

Supplementary table 1.

Characteristics of patients with type 2 diabetes stratified by age at diagnosis. Men and women separately.

| | Men | | | | | Women | | | | |
|--|------------|----------------------------------|------------|------------|------------|------------|----------------------------------|------------|------------|-------------|
| | Valid data | Age at diabetes diagnosis, years | | | | Valid data | Age at diabetes diagnosis, years | | | |
| | | All ages | <40 | 40-49 | ≥50 | | All ages | <40 | 40-49 | ≥50 |
| Patient characteristics, n (%) or mean years (sd) | | | | | | | | | | |
| Total study participants | 5301 | 5301 (100) | 545 (10) | 1219 (23) | 3537 (67) | 4304 | 4304 (100) | 435 (10) | 779 (18) | 3090 (72) |
| Age at diagnosis | 5301 | 55 (12) | 33 (5.1) | 45 (2.8) | 62 (8.2) | 4304 | 57 (13) | 33 (5.0) | 45 (2.9) | 64 (9.2) |
| Age in 2014 | 5301 | 64 (12) | 44 (10) | 55 (8.3) | 69 (8.9) | 4304 | 66 (13) | 45 (9.9) | 55 (8.3) | 72 (9.9) |
| Diabetes duration | 5301 | 8.4 (7.0) | 11.2 (9.2) | 9.8 (8.1) | 7.5 (5.9) | 4304 | 8.9 (6.9) | 11.8 (8.7) | 10.4 (7.9) | 8.1 (6.2) |
| | | | | | | | | | | |
| Country of origin, n (%) | | | | | | | | | | |
| Europe or North America | 5301 | 4522 (85) | 347 (63) | 950 (78) | 3225 (91) | 4304 | 3625 (84.2) | 252 (57.9) | 553 (71.0) | 2820 (91.3) |
| South-Asia | 5301 | 405 (7.6) | 116 (21) | 136 (11) | 153 (4.3) | 4304 | 345 (8.0) | 100 (23.0) | 116 (14.9) | 129 (4.2) |
| Other | 5301 | 374 (7.1) | 82 (15) | 133 (11) | 159 (4.5) | 4304 | 334 (7.8) | 83 (19.1) | 110 (14.1) | 141 (4.6) |
| | | | | | | | | | | |
| Highest education level, n (%) | | | | | | | | | | |
| Compulsory (primary and lower secondary) | 5176 | 1574 (30) | 201 (39) | 392 (33) | 981 (28) | 4117 | 1713 (42) | 172 (43) | 289 (40) | 1252 (42) |
| Upper secondary | 5176 | 2501 (48) | 215 (42) | 528 (45) | 1758 (51) | 4117 | 1754 (43) | 142 (36) | 292 (41) | 1320 (44) |
| Higher | 5176 | 1101 (21) | 101 (20) | 258 (22) | 742 (21) | 4117 | 650 (16) | 85 (21) | 139 (19) | 426 (14) |
| | | | | | | | | | | |
| Clinical characteristics, mean (sd) | | | | | | | | | | |
| BMI | 2562 | 30.0 (5.6) | 31.7 (6.5) | 31.1 (6.2) | 29.2 (5.0) | 1960 | 30.5 (6.3) | 32.6 (6.9) | 31.6 (6.2) | 29.7 (6.0) |
| Current smoker, n (%) | 4412 | 1011 (23) | 112 (26) | 298 (29) | 601 (20) | 3343 | 726 (22) | 83 (25) | 160 (26) | 483 (20) |
| HbA1c, % | 5126 | 7.1 (1.3) | 7.7 (1.6) | 7.3 (1.4) | 6.9 (1.1) | 4220 | 7.0 (1.2) | 7.5 (1.6) | 7.3 (1.4) | 6.8 (1.0) |
| HbA1c, mmol/mol | 5126 | 54 (14) | 60 (17) | 57 (15) | 52 (12) | 4220 | 53 (13) | 58 (18) | 56 (15) | 51 (11) |
| Systolic BP, mmHg | 4670 | 134 (16) | 130 (15) | 133 (16) | 136 (16) | 3810 | 136 (17) | 1295 (17) | 132 (16) | 138 (17) |
| LDL cholesterol mmol/L | 4499 | 2.6 (0.9) | 2.8 (0.9) | 2.7 (0.9) | 2.6 (0.9) | 3606 | 2.9 (1.0) | 2.9 (0.9) | 2.9 (0.9) | 2.9 (1.0) |
| Cholesterol ratio, total/HDL | 4578 | 4.2 (1.3) | 4.7 (1.5) | 4.4 (1.3) | 4.0 (1.2) | 3660 | 3.8 (1.2) | 4.2 (1.3) | 4.0 (1.1) | 3.7 (1.1) |
| eGFR, ml/min/1.73m ² | 5002 | 83 (21) | 100 (20) | 92 (18) | 78 (19) | 4133 | 71 (27) | 61 (27) | 64 (19) | 75 (28) |

