MOUNT HOOD 2026

REDDIE #1 (CROSS-SECTIONAL) CHALLENGE

TYPE 2 DIABETES

(THIS CHALLENGE IS UNDER DEVELOPMENT – REGISTER INTEREST IF YOU WANT TO PARTICIPATE IN CHALLENGE – FEADBACK WELCOME: SEND COMMENTS TO MTHOOD2016@GMAIL.COM)

1. BACKGROUND

This document sets out the first of two challenges that have been devised by the REDDIE consortium for the 2026 Mount Hood meeting, in Padova, Italy.

REDDIE (Real-World Evidence for Decisions in Diabetes; www.reddie-diabetes.eu) is an EU-funded project exploring how real-world data can complement RCTs in diabetes. One of the project's aims is to generate synthetic data that mimic the statistical properties of a population with type 2 diabetes without disclosing any real patient-level data, and to test the use of these data in applications where real patient-level data might otherwise be used.

The originator dataset we have used is drawn from the Swedish National Diabetes Register (NDR; last seen at Mount Hood 6 in 2012). The NDR is a nationwide, prospective registry that captures detailed data on people with diabetes in Sweden, including risk factors, treatments, and complications, with near-complete population coverage. It is linkable to other national registers (e.g., hospitalisations, prescriptions, and mortality), enabling long-term observational and outcomes research at scale.

As it is not currently feasible to provide a synthetic version of the entire NDR population, we have focused on a subpopulation defined by Hallström *et al.*[1], comprising people with type 2 diabetes starting a new medicine (either DPP-4 inhibitor or GLP-1 receptor agonist) between 2012 and 2022 (n = 29,057). We have longitudinal data for this cohort that we will use in our second challenge, but this challenge focuses only on the baseline characteristics of the cohort.

As they depend on specifying heterogeneous populations, **these challenges are likely only to be possible for patient-level simulation models**. If your model functions at cohort level, please feel free to review the instructions below and let us know if there is anything further we can do to enable your participation.

2. CHALLENGE

Motivation

This challenge relies solely on cross-sectional data reflecting a snapshot of the target population. We are interested to know whether increasingly sophisticated representation of the baseline population produces different results.

The purpose of this challenge is not to determine which model is 'best'; rather, we are interested to explore the extent to which any or all of the participating models are sensitive to how realistically we define the baseline cohort.

As detailed below, we are asking participants to simulate cohorts starting from this snapshot multiple times, with increasingly detailed information to define their baseline populations:

(i) repeatedly simulating a single person representing the mean characteristics of the target population;
(ii) simulating a heterogeneous population based on the mean and variance of each baseline characteristic, but sampling these independently, **without** information on correlations between them;
(iii) simulating a heterogeneous population based on the mean and variance of each baseline characteristic **with** information on correlations between them;
(iv) directly using pseudo-patient-level data from a synthetic population derived in REDDIE.

Using Li *et al.*'s review[2] as our guide, we have attempted to include as many baseline characteristics as we can that are likely to feature in your model, but we cannot cover everything. Therefore, we ask, below, for you to define additional baseline parameters as neutrally as possible and to provide details of any that you use.

There is one common variable that we have been unable to provide: the NDR does not collect data on ethnicity *per se*. Therefore, we request that you simulate a 100% white population throughout these challenges, as the Swedish diabetic population is very predominantly of Nordic origin.[3]

2.1. Round one: average participant simulated repeatedly

Table 1 provides the mean characteristics of the NDR cohort.

Table 1 Mean values of NDR cohort

Parameter	Category	N	n	Prob	Mean
Background					
Age		29,057	-	-	72.639
Sex (% male)		29,057	17,003	0.585	-
Smoker (current)		29,057	3,299	0.114	-
Duration of diabetes		29,057	-	-	11.549
Ethnicity (white)		assume		1.000	
Clinical measurements / biomarkers					
BMI (kg/m^2)		29,057	-	-	30.882
HbA1c (mmol/mol)		29,057	-	-	68.050
eGFR		29,057	-	-	65.968
Urinary ACR (mg/mmol)		29,057	-	-	21.219
Albuminuria	Normal	29,057	12,757	0.439	-
	Microalbuminuria	29,057	9,362	0.322	-
	Macroalbuminuria	29,057	6,938	0.239	-
Systolic BP (mmHg)		29,057	-	-	136.145
Diastolic BP (mmHg)		29,057	-	-	76.075
LDL cholesterol (mmol/l)		29,057	-	-	2.438

