Supplementary material

Prediction accuracy

The estimated Standard Error (SE) of the IRT scores were less than 20 in most cases, however among the PREM scales, CoDC gives the most uncertain predictions, in the upper half of the scale with SE ranging from 25 to 35 (Figure S1). Among the PROM scales, NLBS in DMT2 has SE ranging from 25 to 30 for the highest scores between 90 and 100 on the scale. DiEx and GenW have SE between 20 and 25 across the whole scale. The scales NLD and MoE are uncertain for the highest scores (90-100), SE ranging from 20 to 25.

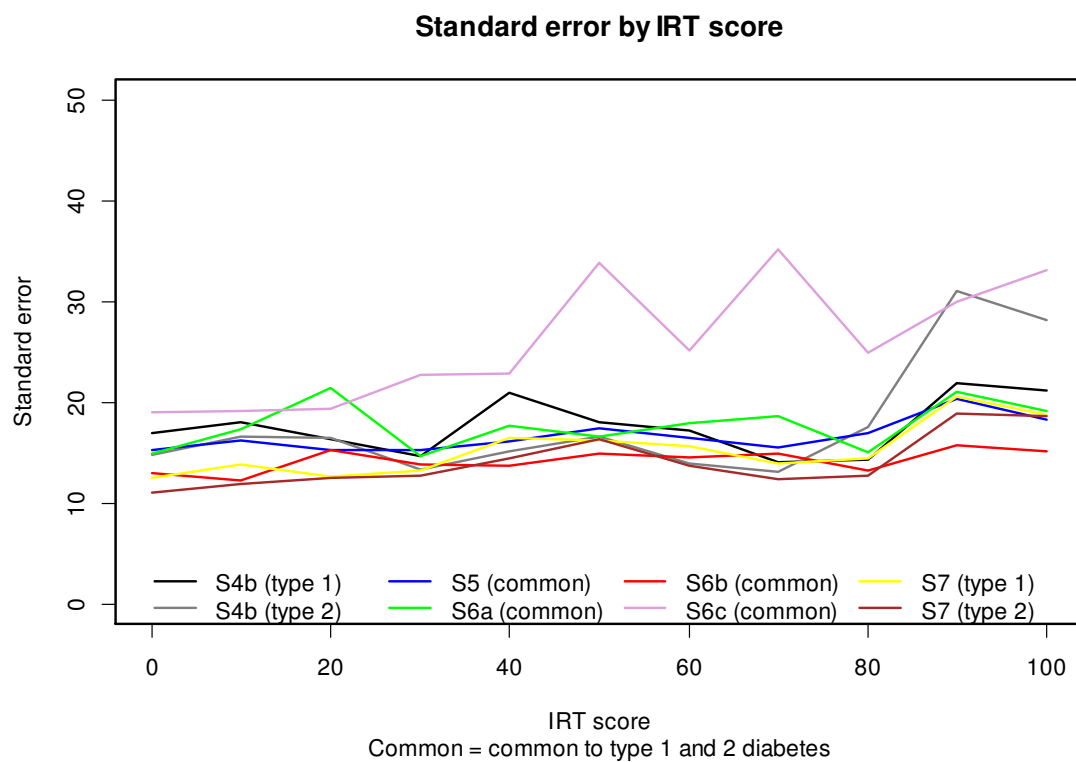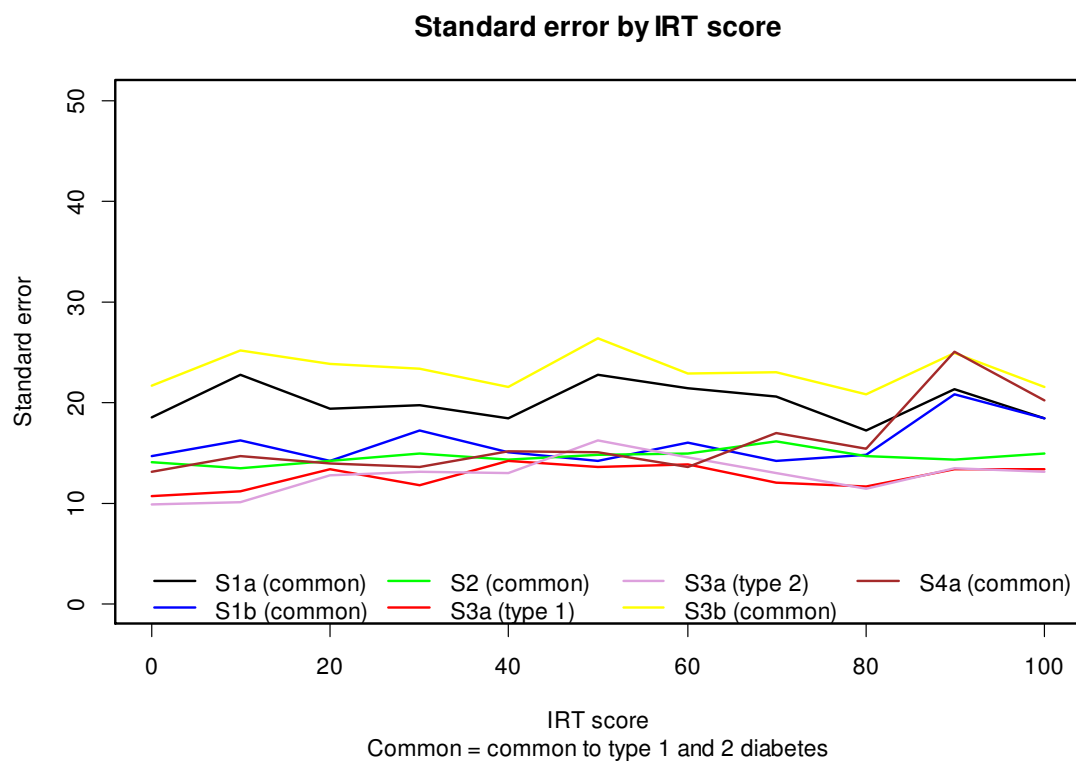Figure S1. Standard error by Item Response Theory (IRT) Score

