

SUPPLEMENTARY DATA

**Supplementary Table 1.** Definitions of the diabetes-related complications (International Classification of Diseases, 9<sup>th</sup> revision [ICD-9] codes).

<b>Complications</b>	<b>ICD-9 codes</b>
Non-fatal myocardial infarction (MI)	410
Fatal MI	Fatal vascular event (>410 and <414.9, or >428 and <428.9) sudden death (>798 and <798.9)
Non-fatal stroke	>430 and <434.9, or 436
Fatal stroke	>430 and <438.9
Congestive heart failure (CHF)	>428 and <428.9
Other ischaemic heart disease (IHD)	>410 and <414.9
Amputation	>5.845 and <5.848, or 250.6
Blindness in one eye	>369 and <369.9
Renal failure	250.3, or >585 and <586
Fatal renal failure	>580 and <593.9

SUPPLEMENTARY DATA

**Supplementary Table 2.** Increase in risk<sup>a</sup>, holding everything else constant, for the six diabetes related complications and death from a change in time-varying risk factor levels (mean and 95% CI).

Risk factor (change)	MI, %	Other IHD, %	CHF, %	Stroke, %	Amp, %	Blind, %	Renal Failure, %	Event fatality, %	Diabetes mort, %	Other mort, %
HbA1c (1% increase)	13	13	17	14	54	25		12		
	(7-18)	(6-21)	(5-31)	(5-23)	(36-76)	(13-38)		(1-24)		
SBP (10mmHg increase)	11	10	12	32	26		50			
	(5-16)	(3-19)	(0.4-25)	(21-43)	(8-45)		(22-84)			
Total:HDL cholesterol (1 unit increase)	24 <sup>b</sup>	31		12 <sup>b</sup>					12	
	(0-55)	(0-74)		(7-18)					(2-22)	
Smoking	41			43						36
	(17-71)			(0.4-103)						(3-79)
History of MI (yes)									206	
									(78-427)	
History of other IHD (yes)	149									
	(86-235)									
History of CHF (yes)	375			471						
	(220-606)			(225-902)						
History of blindness in one eye (yes)					512		702			
					(148-1414)		(172-2262)			
History of renal failure (yes)									388	
									(163-805)	
History of amputation (yes)									181	
									(34-488)	

MI: myocardial infarction; IHD: ischaemic heart disease; CHF: Congestive heart failure; Amp: amputation; Blind: blindness in one eye.

<sup>a</sup>Calculated using hazard ratios from UKPDS 68. <sup>b</sup>Calculated from UKPDS-OM using a patient age 55 years with average risk factor levels of the UKPDS population (Stratton 2000).

SUPPLEMENTARY DATA

**Supplementary Table 3.** Diabetes-related complications in PTM period conditional on lack of previous history.

<b>Complications</b>	<b>Proportion of events (%)</b>	<b>Number of events during PTM study</b>	<b>Total at start of PTM without history of complication</b>
Deaths from any cause	33	1335	4031
MI	15	565	3772
Stroke	6	244	3900
IHD	5	202	3782
Congestive heart failure	3	109	3938
Amputation	3	101	3995
Blindness	3	101	3885
Renal failure	1	57	4011

SUPPLEMENTARY DATA

**Supplementary Table 4.** Model predictions (Pred) using model-predicted time paths vs. observed data (Obs) from PTM study (mean and 95%CI). Bold indicates the prediction is within the observed 95%CI.

		Proportion of population with event at year:									
Complication		1	2	3	4	5	6	7	8	9	10
Death from any cause	Obs	3.3 (2.8-3.9)	5.9 (5.2-6.7)	8.7 (7.9-9.6)	12.0 (11.0-13.0)	15.0 (13.9-16.1)	18.8 (17.6-20.0)	22.8 (21.5-24.1)	25.6 (24.3-27.0)	29.2 (27.9-30.7)	32.7 (31.3-34.2)
	Pred	<b>3.2</b>	<b>6.3</b>	<b>9.4</b>	<b>12.7</b>	<b>16.1</b>	<b>19.6</b>	<b>23.2</b>	<b>27.0</b>	30.8	34.8
Myocardial infarction	Obs	1.6 (1.3-2.1)	3.1 (2.6-3.7)	4.8 (4.2-5.6)	6.5 (5.7-7.4)	8.6 (7.7-9.6)	10.9 (9.9-12.1)	13.3 (12.2-14.6)	15.5 (14.2-16.9)	18.3 (16.9-19.9)	20.2 (18.7-21.8)
	Pred	2.5	4.8	6.9	8.8	10.7	12.5	<b>14.3</b>	<b>16.0</b>	<b>17.7</b>	<b>19.3</b>
Stroke	Obs	0.8 (0.6-1.2)	1.7 (1.3-2.2)	2.5 (2.0-3.1)	3.5 (2.9-4.1)	4.0 (3.4-4.7)	5.1 (4.4-5.9)	6.0 (5.2-6.9)	6.9 (6.0-7.9)	7.6 (6.7-8.6)	8.4 (7.4-9.5)
	Pred	<b>0.8</b>	<b>1.5</b>	<b>2.3</b>	<b>3.0</b>	<b>3.7</b>	<b>4.4</b>	5.1	5.8	6.5	7.3
Other ischaemic heart disease	Obs	0.7 (0.5-1.0)	1.4 (1.0-1.8)	2.0 (1.6-2.5)	2.9 (2.4-3.5)	3.7 (3.1-4.4)	4.6 (3.9-5.4)	5.4 (4.6-6.3)	6.0 (5.1-6.9)	6.8 (5.9-7.8)	7.5 (6.5-8.6)
	Pred	<b>0.8</b>	<b>1.6</b>	<b>2.4</b>	<b>3.3</b>	<b>4.1</b>	<b>4.9</b>	<b>5.7</b>	<b>6.5</b>	<b>7.3</b>	<b>8.1</b>
Amputation	Obs	0.2 (0.1-0.4)	0.5 (0.3-0.8)	0.8 (0.6-1.2)	1.2 (0.9-1.6)	1.5 (1.2-2.0)	1.9 (1.5-2.5)	2.4 (2.0-3.1)	2.7 (2.1-3.3)	3.1 (2.5-3.8)	3.7 (3.0-4.5)
	Pred	<b>0.2</b>	<b>0.5</b>	<b>0.7</b>	<b>0.9</b>	<b>1.2</b>	1.4	1.7	2.0	2.3	2.6
Blindness in one eye	Obs	0.5 (0.3-0.8)	0.9 (0.7-1.3)	1.2 (0.9-1.6)	1.6 (1.2-2.0)	2.0 (1.6-2.5)	2.3 (1.9-2.9)	2.7 (2.2-3.3)	2.8 (2.2-3.4)	3.1 (2.5-3.8)	3.5 (2.8-4.2)
	Pred	<b>0.4</b>	<b>0.7</b>	<b>1.1</b>	<b>1.4</b>	<b>1.8</b>	<b>2.2</b>	<b>2.5</b>	<b>2.9</b>	<b>3.3</b>	<b>3.6</b>
Renal failure	Obs	0.4 (0.2-0.6)	0.7 (0.4-1.0)	0.7 (0.5-1.1)	0.9 (0.6-1.2)	0.9 (0.7-1.3)	1.1 (0.8-1.5)	1.2 (0.9-1.6)	1.3 (1.0-1.8)	1.6 (1.2-2.1)	2.0 (1.5-2.6)
	Pred	0.1	0.3	0.4	0.5	<b>0.7</b>	<b>0.9</b>	<b>1.0</b>	<b>1.2</b>	<b>1.4</b>	<b>1.6</b>
Heart failure	Obs	0.4 (0.2-0.7)	0.8 (0.6-1.2)	1.1 (0.8-1.5)	1.3 (1.0-1.8)	1.8 (1.4-2.2)	2.3 (1.9-2.9)	2.8 (2.2-3.4)	3.2 (2.6-3.9)	3.3 (2.7-4.1)	3.9 (3.2-4.7)
	Pred	<b>0.5</b>	<b>1.0</b>	<b>1.5</b>	2.0	2.5	3.1	3.7	4.3	4.9	5.5

