ADA T2D risk prediction project

Table Shells and Figure Captions

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Table 1. Descriptive table of Diabetes Prevention Program and Multi-Ethnic Study of Atherosclerosis participants, baseline characteristics overall of included analytic samples

|  |  |  |
| --- | --- | --- |
| Baseline/screening/randomization values\* | Cohort |  |
| Characteristic | DPP | MESA |
| Number, n |  |  |
| Age, years (standard deviation) |  |  |
| Age range, years |  |  |
| Female sex, n (%) |  |  |
| Race/ethnicity |  |  |
| Non-Hispanic White, n (%) |  |  |
| Non-Hispanic Black, n (%) |  |  |
| Hispanic, n (%) |  |  |
| Other/Chinese, n (%) |  |  |
| Educational attainment |  |  |
| < High School, n (%) |  |  |
| High School Graduate, n (%) |  |  |
| Some College, n (%) |  |  |
| ≥College Graduate, n (%) |  |  |
| Fasting Glucose, mg/dl (SD) |  |  |
| Glycated Hemoglobin, % (SD) |  |  |
| HOMA-Insulin Resistance, median (IQR) |  |  |
| HOMA-Beta cell function, median (IQR) |  |  |
| Body Mass Index, kg/m2 (SD) |  |  |
| Triglycerides, mg/dl, median (IQR) |  |  |
| Low-density lipoprotein cholesterol, mg/dl (SD) |  |  |
| High-density lipoprotein cholesterol, mg/dl (SD) |  |  |
| Cholesterol lowering medication use, n (%) |  |  |
| Systolic blood pressure, mm Hg (SD) |  |  |
| Diastolic blood pressure, mm Hg (SD) |  |  |
| Blood pressure lowering medication use, n (%) |  |  |
| Smoking status |  |  |
| Never, n (%) |  |  |
| Former, n (%) |  |  |
| Current, n (%) |  |  |
| Physical activity level, [units vary] (SD) |  |  |
| Alcohol consumption |  |  |
| No regular, n (%) |  |  |
| ≤1 drink daily, n (%) |  |  |
| >1 drink daily, n (%) |  |  |
| DPP randomization arm |  |  |
| Placebo, n (%) |  | NA |
| Metformin, n (%) |  | NA |
| Lifestyle, n (%) |  | NA |
| \*Values are means and SD and N (%) unless noted | | |

Table 2. Descriptive table of Diabetes Prevention Program and Multi-Ethnic Study of Atherosclerosis participants **excluded** from analysis

|  |  |  |
| --- | --- | --- |
| Baseline/screening/randomization values\* | Cohort |  |
| Characteristic | DPP | MESA |
| Number, n |  |  |
| Age, years (standard deviation) |  |  |
| Age range, years |  |  |
| Female sex, n (%) |  |  |
| Race/ethnicity |  |  |
| Non-Hispanic White, n (%) |  |  |
| Non-Hispanic Black, n (%) |  |  |
| Hispanic, n (%) |  |  |
| Other/Chinese, n (%) |  |  |
| Educational attainment |  |  |
| < High School, n (%) |  |  |
| High School Graduate, n (%) |  |  |
| Some College, n (%) |  |  |
| ≥College Graduate, n (%) |  |  |
| Fasting Glucose, mg/dl (SD) |  |  |
| Glycated Hemoglobin, % (SD) |  |  |
| Diabetes, n (%) |  |  |
| HOMA-Insulin Resistance, median (IQR) |  |  |
| HOMA-Beta cell function, median (IQR) |  |  |
| Body Mass Index, kg/m2 (SD) |  |  |
| Triglycerides, mg/dl, median (IQR) |  |  |
| Low-density lipoprotein cholesterol, mg/dl (SD) |  |  |
| High-density lipoprotein cholesterol, mg/dl (SD) |  |  |
| Cholesterol lowering medication use, n (%) |  |  |
| Systolic blood pressure, mm Hg (SD) |  |  |
| Diastolic blood pressure, mm Hg (SD) |  |  |
| Blood pressure lowering medication use, n (%) |  |  |
| Smoking status |  |  |
| Never, n (%) |  |  |
| Former, n (%) |  |  |
| Current, n (%) |  |  |
| Physical activity level, [units vary] (SD) |  |  |
| Alcohol consumption |  |  |
| No regular, n (%) |  |  |
| ≤1 drink daily, n (%) |  |  |
| >1 drink daily, n (%) |  |  |
| DPP randomization arm |  |  |
| Placebo, n (%) |  | NA |
| Metformin, n (%) |  | NA |
| Lifestyle, n (%) |  | NA |
| Troglitazone, n (%) |  | NA |
| \*Values are means and SD and N (%) unless noted | | |

Table 3. Cumulative incidence of diabetes over follow-up in the Diabetes Prevention Program and Multi-Ethnic Study of Atherosclerosis

|  |  |  |
| --- | --- | --- |
|  | Cohort |  |
|  | DPP | MESA |
| Number at risk, N |  |  |
| Incident cases of diabetes, n |  |  |
| Cumulative incidence of diabetes, % |  |  |
| Total years of follow-up, years (median years) |  |  |
| Incidence rate of diabetes, per 100 years |  |  |