| | | | | | | | | | | |
|--------------------------------|------|-----------|----------|----------|-----------|------|-------------|-----------|------------|-------------|
| | | | | | | | | | | |
| Medical treatment n (%) | | | | | | | | | | |
| diet only | 5299 | 1369 (26) | 75 (14) | 221 (18) | 1073 (30) | 4303 | 1323 (30.7) | 64 (14.7) | 163 (21.0) | 1096 (35.5) |
| other glucose-lowering agents | 5301 | 3529 (67) | 403 (74) | 900 (74) | 2226 (63) | 4304 | 2638 (61) | 331 (76) | 556 (71) | 1751 (57) |
| Insulin | 5287 | 934 (18) | 189 (35) | 291 (24) | 454 (13) | 4300 | 731 (17) | 151 (35) | 176 (23) | 404 (13) |
| | | | | | | | | | | |
| Eye examination | | | | | | | | | | |
| Fundus exam performed * | 5301 | 3222 (61) | 331 (61) | 754 (62) | 2137 (60) | 4304 | 2698 (63) | 268 (62) | 489 (63) | 1941 (63) |

*missing assigned to no, 3946 recorded as missing in dataset

Supplementary Table 2. Complications in men by age at diabetes diagnosis. Unadjusted prevalences and average predictions adjusted for mean age or diabetes duration.

| | Valid data | Total sample | Age at diabetes diagnosis, years | | |
|---|------------|--------------|----------------------------------|---------------|---------------|
| | | | <40 | 40-49 | ≥50 |
| Complications, n (%) unadjusted | | | | | |
| Retinopathy | 3253 | 487 (15) | 102 (30) | 163 (21) | 222 (10) |
| Chronic kidney disease* | 5002 | 683 (14) | 20 (1.4) | 66 (5.8) | 597 (18) |
| Reduced foot sensibility/neuropathy | 1488 | 182 (12) | 10 (6.3) | 45 (12) | 127 (14) |
| CHD | 5288 | 1442 (27) | 61 (11) | 243 (20) | 1138 (32) |
| Stroke | 5293 | 421 (8.0) | 14 (2.6) | 58 (4.8) | 349 (9.9) |
| | | | | | |
| AAP, Complications, % (95% confidence interval) adjusted for current age | | | | | |
| Retinopathy | 3253 | | 53 (46-59) | 30 (26-34) | 8.4 (7.3-9.5) |
| Chronic kidney disease* | 5002 | | 26 (19-33) | 18(15-21) | 13 (12-14) |
| Reduced foot sensibility/neuropathy | 1488 | | 14 (5.6-22) | 17 (12-21) | 11 (9.2-13) |
| CHD | 5288 | | 29 (24-35) | 31 (28-34) | 26 (25-28) |
| Stroke | 5293 | | 8.3 (4.1-12) | 8.7 (6.4-11) | 7.8 (7.0-8.6) |
| | | | | | |
| AAP, Complications, % (95% confidence interval) adjusted for diabetes duration | | | | | |
| Retinopathy | 3253 | | 23 (19-27) | 18 (15-20) | 12 (11-14) |
| Chronic kidney disease* | 5002 | | 2.4 (1.3-3.5) | 4.8 (3.7-5.9) | 19 (18-21) |
| Reduced foot sensibility/neuropathy | 1488 | | 4.9 (1.9-8.0) | 11 (7.6-14) | 15 (12-17) |
| CHD | 5288 | | 9.2 (7.012) | 19 (16-21) | 34 (32-35) |
| Stroke | 5293 | | 2.2 (1.1-3.4) | 4.4 (3.3-5.5) | 10 (9.3-11) |