SUPPLEMENTARY DATA

**Supplementary Table 5.** Mean risk factor values at PTM baseline per deciles of predicted risk of complication (based on model predicted risk factor time paths).

Risk group	Current smokers (%)	Total: HDL ratio	SBP (mmHG)	HBa1c (%)	MI (%)	IHD (%)	Blind (%)	Renal failure (%)	Stroke (%)	Heart failure (%)	Amp (%)
<b>Myocardial infarction</b>											
1	16	4.0	130.8	8.3	-	1	4	0	1	1	1
2	21	4.5	133.9	8.4	-	0	2	1	2	2	0
3	20	4.8	136.1	8.3	-	0	2	0	2	1	1
4	23	5.1	137.0	8.3	-	1	3	0	2	1	1
5	23	5.0	139.6	8.0	-	0	4	0	3	3	0
6	25	5.3	140.1	8.2	-	1	3	0	2	3	1
7	21	5.2	141.8	8.1	-	0	4	1	3	3	1
8	18	5.4	142.4	8.0	-	1	4	1	6	3	1
9	23	5.5	146.2	8.1	-	2	6	1	5	3	1
10	19	5.7	145.5	8.3	-	51	6	2	5	3	2
<b>Stroke</b>											
1	27	4.7	124.0	8.2	1	1	1	0	-	0	1
2	23	5.0	130.3	8.5	6	1	1	0	-	1	1
3	23	5.1	133.7	8.4	4	1	3	1	-	1	0
4	26	5.1	134.8	8.4	6	0	2	0	-	2	0
5	22	4.9	136.8	8.2	4	1	4	0	-	3	1
6	18	5.2	141.2	8.1	7	1	3	0	-	3	1
7	14	5.2	142.9	8.0	8	1	4	1	-	3	1
8	18	5.0	145.3	8.0	7	2	5	1	-	3	1
9	17	5.2	148.0	8.1	9	8	6	1	-	3	1
10	16	5.4	151.3	8.3	10	47	5	2	-	3	2
<b>Other ischaemic heart disease</b>											
1	22	3.9	127.4	8.0	1	-	1	0	1	1	1
2	21	4.4	132.4	8.1	3	-	3	0	2	1	0
3	22	4.5	135.6	8.1	3	-	3	0	2	1	1
4	23	4.8	136.8	8.1	5	-	3	0	1	3	0
5	20	4.9	139.4	8.3	6	-	3	0	3	1	0
6	23	5.2	139.8	8.1	8	-	4	0	3	4	1
7	20	5.3	141.4	8.3	6	-	3	0	4	1	1
8	21	5.6	141.6	8.1	7	-	5	1	4	4	1
9	19	5.7	144.4	8.4	10	-	3	1	7	2	1
10	19	6.3	150.8	8.6	12	-	6	1	6	4	2
<b>Heart failure</b>											
1	21	5.2	132.0	8.2	9	59	3	2	3	-	1
2	31	5.2	128.5	8.3	4	1	1	1	1	-	1
3	27	5.1	132.3	8.3	6	0	2	0	1	-	1
4	25	4.9	134.8	8.3	6	0	2	0	3	-	1
5	22	5.1	138.1	8.2	5	0	3	1	2	-	1
6	18	5.1	139.7	8.2	6	0	3	1	2	-	1
7	20	5.1	141.3	8.2	7	1	4	0	3	-	1
8	15	5.1	145.2	8.0	7	0	5	0	3	-	1
9	13	5.0	146.3	8.1	7	1	6	1	5	-	1
10	14	5.1	152.0	8.3	8	0	5	0	7	-	1

SBP: systolic blood pressure; MI: myocardial infarction; IHD: other ischaemic heart disease; Amp: amputation.