Parameter	Category	N	n	Prob	Mean
HDL cholesterol (mmol/l)		29,057	-	-	1.160
Triglycerides (mmol/l)		29,057	-	-	2.151
Total cholesterol (mmol/l)		29,057	-	-	4.383
Medical history					
Ischaemic heart disease		29,057	9,982	0.344	-
Heart failure		29,057	4,568	0.157	-
Stroke		29,057	3,873	0.133	-
Myocardial infarction		29,057	4,732	0.163	-
Angina		29,057	5,682	0.196	-
Coronary revascularisation		29,057	5,999	0.206	-
Peripheral arterial disease		29,057	1,960	0.067	-
Atrial fibrillation		29,057	5,809	0.200	-
Renal disease		29,057	1,739	0.060	-
Diabetic retinopathy		29,057	12,008	0.413	-
Medicines					
Insulin		29,057	8,928	0.307	-
Non-insulin antihyperglycaemics		29,057	29,057	1.000	-
Statins		29,057	21,349	0.735	-
Antihypertensives		29,057	24,503	0.843	-

We would like you to simulate the average person repeatedly, with as little variation as your model allows.

- Step one: define the modelled population:
  - If your model allows you to simulate an individual person with hybrid characteristics (i.e. an observation that is 59% male) then please take advantage of this to simulate a single person who represents the average characteristics of the cohort.
  - If this is not possible in your model, then please simulate a small population where all observations have the same value for all continuous variables (equal to the mean for the NDR population), and the binary characteristics are correctly (but independently) distributed. E.g. 100 people, all aged 72.6, a random 59 of whom are male, a random 11 of whom are current smokers, and so on. **We have provided an example in the Excel workbook (sheet 'Baseline_Round1a')**.
  - If your model requires baseline patient characteristics other than those specified here, please make the most neutral assumptions possible and document the values and sources you use in the 'Baseline_Round1' tab in the Excel workbook.
- Step two: Run the model to produce 29,070,000 realisations, e.g. **1 person × 29,070,000 internal loops** or **100 people × 290,700 internal loops**. By 'internal loops', we mean the number of times the same patient is simulated through the risk equations to reduce first-order uncertainty.
  - If this is insufficient to generate stable results, increase the number of internal loops for this and other rounds accordingly.

- Step three: report results over a **30-year time horizon** discounting costs, LYs, and QALYs at **3.5% per year**.
- Step four: repeat steps 1–3, but include **all** of the following at 1 year:
  - 5.5 mmol/mol (0.5%-point) reduction in HbA1c;
  - 10 mmHg reduction in systolic blood pressure;
  - 0.5 mmol/l (19.33 mg/dl) reduction in LDL cholesterol
  - 1-unit reduction in BMI (kg/m^2)

  Allow the difference to persist unattenuated for the remainder of the model time horizon. Report results in the Excel workbook.

2.2. Round two: independently sampled characteristics

Table 2 supplements information on the mean characteristics of the NDR cohort with information on dispersion of continuous measures.

Table 2 Mean values of NDR cohort with dispersion

Parameter	Category	N	n	Prob	Mean	SD
Background						
Age		29,057	-	-	72.639	9.249
Sex (% male)		29,057	17,003	0.585	-	-
Smoker (current)		29,057	3,299	0.114	-	-
Duration of diabetes		29,057	-	-	11.549	8.168
Ethnicity (white)		assume		1.000		
Clinical measurements / biomarkers						
BMI (kg/m^2)		29,057	-	-	30.882	6.697
HbA1c (mmol/mol)		29,057	-	-	68.050	13.789
eGFR		29,057	-	-	65.968	26.412
Urinary ACR (mg/mmol)		29,057	-	-	21.219	56.520
Albuminuria	Normal	29,057	12,757	0.439	-	-
	Microalbuminuria	29,057	9,362	0.322	-	-
	Macroalbuminuria	29,057	6,938	0.239	-	-
Systolic BP (mmHg)		29,057	-	-	136.145	16.735
Diastolic BP (mmHg)		29,057	-	-	76.075	10.236
LDL cholesterol (mmol/l)		29,057	-	-	2.438	0.960
HDL cholesterol (mmol/l)		29,057	-	-	1.160	0.349
Triglycerides (mmol/l)		29,057	-	-	2.151	1.447
Total cholesterol (mmol/l)		29,057	-	-	4.383	1.145
Medical history						
Ischaemic heart disease		29,057	9,982	0.344	-	-
Heart failure		29,057	4,568	0.157	-	-
Stroke		29,057	3,873	0.133	-	-
Myocardial infarction		29,057	4,732	0.163	-	-
Angina		29,057	5,682	0.196	-	-
Coronary revascularisation		29,057	5,999	0.206	-	-
Peripheral arterial disease		29,057	1,960	0.067	-	-
Atrial fibrillation		29,057	5,809	0.200	-	-
Renal disease		29,057	1,739	0.060	-	-

