# A Monte Carlo Simulation Model for Evaluating the Effectiveness of Interventions along the 'Diabesity' Pathway

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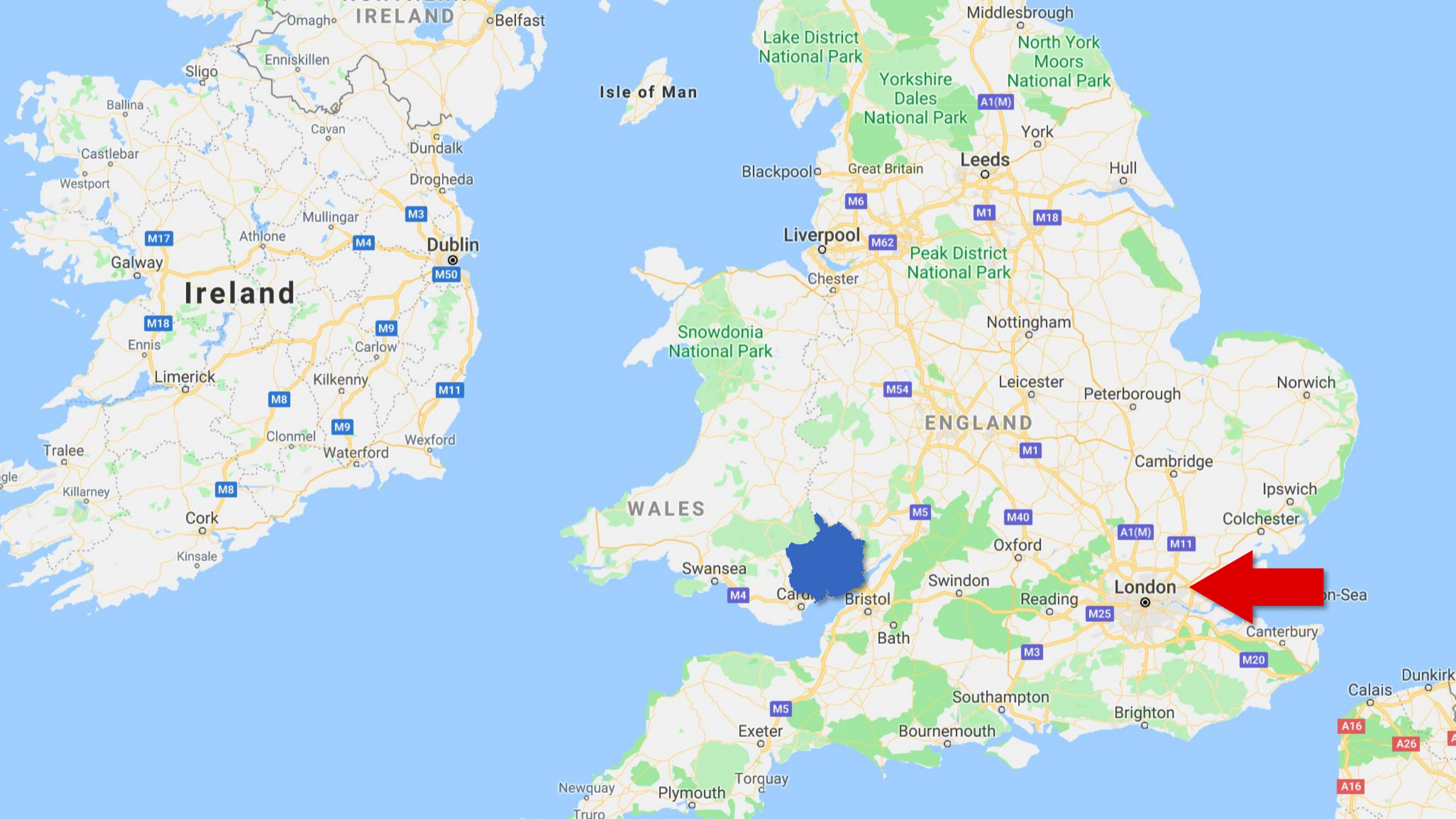
IRELAND
Omagh
Belfast
Enniskillen
Sligo
Isle of Man
Ballina
Cavan
Dundalk
Castlebar
Drogheda
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Mullingar
M3
M17
Athlone
M4
Dublin
Galway
M50
Ireland
M18
M9
Ennis
Carlow
Limerick
Kilkenny
M8
M11
M9
Clonmel
Wexford
Tralee
Waterford
Killarney
M8
Cork
Kinsale
Lake District National Park
Middlesbrough
North York Moors National Park
Yorkshire Dales National Park
A1(M)
York
Leeds
Blackpool
Great Britain
Hull
M6
M1
M18
Liverpool
M62
Peak District National Park
Chester
Snowdonia National Park
Nottingham
Leicester
M54
Peterborough
Norwich
ENGLAND
M1
Cambridge
Ipswich
WALES
M5
M40
Colchester
A1(M)
Oxford
M11
Swansea
Swindon
London
M4
Bristol
Reading
M25
Bath
Canterbury
M3
M20
Southampton
Dunkirk
Calais
M5
Brighton
Exeter
Bournemouth
A16
A26
Newquay
Torquay
Plymouth
A16
Truro