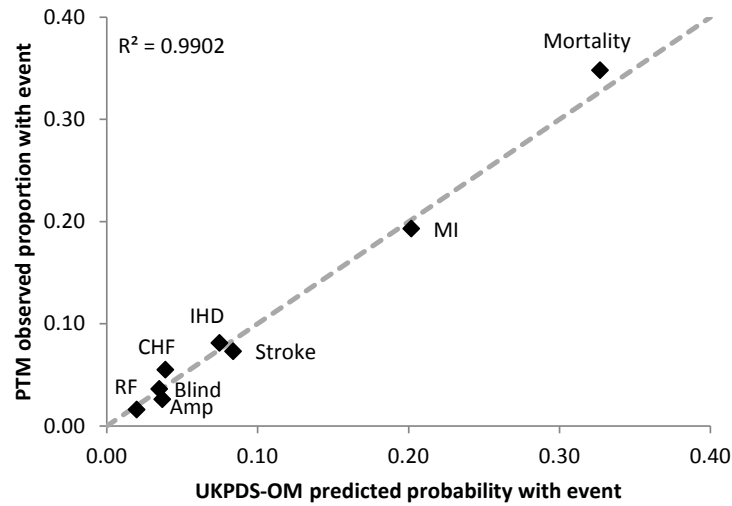
SUPPLEMENTARY DATA

Risk group	Current smokers (%)	Total: HDL ratio	SBP (mmHG)	HBa1c (%)	MI (%)	IHD (%)	Blind (%)	Renal failure (%)	Stroke (%)	Heart failure (%)	Amp (%)
<b>Renal failure</b>											
1	33	5.0	115.4	8.2	4	3	1	-	2	1	0
2	23	5.1	124.6	8.1	6	3	0	-	1	1	0
3	26	5.2	130.1	8.3	6	3	1	-	2	0	0
4	23	5.1	132.9	8.4	6	6	0	-	1	2	1
5	21	5.1	136.7	8.3	7	5	0	-	2	2	0
6	17	5.1	142.1	8.3	6	7	0	-	4	3	1
7	19	5.1	143.6	8.2	5	8	0	-	5	2	1
8	16	5.2	149.9	8.1	7	7	0	-	4	3	1
9	12	5.0	155.7	8.2	8	9	0	-	4	2	1
10	14	5.0	158.5	8.2	8	8	31	-	7	5	2
<b>Amputation</b>											
1	26	5.0	124.2	6.4	3	3	0	0	2	1	-
2	22	5.1	130.2	7.1	7	3	1	0	2	3	-
3	24	5.0	135.0	7.4	5	6	0	0	3	2	-
4	23	5.2	138.1	7.7	7	6	1	0	3	1	-
5	16	5.0	139.2	8.1	9	7	1	0	2	0	-
6	19	5.0	139.7	8.4	6	6	0	0	4	2	-
7	18	5.2	143.3	8.5	9	8	0	1	3	3	-
8	21	5.1	145.2	9.1	6	8	1	1	5	2	-
9	20	5.1	146.5	9.7	6	6	1	0	3	3	-
10	16	5.0	148.5	9.7	6	10	32	2	5	5	-
<b>Blindness in one eye</b>											
1	32	5.2	128.1	7.8	3	3	-	1	1	0	1
2	27	5.2	133.5	8.1	5	3	-	0	1	1	1
3	23	5.2	135.3	8.2	6	6	-	1	3	2	0
4	22	5.1	136.7	8.3	6	5	-	0	3	2	1
5	21	5.0	139.3	8.2	6	6	-	0	4	2	1
6	22	5.1	141.3	8.2	7	8	-	1	2	3	1
7	18	5.1	141.9	8.1	7	7	-	0	3	3	0
8	15	5.0	142.9	8.1	7	7	-	0	5	2	0
9	13	4.9	144.4	8.2	9	7	-	0	6	4	1
10	14	5.1	146.2	9.0	9	10	-	0	6	3	2
<b>Death from any cause</b>											
1	25	5.0	127.1	8.3	1	1	1	0	0	0	0
2	29	5.1	132.8	8.5	2	1	1	0	1	0	0
3	22	5.0	135.2	8.4	3	1	3	0	2	2	0
4	23	5.0	138.4	8.4	3	1	1	0	2	2	0
5	21	5.1	138.1	8.1	6	3	3	0	1	3	0
6	18	5.1	141.4	8.1	6	3	2	0	2	2	1
7	19	5.0	143.0	8.0	5	3	4	0	4	3	1
8	18	5.1	143.0	8.1	9	6	3	0	4	3	1
9	16	5.1	145.0	8.1	10	10	9	1	8	3	1
10	14	5.3	145.9	8.2	18	31	8	3	7	4	3

SBP: systolic blood pressure; MI: myocardial infarction; IHD: other ischaemic heart disease; Amp: amputation.