Parameter	Category	N	n	Prob	Mean	SD
Diabetic retinopathy		29,057	12,008	0.413	-	-
Medicines						
Insulin		29,057	8,928	0.307	-	-
Non-insulin antihyperglycaemics		29,057	29,057	1.000	-	-
Statins		29,057	21,349	0.735	-	-
Antihypertensives		29,057	24,503	0.843	-	-

We would like you to simulate this population, allowing for variation in continuous variables, but with no information as to how all variables are correlated with each other.

- Step one: generate a population of size **29,070** using the means, SDs, and proportions provided
  - Your model may already be configured to simulate a population based on such inputs; if not, please generate one externally and use it to populate your model
  - Note that, for some variables, simply sampling from an untruncated normal distribution may result in impossible values (e.g. negative duration of diabetes). To preserve realism of the task (i.e. to reflect what it's really like to try to simulate a population based on publicly available data), we leave this as a problem for participants to solve.
  - If your model requires baseline patient characteristics other than those specified here, please make the most neutral assumptions possible and document the values and sources you use in the 'Baseline_Round2' tab in the Excel workbook.
- Step two: run the model to produce **29,070 people × 1,000 internal loops**.
- Step three: report results over a **30-year time horizon** discounting costs, LYs, and QALYs at **3.5% per year**.
- Step four: repeat steps 1–3, but include **all** of the following at 1 year:
  - 5.5 mmol/mol (0.5%-point) reduction in HbA1c;
  - 10 mmHg reduction in systolic blood pressure;
  - 0.5 mmol/l (19.33 mg/dl) reduction in LDL cholesterol
  - 1-unit reduction in BMI (kg/m^2)

  Allow the difference to persist unattenuated for the remainder of the model time horizon. Report results in the Excel workbook.

2.3. Round three: characteristics sampled with correlations

Table 3 shows correlations between variables which, combined with the information already provided in *Table 2*, will enable joint sampling of all parameters.

Steps are similar to before.

- Step one: generate a population of size **29,070** using the means, SDs, proportions, and correlation coefficients provided

  - You are likely to have to generate a population externally and use it to populate your model.
  - Correlation coefficients are:
    - Pearson for continuous–continuous pairs
    - Polyserial for categorical–continuous pairs
    - Polychoric for categorical–categorical pairs
  - As before, be aware that nothing in the information provided actively precludes the sampling of impossible values (e.g. negative duration of diabetes). Again, we are not providing any additional information, as we want to test how well a model can be populated using data that might plausibly be in the public domain, so we leave this as a problem for participants to solve.
  - If your model requires baseline patient characteristics other than those specified here, please make the most neutral assumptions possible and document the values and sources you use in the 'Baseline_Round3' tab in the Excel workbook.
- Step two: run the model to produce **29,070 people × 1,000 internal loops**.
- Step three: report results over a **30-year time horizon** discounting costs, LYs, and QALYs at **3.5% per year**.
- Step four: repeat steps 1–3, but include **all** of the following at 1 year:
  - 5.5 mmol/mol (0.5%-point) reduction in HbA1c;
  - 10 mmHg reduction in systolic blood pressure;
  - 0.5 mmol/l (19.33 mg/dl) reduction in LDL cholesterol
  - 1-unit reduction in BMI (kg/m^2)

  Allow the difference to persist unattenuated for the remainder of the model time horizon. Report results in the Excel workbook.