**Almost 40,000**

**people have been diagnosed with diabetes in ABUHB**

**160,000**

**people are at increased risk of acquiring type II diabetes**

# IET - user inputs

Adult Weight Management Service

Please enter your data into the cells, then click on Run.
(Takes approx 3 minutes to run)

Run

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Aneurin Bevan University Health Board

## Patient information

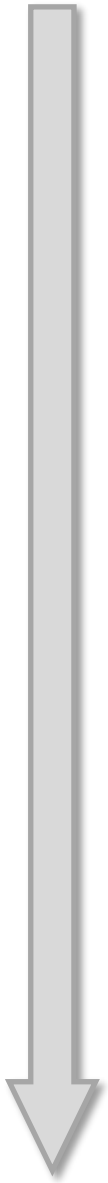
| | | |
|---|---|---|
| Sex | F | |
| Age | 48 | years |
| Starting weight | 121.03 | kg |
| Height | 1.66 | m |
| Ethnicity | Other | |
| Current smoker | N | |
| HbA1c | 6.42 | % |
| SBP | 137 | mmHg |
| Total cholesterol | 5.65 | mmol/l |
| HDL cholesterol | 1.11 | mmol/l |
| Atrial fibrillation detected | N | |
| Pre-existing type II diabetes | N | |

Restore default HBA1c

Restore default SBP

Restore default Total Cholesterol