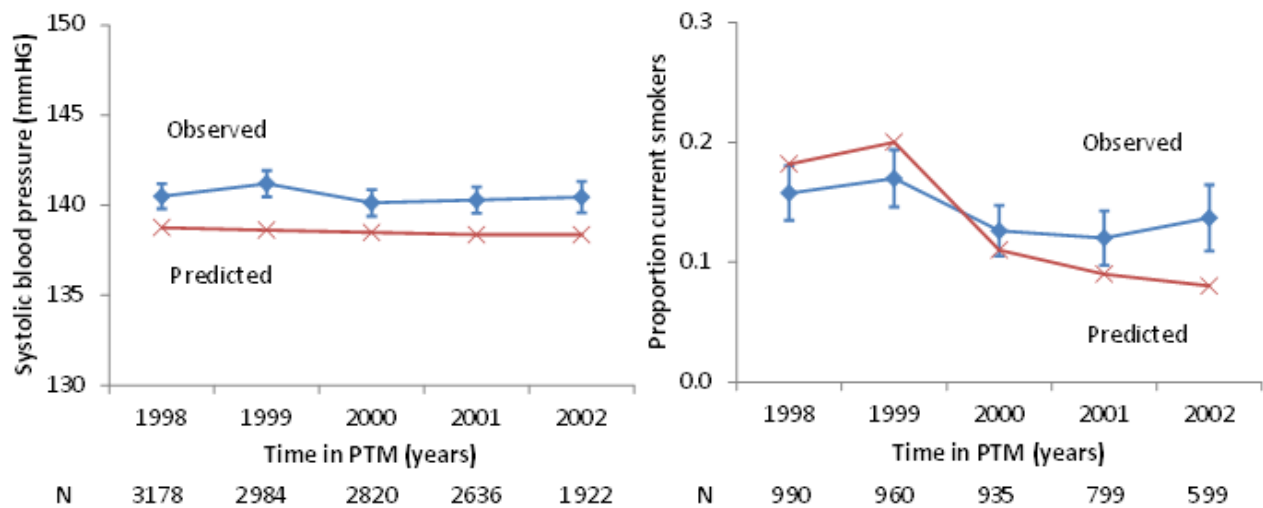
SUPPLEMENTARY DATA

**Supplementary Figure 1.** Correlation between observed proportions and predicted probabilities of cumulative failure for each complication at 10-years of follow up<sup>a</sup>.

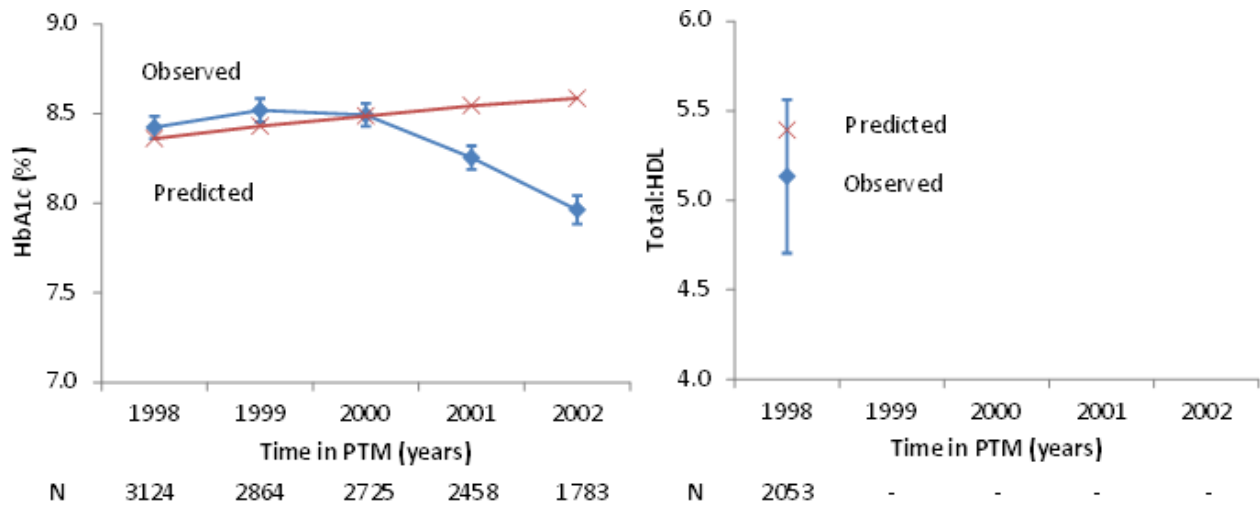


<sup>a</sup>Each point refers to a clinical outcome. The 45° line (grey) represents perfect correlation.

**Supplementary Figure 2.** Risk factors: observed vs. model predicted time paths for patients with observed risk factor data<sup>a</sup>. Number of observations for each risk factor (N) is shown below the x-axis.