Table 3 Correlation matrix for NDR cohort

	Age	Sex (% male)	Smoker (current)	Duration of diabetes	BMI (kg/m2)	HbA1c (mmol/mol)	eGFR	Urinary ACR (mg/mmol)	Albuminuria	Systolic BP (mmHg)	Diastolic BP (mmHg)	LDL cholesterol (mmol/l)	HDL cholesterol (mmol/l)	Triglycerides (mmol/l)	Total cholesterol (mmol/l)	Ischaemic heart disease	Heart failure	Peripheral arterial disease	Atrial fibrillation	Myocardial infarction	Angina	Coronary revascularisation	Renal disease	Stroke	Diabetic retinopathy	Insulin	Statins	Antihypertensives
Age	1.00	-0.24	-0.33	0.24	-0.25	-0.03	-0.37	-0.04	0.03	0.03	-0.24	0.02	0.17	-0.15	0.00	-0.07	0.13	-0.01	-0.13	-0.05	-0.22	0.06	0.26	-0.02	0.07	-0.03	-0.14	-0.03
Sex (% male)	-0.24	1.00	0.05	-0.06	-0.06	0.01	0.27	0.04	0.10	-0.04	0.10	-0.15	-0.38	0.01	-0.25	0.23	0.02	0.03	0.19	0.18	0.31	0.04	0.05	0.07	0.01	0.02	0.14	0.05
Smoker (current)	-0.33	0.05	1.00	-0.10	-0.03	0.06	0.22	0.11	0.11	-0.02	0.04	0.01	-0.11	0.09	0.02	0.02	-0.01	0.04	0.07	-0.01	0.06	0.21	-0.13	0.00	-0.03	-0.02	0.05	-0.06
Duration of diabetes	0.24	-0.06	-0.10	1.00	-0.12	0.09	-0.15	0.04	0.01	0.03	-0.16	-0.07	0.08	-0.10	-0.08	-0.01	0.00	-0.03	-0.08	0.03	-0.07	0.10	-0.02	0.14	0.46	0.43	0.06	0.07
BMI (kg/m2)	-0.25	-0.06	-0.03	-0.12	1.00	0.04	0.04	0.02	0.01	0.00	0.10	0.00	-0.11	0.11	0.01	-0.01	0.06	-0.06	-0.01	-0.01	0.00	-0.12	0.03	0.05	-0.06	0.11	0.02	0.10
HbA1c (mmol/mol)	-0.03	0.01	0.06	0.09	0.04	1.00	0.06	0.05	0.11	0.02	0.03	0.04	-0.09	0.13	0.07	0.03	0.10	0.03	0.04	0.01	0.02	0.04	0.03	0.04	0.09	0.33	-0.02	-0.06
eGFR	-0.37	0.27	0.22	-0.15	0.04	0.06	1.00	-0.11	-0.01	0.01	0.12	-0.03	-0.04	-0.02	-0.06	0.15	-0.10	0.15	0.17	0.12	0.21	0.07	-0.09	-0.61	-0.08	-0.11	0.06	-0.06
Urinary ACR (mg/mmol)	-0.04	0.04	0.11	0.04	0.02	0.05	-0.11	1.00	0.82	0.08	0.05	0.05	0.01	0.10	0.11	-0.01	0.02	0.03	-0.02	0.00	-0.02	0.08	-0.02	0.24	0.03	0.08	0.01	0.06
Albuminuria	0.03	0.10	0.11	0.01	0.01	0.11	-0.01	0.82	1.00	0.10	0.05	0.05	-0.05	0.07	0.07	-0.08	0.04	-0.03	-0.09	-0.07	-0.12	-0.01	0.05	0.24	0.00	0.10	-0.09	-0.02
Systolic BP (mmHg)	0.03	-0.04	-0.02	0.03	0.00	0.02	0.01	0.08	0.10	1.00	0.47	0.11	0.06	0.01	0.11	-0.11	-0.22	-0.04	-0.09	-0.08	-0.09	0.04	-0.16	0.00	0.04	0.01	-0.10	0.09
Diastolic BP (mmHg)	-0.24	0.10	0.04	-0.16	0.10	0.03	0.12	0.05	0.05	0.47	1.00	0.11	-0.01	0.06	0.11	-0.10	-0.16	0.00	-0.04	-0.09	-0.04	-0.11	-0.08	-0.04	-0.10	-0.09	-0.10	-0.04
LDL cholesterol (mmol/l)	0.02	-0.15	0.01	-0.07	0.00	0.04	-0.03	0.05	0.05	0.11	0.11	1.00	0.12	0.06	0.84	-0.20	-0.05	-0.08	-0.18	-0.14	-0.20	-0.04	-0.07	-0.02	-0.07	-0.05	-0.48	-0.12
HDL cholesterol (mmol/l)	0.17	-0.38	-0.11	0.08	-0.11	-0.09	-0.04	0.01	-0.05	0.06	-0.01	0.12	1.00	-0.26	0.27	-0.18	-0.10	0.02	-0.14	-0.13	-0.20	-0.05	-0.10	-0.05	0.02	-0.07	-0.10	-0.06