Average adjusted predictions (AAP) calculated by logistic regression followed by the margins command in Stata. *eGFR <60 ml/min/1.73m²

Supplementary Table 3.

Complications in women by age at diabetes diagnosis. Unadjusted prevalences and average predictions adjusted for mean age or diabetes duration.

| | Valid data | Total sample | Age at diabetes diagnosis, years | | |
|---|------------|--------------|----------------------------------|----------------|---------------|
| | | | <40 | 40-49 | ≥50 |
| Complications, n (%) unadjusted | | | | | |
| Retinopathy | 2627 | 280 (11) | 50 (19) | 63 (13) | 167 (9.0) |
| Chronic kidney disease* | 4133 | 779 (19) | 15 (3.7) | 41 (5.5) | 723 (24) |
| Reduced foot sensibility/neuropathy | 1175 | 109 (9.3) | 13 (12) | 15 (6.4) | 81 (9.8) |
| CHD | 4293 | 670 (16) | 32 (7.4) | 73 (9.4) | 565 (18) |
| Stroke | 4297 | 285 (6.6) | 10 (2.3) | 27 (3.5) | 248 (8.0) |
| | | | | | |
| AAP, Complications, % (95% confidence interval) adjusted for current age | | | | | |
| Retinopathy | 2627 | | 39 (31-48) | 20 (15-25) | 7.4 (6.3-8.5) |
| Chronic kidney disease* | 4133 | | 30 (22-39) | 21 (17-25) | 19 (17-20) |
| Reduced foot sensibility/neuropathy | 1175 | | 19 (8.0-29) | 8.3 (4.0-13) | 8.7 (6.8-11) |
| CHD | 4293 | | 24 (17-30) | 19 (15-22) | 15 (14-16) |
| Stroke | 4297 | | 9.1 (3.7-15) | 7.7 (4.8-11) | 6.4 (5.7-7.2) |
| | | | | | |
| AAP, Complications, % (95% confidence interval) adjusted for diabetes duration | | | | | |
| Retinopathy | 2627 | | 14 (10-17) | 10 (8.0-13) | 10 (8.7-12) |
| Chronic kidney disease* | 4133 | | 2.4 (1.2-3.7) | 4.5 (3.1-5.8) | 26 (24-27) |
| Reduced foot sensibility/neuropathy | 1175 | | 11 (5.0-16) | 6.1 (3.1-9.2) | 10 (7.9-12) |
| CHD | 4293 | | 6.0 (4.0-8.1) | 8.5 (6.6-10.4) | 19 (18-21) |
| Stroke | 4297 | | 1.9 (0.7-3.0) | 3.1 (2.0-4.3) | 8.5 (7.5-9.5) |

Average adjusted predictions (AAP) calculated by logistic regression followed by the margins command in Stata.