Standard error by IRT score

Standard error by IRT score

Table S1. Responses to Retest Questions 34 and 35

	Type 1		Type 2	
	Question 34	Question 35	Question 34	Question 35
Very much better	1 (1%)	3 (3%)	3 (3%)	4 (3%)
Much better	10 (9%)	5 (4%)	8 (7%)	10 (8%)
A little better	20 (17%)	7 (6%)	8 (7%)	5 (4%)
No change	74 (64%)	96 (84%)	91 (76%)	99 (83%)
A little worse	9 (8%)	2 (2%)	9 (8%)	2 (2%)
Much worse	1 (1%)	1 (1%)	1 (1%)	0 (0%)
Very much worse	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	115 (100%)	114 (100%)	120 (100%)	120 (100%)

Notes: In type 1, 2 missing in Question 34, 3 missing in Question 35. In type 2, 6 missing in Question 34, 6 missing in Question 35.

Table S2. Patient characteristics among responders and non-responders.

	Type 1		Type 2	
	Responders	Non-responders	Responders	Non-responders
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Age (years)	48.42 (16.39)	40.84 (15.37)	66.49 (9.07)	62.8 (10.91)
Per cent Male	50 (50)	39 (49)	61 (49)	58 (49)
Diabetes duration (years)	24.77 (15.89)	21.62 (13.92)	9.27 (7.53)	8.50 (7.11)
HbA1c mmol/mol	61.18 (12.65)	64.73 (15.15)	52.56 (12.40)	53.92 (14.36)
SBP mmHg	126.92 (14.21)	125.89 (13.84)	134.19 (14.54)	134.69 (15.89)
DBP mmHg	72.88 (9.09)	74.63 (8.94)	76.74 (9.48)	77.60 (9.56)
BMI kg/m^2)	25.95 (4.26)	26.00 (4.61)	30.00 (5.28)	30.97 (5.93)
Cholesterol	4.58 (0.94)	4.62 (0.94)	4.51 (1.08)	4.69 (1.10)
Triglycerides	1.03 (0.70)	1.14 (0.89)	1.85 (1.37)	1.89 (1.26)
HDL	1.69 (0.52)	1.58 (0.51)	1.25 (0.38)	1.26 (0.41)
LDL	2.45 (0.78)	2.55 (0.80)	2.48 (0.89)	2.65 (0.94)
Number of patients	1 849	1 436	1 840	1 450

Notes: HbA1c=glycated hemoglobin level, SBP=Systolic Blood Pressure, DBP=diastolic blood pressure, BMI=Body Mass Index, HDL=high-density lipoprotein cholesterol level, LDL=low-density lipoprotein cholesterol level.

Table S3. Test-retest analysis using Intra-Class Correlation (ICC) of respondents reporting no change, and a sensitivity analysis of respondents reporting small improvement, no change, or small worsening (ICC SA).

Scale	Name	Type 1 diabetes ICC	ICC SA	Type 2 diabetes ICC	ICC SA
GenW	General Wellbeing	0.66	0.63	0.63	0.65
MoE	Mood and Energy	0.79	0.82	0.72	0.73
FreW	Free of Worries (about blood sugar)	0.77	0.74	0.69	0.67
ManD	(Capabilities to) Manage your Diabetes	0.68	0.65	0.69	0.68
DiEx	Diet and Exercise	0.64	0.61	0.75	0.69
NLD	Not Limited by Diabetes	0.82	0.79	0.76	0.77
NLBS	Not Limited by Blood Sugar	0.57	0.62	0.47	0.54
SuO	Support from Others	0.79	0.76	0.73	0.66
SuDC	Support from Diabetes Care	0.79	0.79	0.76	0.74
AcDC	Access to Diabetes Care	0.75	0.75	0.75	0.69
CoDC	Continuity in Diabetes Care	0.55	0.56	0.64	0.62
MDMT	Medical Devices and Medical Treatment	0.74	0.73	0.59	0.61

Notes: ICC <0.40 judged as poor retest-reliability, 0.40-0.59 fair, 0.60-0.74 good and >0.74 excellent.