Triglycerides (mmol/l)	-0.15	0.01	0.09	-0.10	0.11	0.13	-0.02	0.10	0.07	0.01	0.06	0.06	-0.26	1.00	0.36	-0.02	0.02	-0.05	-0.03	-0.01	-0.02	0.00	-0.02	0.05	-0.09	0.02	0.02	0.02
Total cholesterol (mmol/l)	0.00	-0.25	0.02	-0.08	0.01	0.07	-0.06	0.11	0.07	0.11	0.11	0.84	0.27	0.36	1.00	-0.23	-0.06	-0.08	-0.21	-0.16	-0.24	-0.05	-0.09	0.00	-0.09	-0.04	-0.44	-0.10
Ischaemic heart disease	-0.07	0.23	0.02	-0.01	-0.01	0.03	0.15	-0.01	-0.08	-0.11	-0.10	-0.20	-0.18	-0.02	-0.23	1.00	0.34	-0.11	0.87	0.87	0.95	0.10	0.19	0.06	-0.01	0.06	0.36	0.09
Heart failure	0.13	0.02	-0.01	0.00	0.06	0.10	-0.10	0.02	0.04	-0.22	-0.16	-0.05	-0.10	0.02	-0.06	0.34	1.00	-0.05	0.24	0.22	0.14	0.05	0.60	0.15	-0.01	0.10	-0.01	0.05
Peripheral arterial disease	-0.01	0.03	0.04	-0.03	-0.06	0.03	0.15	0.03	-0.03	-0.04	0.00	-0.08	0.02	-0.05	-0.08	-0.11	-0.05	1.00	-0.16	-0.07	-0.22	-0.05	0.10	-0.04	0.01	0.01	0.16	-0.03
Atrial fibrillation	-0.13	0.19	0.07	-0.08	-0.01	0.04	0.17	-0.02	-0.09	-0.09	-0.04	-0.18	-0.14	-0.03	-0.21	0.87	0.24	-0.16	1.00	0.53	0.89	0.02	0.05	0.01	-0.05	0.01	0.34	0.10
Myocardial infarction	-0.05	0.18	-0.01	0.03	-0.01	0.01	0.12	0.00	-0.07	-0.08	-0.09	-0.14	-0.13	-0.01	-0.16	0.87	0.22	-0.07	0.53	1.00	0.81	0.11	0.16	0.05	0.02	0.06	0.28	0.05
Angina	-0.22	0.31	0.06	-0.07	0.00	0.02	0.21	-0.02	-0.12	-0.09	-0.04	-0.20	-0.20	-0.02	-0.24	0.95	0.14	-0.22	0.89	0.81	1.00	0.01	0.02	-0.01	-0.02	0.02	0.40	0.10
Coronary revascularisation	0.06	0.04	0.21	0.10	-0.12	0.04	0.07	0.08	-0.01	0.04	-0.11	-0.04	-0.05	0.00	-0.05	0.10	0.05	-0.05	0.02	0.11	0.01	1.00	0.06	0.09	0.08	0.11	0.13	-0.04
Renal disease	0.26	0.05	-0.13	-0.02	0.03	0.03	-0.09	-0.02	0.05	-0.16	-0.08	-0.07	-0.10	-0.02	-0.09	0.19	0.60	0.10	0.05	0.16	0.02	0.06	1.00	0.06	-0.01	0.01	-0.02	0.01
Stroke	-0.02	0.07	0.00	0.14	0.05	0.04	-0.61	0.24	0.24	0.00	-0.04	-0.02	-0.05	0.05	0.00	0.06	0.15	-0.04	0.01	0.05	-0.01	0.09	0.06	1.00	0.15	0.28	0.09	0.08
Diabetic retinopathy	0.07	0.01	-0.03	0.46	-0.06	0.09	-0.08	0.03	0.00	0.04	-0.10	-0.07	0.02	-0.09	-0.09	-0.01	-0.01	0.01	-0.05	0.02	-0.02	0.08	-0.01	0.15	1.00	0.39	0.06	0.10
Insulin	-0.03	0.02	-0.02	0.43	0.11	0.33	-0.11	0.08	0.10	0.01	-0.09	-0.05	-0.07	0.02	-0.04	0.06	0.10	0.01	0.01	0.06	0.02	0.11	0.01	0.28	0.39	1.00	0.11	0.09
Statins	-0.14	0.14	0.05	0.06	0.02	-0.02	0.06	0.01	-0.09	-0.10	-0.10	-0.48	-0.10	0.02	-0.44	0.36	-0.01	0.16	0.34	0.28	0.40	0.13	-0.02	0.09	0.06	0.11	1.00	0.28
Antihypertensives	-0.03	0.05	-0.06	0.07	0.10	-0.06	-0.06	0.06	-0.02	0.09	-0.04	-0.12	-0.06	0.02	-0.10	0.09	0.05	-0.03	0.10	0.05	0.10	-0.04	0.01	0.08	0.10	0.09	0.28	1.00

