.412	29.60	0.595
TyG	0.716	0.708	0.416	0.896	0.780 (0.747-0.813)	0.424	8.53	0.619
HOMA-IR	0.573	0.859	0.541	0.874	0.786 (0.752-0.819)	0.432	2.57	0.957
Age>=65								
VAI	0.535	0.715	0.703	0.550	0.648 (0.584-0.713)	0.251	1.87	0.137
LAP	0.619	0.683	0.711	0.587	0.673 (0.610-0.736)	0.302	49.95	0.695
TyG	0.523	0.805	0.771	0.572	0.703 (0.642-0.763)	0.327	8.85	0.867
HOMA-IR	0.716	0.764	0.793	0.681	0.785 (0.731-0.839)	0.480	2.25	0.647
Age<65								
VAI	0.644	0.643	0.380	0.842	0.694 (0.664-0.723)	0.288	1.,52	0.495
LAP	0.683	0.689	0.426	0.865	0.748 (0.721-0.774)	0.371	41.30	0.817
TyG	0.749	0.681	0.443	0.889	0.772 (0.746-0.797)	0.430	860	0.873
HOMA-IR	0.582	0.829	0.535	0.854	0.784 (0.759-0.809)	0.411	2.53	0.828

Sensitivity analysis excluding individuals taking statins, but including individuals with previous MI and/or stroke (Overall: 1934, Men: 903, Women:1031)

VAI, visceral adiposity index; LAP, lipid accumulation product; TyG, triglyceride and glucose PPV, positive predictive value; NPV, negative predictive value; YI, Youden Index

† P-value of receiver operating characteristic (ROC) test between AUC of each marker from original dataset and sensitivity analysis dataset, respectively.