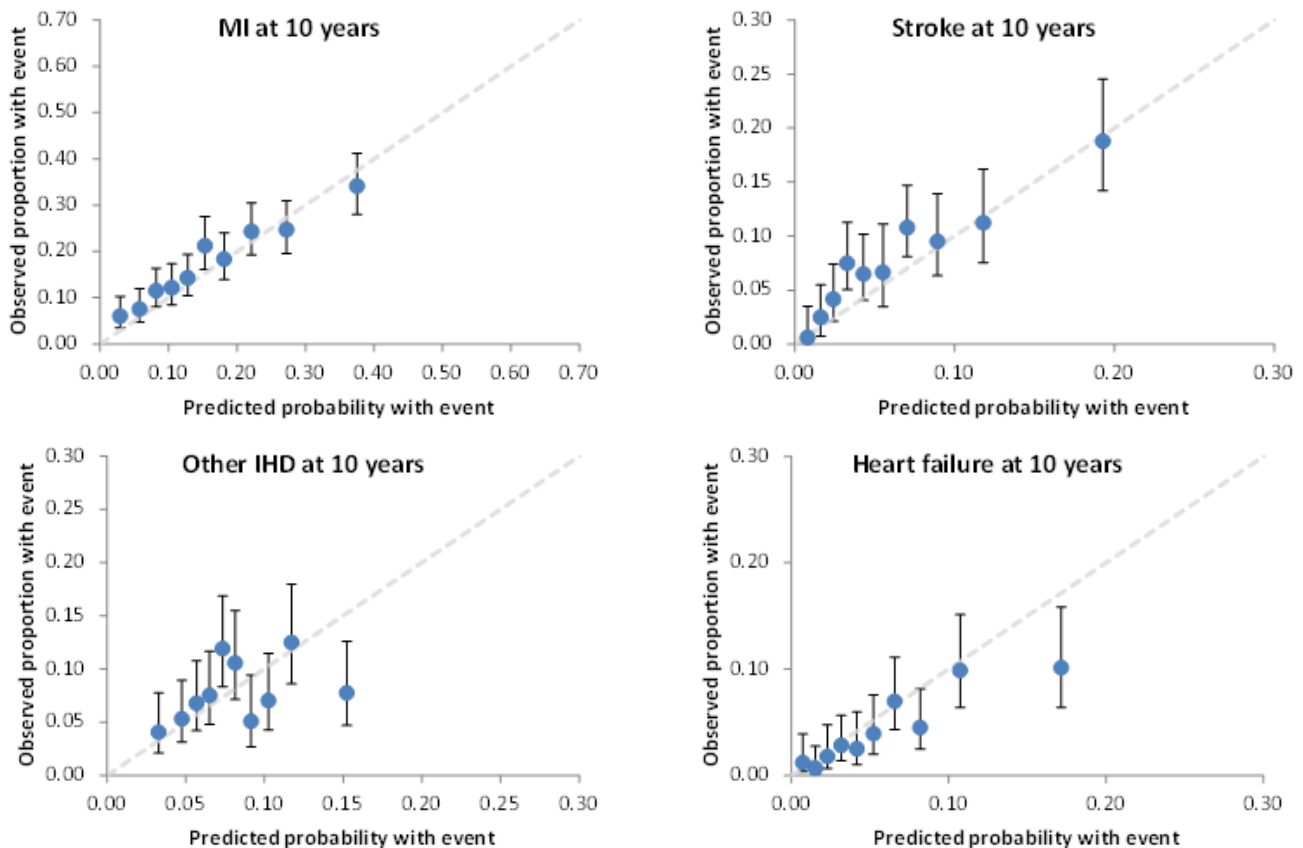


SUPPLEMENTARY DATA



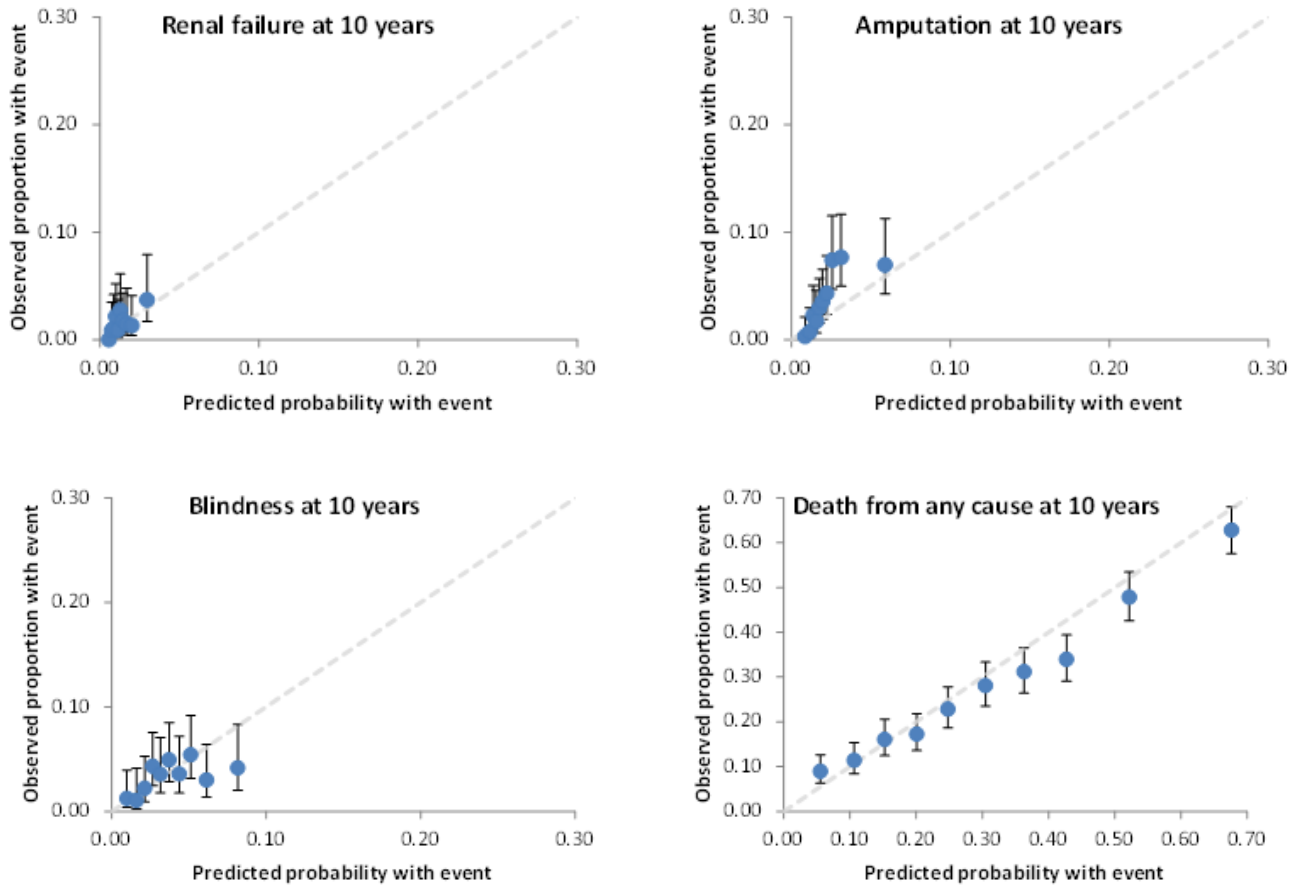
<sup>a</sup> Smoking status was collected every 3 years, whereas HbA1c, SBP and total:HDL cholesterol were collected every year. Hence, plotted smoking status should not be interpreted as trend at cohort level but rather as the proportion of smokers out of all collected smoking data in a given year.