NB correlation coefficients given to greater precision in accompanying Excel workbook

2.4. Round four: using synthetic population

This dataset is not yet available, as we are in the final stages of agreeing disclosure terms with the Swedish NDR (see below), but we will make it available as soon as possible.

For round four we will ask participants to repeat the task using a pseudo-patient-level dataset (n = 29,070) the REDDIE team have generated that we will provide.

- Step one: It will not be necessary to generate your own population; simply plug the provided data into your model.
  - If your model requires baseline patient characteristics other than those provided, please make the most neutral assumptions possible and document the values and sources you use in the 'Baseline_Round4' tab in the Excel workbook.
- Step two: run the model to produce **29,070 people × 1,000 internal loops**.
- Step three: report results over a **30-year time horizon** discounting costs, LYs, and QALYs at **3.5% per year**.
- Step four: repeat steps 1–3, but include **all** of the following at 1 year:
  - 5.5 mmol/mol (0.5%-point) reduction in HbA1c;
  - 10 mmHg reduction in systolic blood pressure;
  - 0.5 mmol/l (19.33 mg/dl) reduction in LDL cholesterol
  - 1-unit reduction in BMI (kg/m^2)

  Allow the difference to persist unattenuated for the remainder of the model time horizon. Report results in the Excel workbook.

In order to receive synthetic data, **participants will have to agree to terms and conditions restricting use of the data to the Mount Hood challenges**. The terms are still to be finalised, but are likely to include undertakings that

(i) participants will only use the synthetic data for the purpose of participating in the 2026 Mount Hood challenges;
(ii) participants will not attempt to reverse-engineer the synthetic data in order to identify any characteristics of the real data on which the synthesiser was trained;
(iii) participants will not share the synthetic data with any other parties;
(iv) participants will delete all copies of the synthetic data from their systems, and confirm that they have done so, once the challenges are concluded.

It will be sufficient for participating researchers to agree to these terms and conditions; we do not anticipate requiring sign-off from legal departments.

Please let us know now if you foresee any difficulties in providing such an undertaking.

3. OTHER DATA AND ASSUMPTIONS FOR MODELLING

For all inputs and assumptions other than baseline characteristics, please follow the Mount Hood Reference Simulation (see https://www.mthooddiabeteschallenge.com/refsim).

3.1. Risk factor progression

Hold all time-varying risk factors (e.g. HbA1c, systolic blood pressure, etc.) constant at their starting values. Do not apply progression equations or drift parameters.

If any such functions are hardwired in your simulation in a way you cannot change, please report details in the Excel workbook.

3.2. Costs

Table 4 gives cost inputs. If your model has other endpoints for which costs are needed, please report these in the 'Costs' tab in the Excel workbook.