Tables 4a and b. Model performance comparing model with intervention interactions to model without intervention interactions (based on 100 split-sample iterations) in the DPP and MESA, estimates with 95% confidence intervals

DPP (100 samples)

|  |  |  |  |
| --- | --- | --- | --- |
| Metric | Interaction model | No interaction model | P for difference comparing models |
| Concordance statistic (discrimination) |  |  |  |
| Index of prediction accuracy (discrimination and calibration?) |  |  |  |
| Net reclassification index |  |  |  |
| Disparate impact |  |  |  |
| Parity |  |  |  |
| [OTHERS?] |  |  |  |

MESA (1 sample) – no 95% CIs or P for difference from single sample

|  |  |  |
| --- | --- | --- |
| Metric | Interaction model | No interaction model |
| Concordance statistic (discrimination) |  |  |
| Index of prediction accuracy (discrimination and calibration?) |  |  |
| Net reclassification index |  |  |
| Disparate impact |  |  |
| Parity |  |  |
| [OTHERS?] |  |  |

Tables 5a and b. Reclassification matrix comparing model with intervention interactions to model without intervention interactions (based on 100 split-sample iterations) in the DPP, by 3-year incident diabetes status

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **INCIDENT CASES** |  | Model with interactions | | | |
|  |  | Risk <5% | Risk 5 - 9.9% | Risk>10% | Total n |
| Model without interactions | Risk <5% | n |  |  |  |
| Risk 5 - 9.9% |  |  |  |  |
| Risk >10% |  |  |  |  |
| Total n |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NON-CASES** |  | Model with interactions | | | |
|  |  | Risk <5% | Risk 5 - 9.9% | Risk >10% | Total n |
| Model without interactions | Risk <5% | n |  |  |  |
| Risk 5 - 9.9% |  |  |  |  |
| Risk >10% |  |  |  |  |
| Total n |  |  |  |  |

Tables 6a and b. Reclassification matrix comparing model with intervention interactions to model without intervention interactions in MESA, by 3-year incident diabetes status

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **INCIDENT CASES** |  | Model with interactions | | | |
|  |  | Risk <5% | Risk 5 - 9.9% | Risk>10% | Total n |
| Model without interactions | Risk <5% | n |  |  |  |
| Risk 5 - 9.9% |  |  |  |  |
| Risk >10% |  |  |  |  |
| Total n |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NON-CASES** |  | Model with interactions | | | |
|  |  | Risk <5% | Risk 5 - 9.9% | Risk >10% | Total n |
| Model without interactions | Risk <5% | n |  |  |  |
| Risk 5 - 9.9% |  |  |  |  |
| Risk >10% |  |  |  |  |
| Total n |  |  |  |  |

Table 7. Optimal preventive intervention and 3-year counterfactual risk for type 2 diabetes from an individualized risk prediction model inthe Diabetes Prevention Program

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | Counterfactual 3-year T2D Predicted Risk, Mean (SD) | | |
|  | N (% total) |  | Risk if assigned to Lifestyle | Risk if assigned to Metformin | Risk if assigned to Placebo |
| Overall | 2640 (100%) |  | 12% (8%) | 17% (9%) | 23% (16%) |
| Intervention | Optimal intervention\*, n (%) |  |  |  |  |
| Lifestyle | 2268 (86%) |  | 10% (6%) | 17% (9%) | 22% (16%) |
| Metformin | 372 (14%) |  | 21% (12%) | 15% (8%) | 27% (17%) |
| Placebo | 0 (0%) |  | \* | \* | \* |
| \*Optimal intervention for an individual is the intervention arm with the lowest 3-year predicted risk for T2D for each respective individual in the DPP. Placebo is never the optimal intervention in DPP for any individual. | | | | | |

Table 8. Optimal preventive intervention and 3-year counterfactual risk for type 2 diabetes from an individualized risk prediction model inthe Multi-Ethnic Study of Atherosclerosis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | Counterfactual 3-year T2D Predicted Risk, Mean (SD) | | |
|  | N (% total) |  | Risk if assigned to Lifestyle | Risk if assigned to Metformin | Risk if assigned to Placebo |
| Overall |  |  |  |  |  |
| Intervention | Optimal intervention\*, n (%) |  |  |  |  |
| Lifestyle |  |  |  |  |  |
| Metformin |  |  |  |  |  |
| Placebo |  |  |  |  |  |
| \*Optimal intervention for an individual is the intervention arm with the lowest 3-year predicted risk for T2D for each respective individual in MESA. | | | | | |

Figure 1. Observed versus predicted risk for diabetes over 3-years in the Diabetes Prevention Program based on the model with intervention interactions

Figure 2. Observed versus predicted risk for diabetes over 3-years in the Multi-Ethnic Study of Atherosclerosis based on the model with intervention interactions

Figure 3. Decision curve analysis in the Diabetes Prevention Program based on the model with intervention interactions

Figure 4. Decision curve analysis in the Multi-Ethnic Study of Atherosclerosis based on the model with intervention interactions