**Supplementary Figure 3.** Calibration plots at 10 years per decile of predicted risk using only patients with no history of complications at PTM entry. Circles indicate correlation of observed and predicted cumulative failure for seven complications and death by deciles of predicted risk, with vertical lines representing observed 95% CI. The 45° line (grey) represents perfect correlation over all deciles of risk.

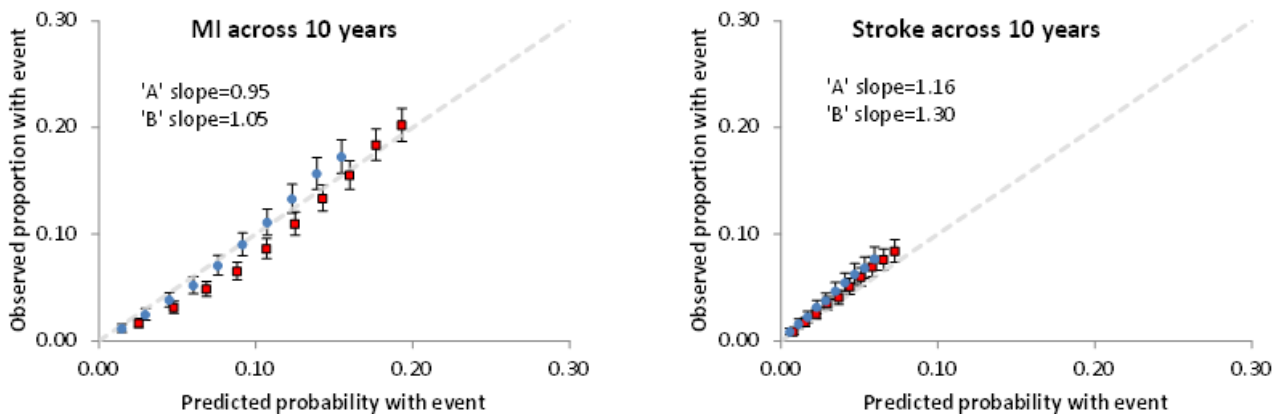




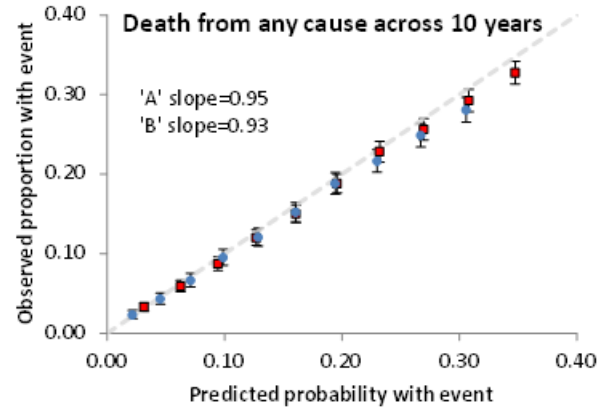
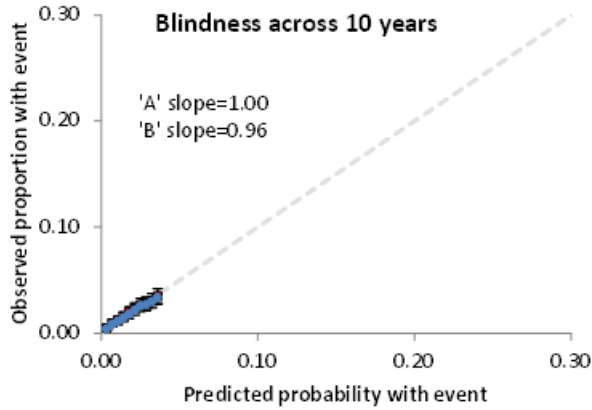
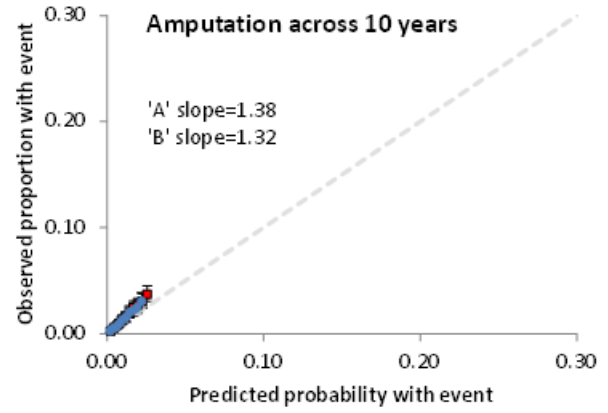
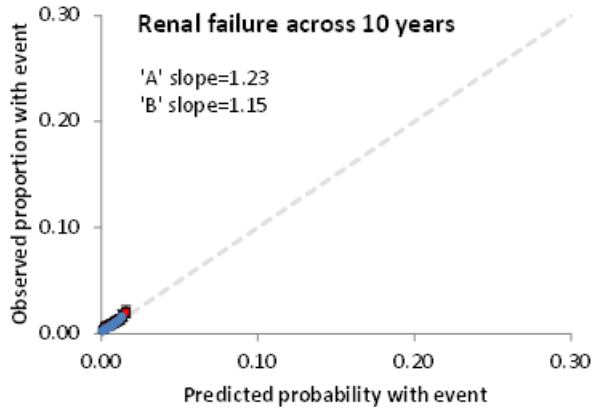
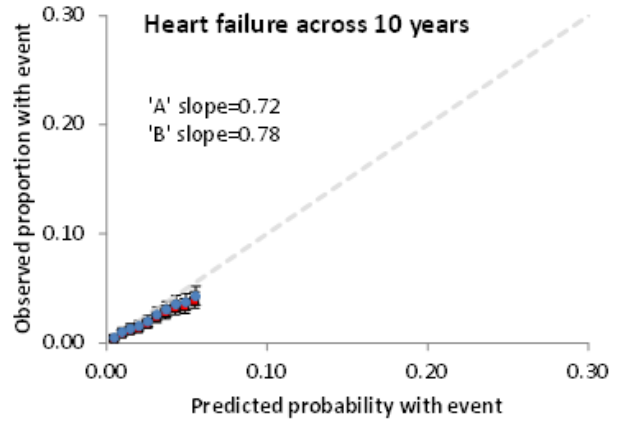
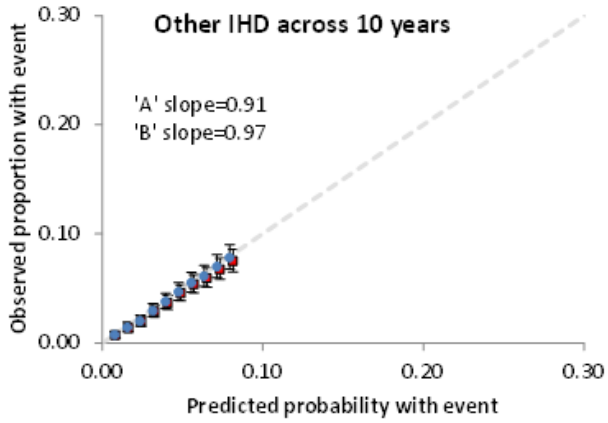
SUPPLEMENTARY DATA