Table S4. Correlations (Spearman) between risk factors and IRT Scores.

(a) Type 1 diabetes	HbA1c	SBP	LDL	GenW	MoE	FreE	ManD	DiEx	NLD	NLBS	SuO	SuDC	AcDC	CoDC	MDMT
HbA1c	1.00*														
SBP	0.05	1.00*													
LDL	0.09*	0.00	1.00*												
GenW General Wellbeing	-0.11*	0.07	-0.01	1.00*											
Moe Mood and energy	-0.12*	0.12*	-0.04	0.56*	1.00*										
FreW Free of worries	-0.14*	0.08	-0.04	0.39*	0.60*	1.00*									
ManD Manage your diabetes	-0.23*	0.04	-0.07	0.41*	0.60*	0.55*	1.00*								
DiEx Diet and exercise	-0.20*	0.08	-0.03	0.37*	0.42*	0.34*	0.47*	1.00*							
NLD Not limited by diabetes	-0.06	0.02	-0.04	0.31*	0.51*	0.46*	0.44*	0.28*	1.00*						
NLBS Not limited by blood sugar	-0.13*	0.03	-0.03	0.35*	0.48*	0.51*	0.43*	0.27*	0.58*	1.00*					
SuO Support from others	-0.08	0.02	-0.03	0.29*	0.36*	0.30*	0.42*	0.31*	0.31*	0.29*	1.00*				
SuDC Support from diabetes care	-0.05	0.02	-0.04	0.31*	0.37*	0.28*	0.37*	0.23*	0.31*	0.26*	0.34*	1.00*			
AcDC Access to diabetes care	-0.05	0.04	-0.04	0.29*	0.36*	0.32*	0.37*	0.25*	0.31*	0.29*	0.35*	0.62*	1.00*		
CoDC Continuity in diabetes care	0.06	-0.03	-0.02	0.08	0.07	0.07	0.12*	0.09	0.13*	0.07	0.15*	0.33*	0.33*	1.00*	
MDMT Medical devices and medical treatment	-0.00	0.05	-0.08	0.27*	0.40*	0.30*	0.39*	0.27*	0.32*	0.23*	0.32*	0.48*	0.42*	0.22*	1.00*

Notes: HbA1c=glycated hemoglobin level, SBP=Systolic Blood Pressure, LDL=low-density lipoprotein cholesterol level. * p <0.001.

Table S4 continued. Correlations (Spearman) between risk factors and IRT Scores.

(b) Type 2 diabetes	HbA1c	SBP	LDL	GenW	MoE	FreE	ManD	DiEx	NLD	NLBS	SuO	SuDC	AcDC	CoDC	MDMT
HbA1c	1.00*														
SBP	0.03	1.00*													
LDL	-0.04	0.03	1.00*												
GenW General Wellbeing	-0.13*	0.02	-0.06	1.00*											
Moe Mood and energy	-0.22*	0.01	-0.05	0.62*	1.00*										
FreW Free of worries	-0.25*	0.00	-0.03	0.44*	0.64*	1.00*									
ManD Manage your diabetes	-0.23*	0.00	-0.00	0.47*	0.63*	0.52*	1.00*								
DiEx Diet and exercise	-0.21*	0.01	0.02	0.42*	0.48*	0.43*	0.57*	1.00*							
NLD Not limited by diabetes	-0.23*	0.03	0.02	0.40*	0.58*	0.52*	0.44*	0.35*	1.00*						
NLBS Not limited by blood sugar	-0.21*	-0.00	0.01	0.39*	0.56*	0.56*	0.42*	0.28*	0.62*	1.00*					
SuO Support from others	-0.09	-0.01	0.04	0.30*	0.42*	0.37*	0.50*	0.40*	0.37*	0.33*	1.00*				
SuDC Support from diabetes care	-0.12*	-0.05	-0.07	0.29*	0.35*	0.30*	0.40*	0.29*	0.29*	0.30*	0.33*	1.00*			
AcDC Access to diabetes care	-0.13*	-0.01	-0.03	0.34*	0.39*	0.35*	0.39*	0.33*	0.32*	0.35*	0.33*	0.69*	1.00*		
CoDC Continuity in diabetes care	-0.03	-0.01	-0.00	0.19*	0.21*	0.18*	0.24*	0.20*	0.19*	0.19*	0.20*	0.47*	0.51*	1.00*	
MDMT Medical devices and medical treatment	-0.10*	-0.02	-0.02	0.31*	0.36*	0.30*	0.38*	0.29*	0.30*	0.30*	0.36*	0.49*	0.48*	0.31*	1.00*

Notes: HbA1c=glycated hemoglobin level, SBP=Systolic Blood Pressure, LDL=low-density lipoprotein cholesterol level. * p <0.001.