*eGFR <60 ml/min/1.73m²

Supplementary table 4. Characteristics of patients with unknown and known retinopathy status.

| | Valid data | Total sample | Retinopathy | |
|--|-------------|--------------|-------------|------------|
| | | | Unknown | Known |
| | | | All ages | All ages |
| Patient characteristics | | | | |
| Total study participants, n | 10241 | 10241 | 2672 | 7569 |
| Sex, men, n (%) | 10241 (100) | 5625 (55) | 1471 (55) | 4154 (55) |
| Age at diagnosis, mean years (sd) | 9605 (94) | 56 (13) | 56 (13) | 56 (13) |
| Age in 2014, mean years (sd) | 10241 (100) | 65 (13) | 64 (14) | 65 (13) |
| Diabetes duration, mean years (sd) | 9605 (94) | 8.6 (7.0) | 7.0 (6.5) | 9.1 (7.0) |
| Country of origin n (%) | | | | |
| Europe or North America | 10241 (100) | 8642 (85) | 1995 (75) | 6647 (88) |
| South-Asia | 10241 (100) | 817 (8.0) | 369 (14) | 448 (5.9) |
| Other | 10241 (100) | 782 (7.6) | 308 (12) | 474 (6.3) |
| Highest education level n (%) | | | | |
| Primary | 9879 (97) | 3509 (36) | 941 (37) | 2568 (35) |
| Secondary | 9879 (97) | 4518 (46) | 1093 (43) | 3425 (47) |
| Tertiary | 9879 (97) | 1852 (19) | 480 (19) | 1372 (19) |
| Clinical characteristics, mean (sd) | | | | |
| BMI | 4651 (45) | 30.2 (6.0) | 30.5 (6.5) | 30.1 (5.8) |
| Current smoker, n (%) | 8070 (79) | 1825 (23) | 564 (30) | 1261 (21) |
| HbA1c, mmol/mol | 9929 (97) | 53 (13) | 53 (14) | 53 (13) |
| HbA1c, % | 9929 (97) | 7.0 (1.2) | 7.0 (1.3) | 7.0 (1.2) |
| Systolic BP, mmHg | 8954 (87) | 135 (17) | 135 (18) | 135 (17) |
| LDL cholesterol mmol/L | 8580 (84) | 2.8 (0.9) | 2.8 (0.9) | 2.7 (0.9) |
| Cholesterol ratio, total/HDL | 8720 (85) | 4.0 (1.2) | 4.1 (1.3) | 4.0 (1.2) |
| eGFR, ml/min/1.73m ² | 9699 (95) | 81.3 (21) | 81.4 (21) | 81.2 (21) |
| Complications n (%) | | | | |
| Retinopathy | 6086 (59) | 797 (13) | N/A | 797 (13) |
| Reduced foot sensibility/neuropathy | 2733 (38) | 302 (11) | 29 (13) | 273 (11) |
| Chronic kidney disease (eGFR < 60 ml/min/1.73 m ²) | 9699 (95) | 1596 (17) | 400 (16) | 1196 (17) |
| CHD | 10217 (100) | 2258 (22) | 519 (20) | 1739 (23) |
| Stroke | 10226 (100) | 756 (7.4) | 196 (7.3) | 560 (7.4) |
| Medical treatment n (%) | | | | |
| Diet only | 10238 (100) | 2855 (28) | 893 (33) | 1962 (26) |
| Other glucose-lowering agents | 10241 (100) | 6573 (64.2) | 1631 (61) | 4942 (65) |
| Insulin | 10223 (100) | 1786 (17.5) | 325 (12) | 1461 (19) |
| Eye examination | | | | |
| Fundus exam performed* | 10241 | 6142 (60) | 227 (8.5) | 5915 (78) |

*missing assigned to no, 3946 recorded as missing in dataset

Supplementary table 5. Odds ratios for having retinopathy by age at T2D diagnosis and sex, complete cases