**Supplementary Figure 4.** ‘Calibration-in-the-large’ plots comparing predictions based on all PTM cohort (A: red box) vs. predictions after excluding patients with history of complications at PTM baseline (B: blue circles). Both sets of predictions were based on model predicted risk factor time paths. Each marker indicates the cumulative failure per year of follow-up and per deciles of predicted risk, with vertical lines representing 95% confidence intervals. Model predictions ‘A’ and ‘B’ were fitted separately with a linear regression, without intercept term, and the slope coefficient is presented. A slope coefficient of 1 represents perfect calibration (equal to the 45° line).

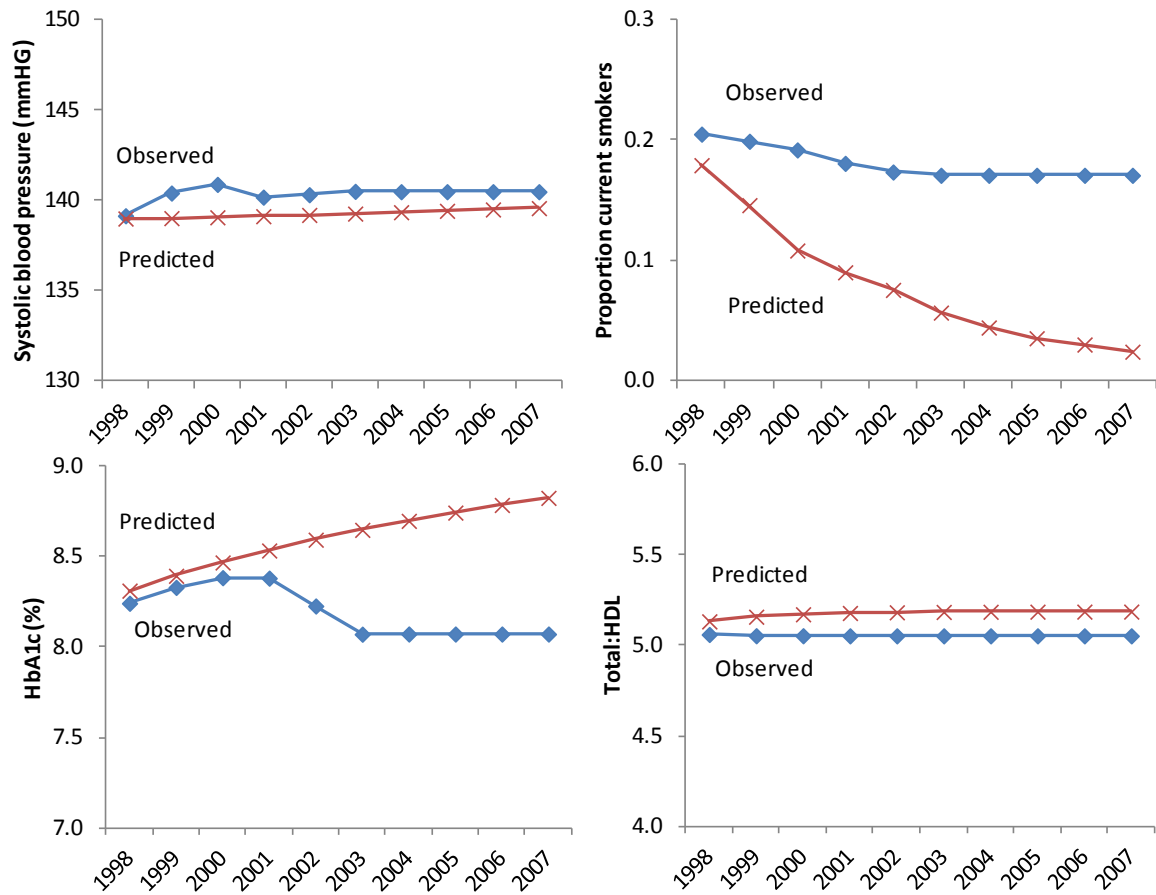


SUPPLEMENTARY DATA

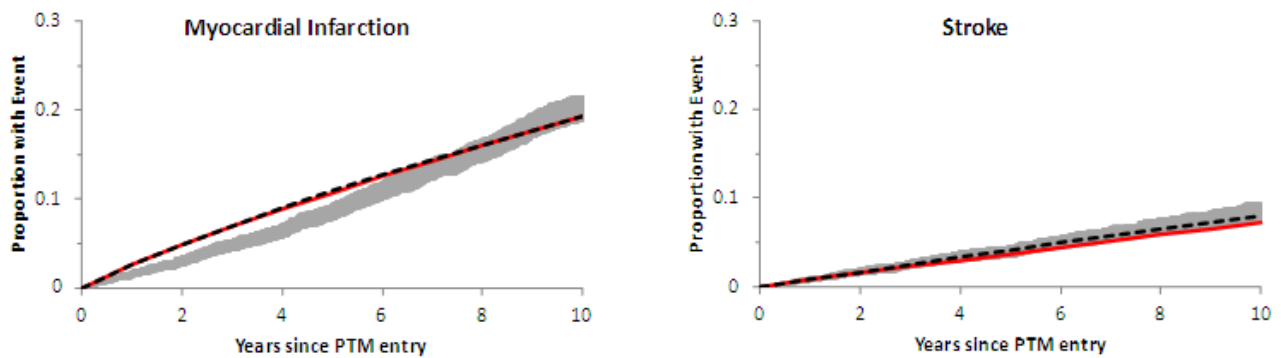


SUPPLEMENTARY DATA