Table 4 Cost inputs for Mount Hood reference simulation

Parameter	Fatal cost	Non-fatal cost	Cost in subsequent years
Ischemic heart disease/Angina	£6,070	£14,001	£3,550
Myocardial infarction	£3,318	£9,518	£3,424
Heart failure	£2,825	£5,650	£4,277
Coronary revascularisation	–	£8,302	£3,550
Stroke	£6,463	£10,755	£3,534
Amputation	£9,825	£15,153	£5,328
Blindness	–	£4,247	£2,206
Haemodialysis	–	£43,359	£43,359
Renal failure / transplant	£10,289	£20,578	£20,578
Ulcer	–	£7,076	£1,072
Peripheral vascular disease	–	£4,698	£1,010
Cataract operation	–	£2,636	£178
Neuropathy	–	£29	£29
Gangrene treatment	–	£3,694	–
Retinopathy laser treatment	–	£1,176	–
Peritoneal Dialysis	–	£32,556	£32,556
Severe hypoglycaemia (req. med. assistance)	–	£1,470	–
Severe hypoglycaemia (req. non med. assistance)	–	£433	–
Non-severe hypoglycaemia	–	£4	–
Cost in the absence of complications		£1,990	

3.3. Utilities

Table 5 gives utility inputs. If your model has other endpoints for which utility values are needed, please report these in the 'Utilities' tab in the Excel workbook.

Table 5 Utility inputs for Mount Hood reference simulation

Category	Parameter	Utility / disutility	Lower 95% CI	Upper 95% CI
Baseline utility value	Diabetes without complications	0.7850	0.6810	0.8890
Acute metabolic disorder	Minor hypoglycaemia event	−0.0140	−0.0040	−0.0040
	Major hypoglycaemia event	−0.0470	−0.0120	−0.0120
Comorbidity	Excess BMI (each unit above 25 kg/m2)	−0.0060	−0.0080	−0.0040
Oculopathy	Cataract*	−0.0160	−0.0310	−0.0010
	Moderate non-proliferative diabetic retinopathy*	−0.0400	−0.0660	−0.0140
	Moderate macular oedema*	−0.0400	−0.0660	−0.0140
	Vision-threatening diabetic retinopathy*	−0.0700	−0.0990	−0.0410
	Severe vision loss*	−0.0740	−0.1240	−0.0250
Nephropathy	Proteinuria*	−0.0480	−0.0910	−0.0050
	Renal transplant	−0.0820	−0.1370	−0.0270
	Haemodialysis*	−0.1640	−0.2740	−0.0540
	Peritoneal dialysis*	−0.2040	−0.3420	−0.0660
Neuropathy	Peripheral vascular disease*	−0.0610	−0.0900	−0.0320
	Neuropathy*	−0.0840	−0.1110	−0.0570
	Active ulcer*	−0.1700	−0.2070	−0.1330
	Amputation event	−0.2800	−0.3890	−0.1700
Cerebrovascular disease	Stroke*	−0.1640	−0.2220	−0.1050
Coronary heart disease	Myocardial infarction	−0.0550	−0.0670	−0.0420
	Ischemic heart disease*	−0.0900	−0.1260	−0.0540
	Heart failure*	−0.1080	−0.1690	−0.0480

* disutility applies for incident state and every subsequent cycle

4. FORTHCOMING LONGITUDINAL CHALLENGE

In a second challenge, to be documented separately, we will ask participants to simulate populations over time, starting from the baseline cohorts developed here. However, for this challenge, we will also provide time-varying covariates (e.g. changes in HbA1c and lipids over time) for 2 cohorts undergoing different treatments (GLP-1RA -v- DPP-4i). Endpoint data from the synthetic dataset(s) created in REDDIE will provide a reference standard to which we will compare the modellers' predicted outcomes.

5. REFERENCES

1. Hallström S, Michelsen J, Imberg H, et al. Cardiovascular outcomes of GLP-1 receptor agonists versus DPP-4 inhibitors in the Swedish National Diabetes Register: a LEADER-inspired target trial emulation. Manuscript in preparation.
2. Li X, Li F, Wang J, van Giessen A, Feenstra TL. Prediction of complications in health economic models of type 2 diabetes: a review of methods used. *Acta Diabetol.* 2023;60(7):861-879. doi:10.1007/s00592-023-02045-8
3. Rawshani A, Svensson AM, Rosengren A, Zethelius B, Eliasson B, Gudbjörnsdottir S. Impact of ethnicity on progress of glycaemic control in 131 935 newly diagnosed patients with type 2 diabetes: a nationwide observational study from the Swedish National Diabetes Register. Published online June 1, 2015. doi:10.1136/bmjopen-2015-007599