| | | Unadjusted | Model 1 | Model 2 | Model 3 | Model 4 |
|------------------------|------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| YOD | | | | | | |
| | Men | 3.6 (2.7-4.7) | 2.6 (1.7-3.8) | 2.1 (1.4-3.1) | 1.9 (1.2-2.9) | 1.7 (1.1-2.6) |
| | Women | 2.4 (1.7-3.4) | 2.2 (1.3-3.6) | 1.5 (0.87-2.6) | 1.5 (0.71-2.2) | 1.3 (0.71-2.1) |
| Age 40-49 at diagnosis | | | | | | |
| | Men | 2.2 (1.8-2.8) | 1.98(1.3-2.5) | 1.5 (1.1-2.1) | 1.6 (1.1-2.2) | 1.4 (1.0-2.0) |
| | Women | 1.4 (1.0-1.9) | 1.3 (0.85-2.1) | 1.1 (0.69-1.8) | 1.1 (0.69-1.8) | 1.0 (0.60-1.6) |
| | N | 3339 | 3256 | 3206 | 3204 | 3154 |
| | R ² p | | 0.0601 | 0.0931 | 0.1358 | 0.1534 |

Exponentiated coefficients; 95% confidence intervals in brackets

T2D, type 2 diabetes; YOD, young onset T2D

Reference: T2D diagnosis age 50 or older

Significant estimates in bold Models 1-4 are adjusted for confounders age, non-Western background, primary education and BMI

Model 2 is also adjusted for HbA1c

Model 3 is also adjusted for diabetes duration

Model 4 is also adjusted for HbA1c and diabetes duration

Supplementary table 6. Odds ratios for having retinopathy by age at T2D diagnosis and sex. Missing retinopathy values assigned to 'no retinopathy'

| | | Unadjusted | Model 1 | Model 2 | Model 3 | Model 4 |
|------------------------|-------|----------------------|----------------------|----------------------|----------------------|----------------------|
| YOD | Men | 3.5 (2.7-4.5) | 2.7 (1.9-4.0) | 2.1 (1.4-3.2) | 1.9 (1.3-2.9) | 1.7 (1.1-2.6) |
| | Women | 2.3 (1.7-3.2) | 2.0 (1.2-3.3) | 1.5 (0.85-2.5) | 1.3 (0.75-2.2) | 1.1 (0.64-1.9) |
| Age 40-49 at diagnosis | Men | 2.4 (1.9-2.9) | 1.9 (1.4-2.6) | 1.6 (1.2-2.2) | 1.6 (1.1-2.2) | 1.4 (1.0-2.0) |
| | Women | 1.6 (1.2-2.1) | 1.4 (0.91-2.2) | 1.2 (0.72-1.8) | 1.1 (0.67-1.7) | 1.0 (0.59-1.6) |
| N | | 4648 | 4504 | 4436 | 4387 | 3154 |
| R ² p | | | 0.0635 | 0.0941 | 0.1468 | 0.1534 |

Exponentiated coefficients; 95% confidence intervals in brackets

T2D, type 2 diabetes; YOD, young onset T2D

Reference T2D diagnosis age 50 or older

Significant estimates in bold

Models 1-4 are adjusted for confounders age, non-Western background, primary education and BMI

Model 2 is also adjusted for HbA1c

Model 3 is also adjusted for diabetes duration

Model 4 is also adjusted for HbA1c and diabetes duration

Supplementary table 7. Linear regression for HbA_{1c} level by age at diagnosis-group and diabetes duration. Reference: Women

| HbA _{1c} , % | YOD | | | 40 years and above at diabetes diagnosis | | |
|-----------------------|-------------------------|-------------------|-------------------------|--|-------------------------|-------------------------|
| | 0 | 1 | 2-10 | 0 | 1 | 2-10 |
| Years since diagnosis | | | | | | |
| Men | 0.74 (0.19-1.29) | 0.32 (-0.27-0.91) | 0.43 (0.10-0.75) | 0.22 (0.08-0.36) | 0.25 (0.14-0.37) | 0.18 (0.11-0.25) |
| Constant term | 7.20 | 6.94 | 7.56 | 7.09 | 6.59 | 6.54 |
| Total measurements | 473 | 392 | 3729 | 5056 | 4510 | 35006 |
| Total individuals | 138 | 124 | 505 | 1698 | 1547 | 5259 |

Years 2-10 adjusted for diabetes duration

No significant interaction between sex and diabetes duration (not included in table)