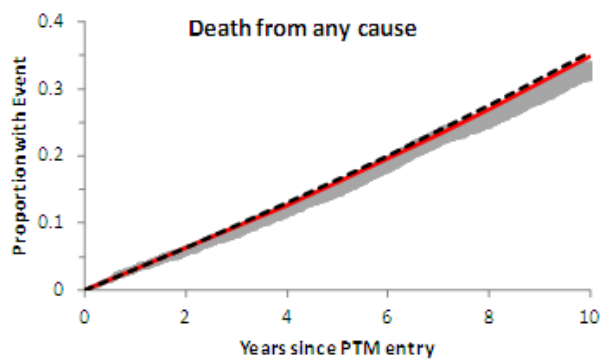
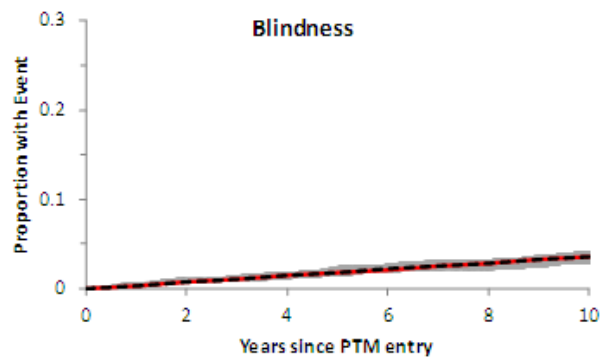
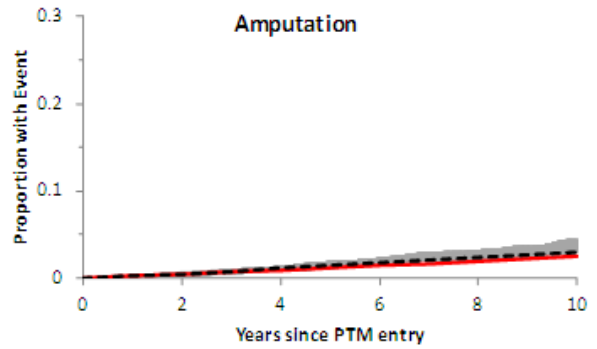
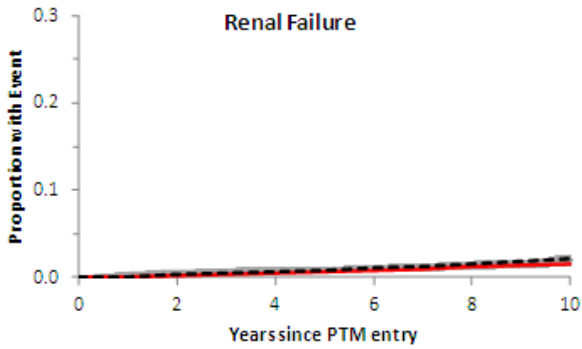
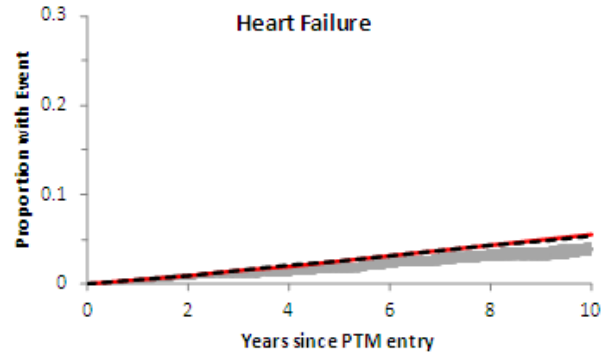
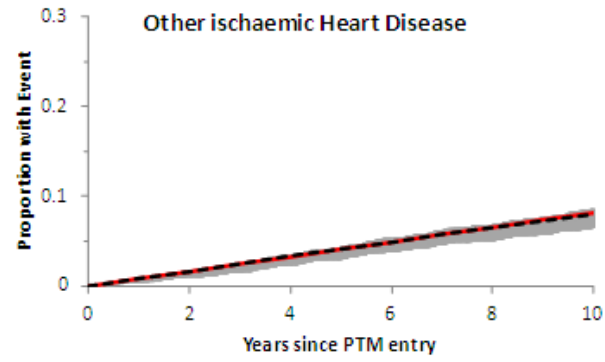
**Supplementary Figure 5.** Risk factors: data from PTM cohort (carried forward if unavailable from years 1-5 of PTM) vs. predicted levels at each year for the entire cohort.



**Supplementary Figure 6.** Observed (grey) and predicted cumulative probabilities of failure of first complications based on model predicted risk factor time paths (red line) or on observed risk factor data from PTM (black dashed line) carried forward if unavailable<sup>a</sup>.



SUPPLEMENTARY DATA



<sup>a</sup> PTM curve comprises the 95% CI. Model predictions comprise the mean predicted estimate.