Restore default HDL Cholesterol

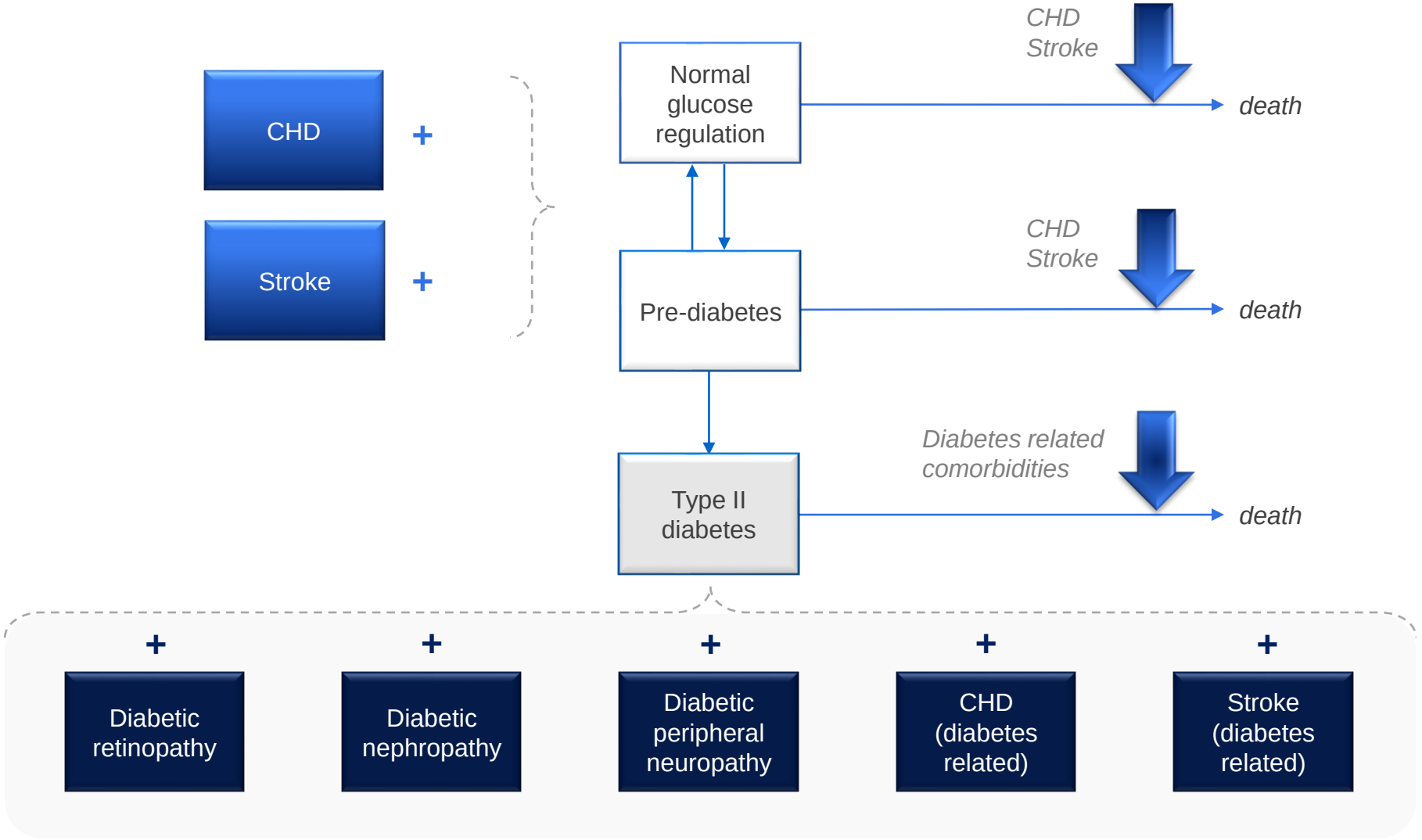


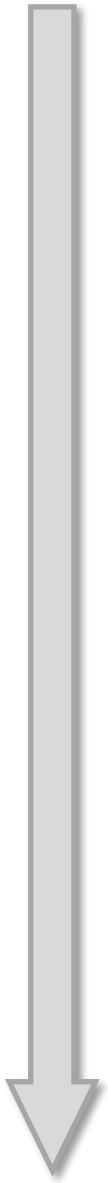
$t = 0$

Age
Sex
**Health state:**
BMI
...

| Normal glucose regulation | Pre-diabetes | Type II diabetes |
|---|---|---|

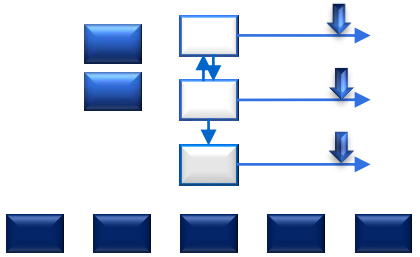
# Model of diabesity progression





$t = 0$

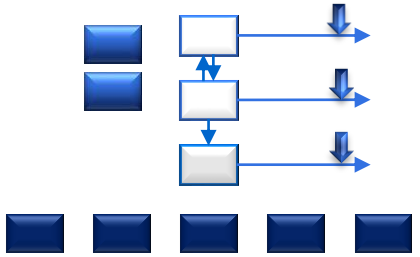
Age
Sex
Health state:
BMI
...



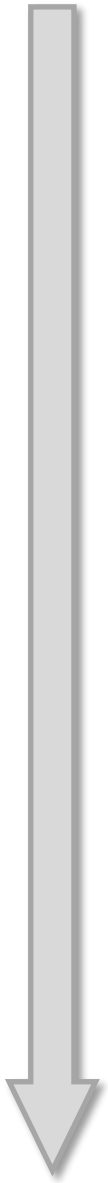
*draw random numbers*

$t = 1$

New Age = Age **+1**
Sex
**New health state:**
BMI
...

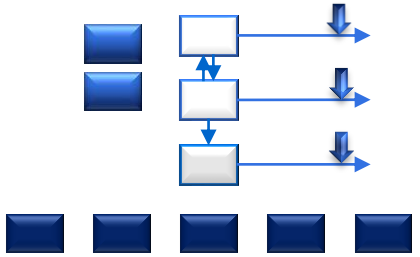


*draw random numbers*



$t = 0$

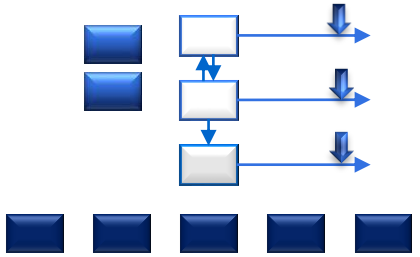
Age
Sex
Health state:
BMI
...



*draw random numbers*

$t = 1$

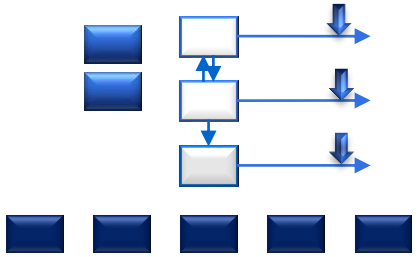
New Age = Age **+1**
Sex
**New health state:**
BMI
...



*draw random numbers*

$t = 2$

New Age= Age **+2**
Sex
**New health state:**
BMI
...

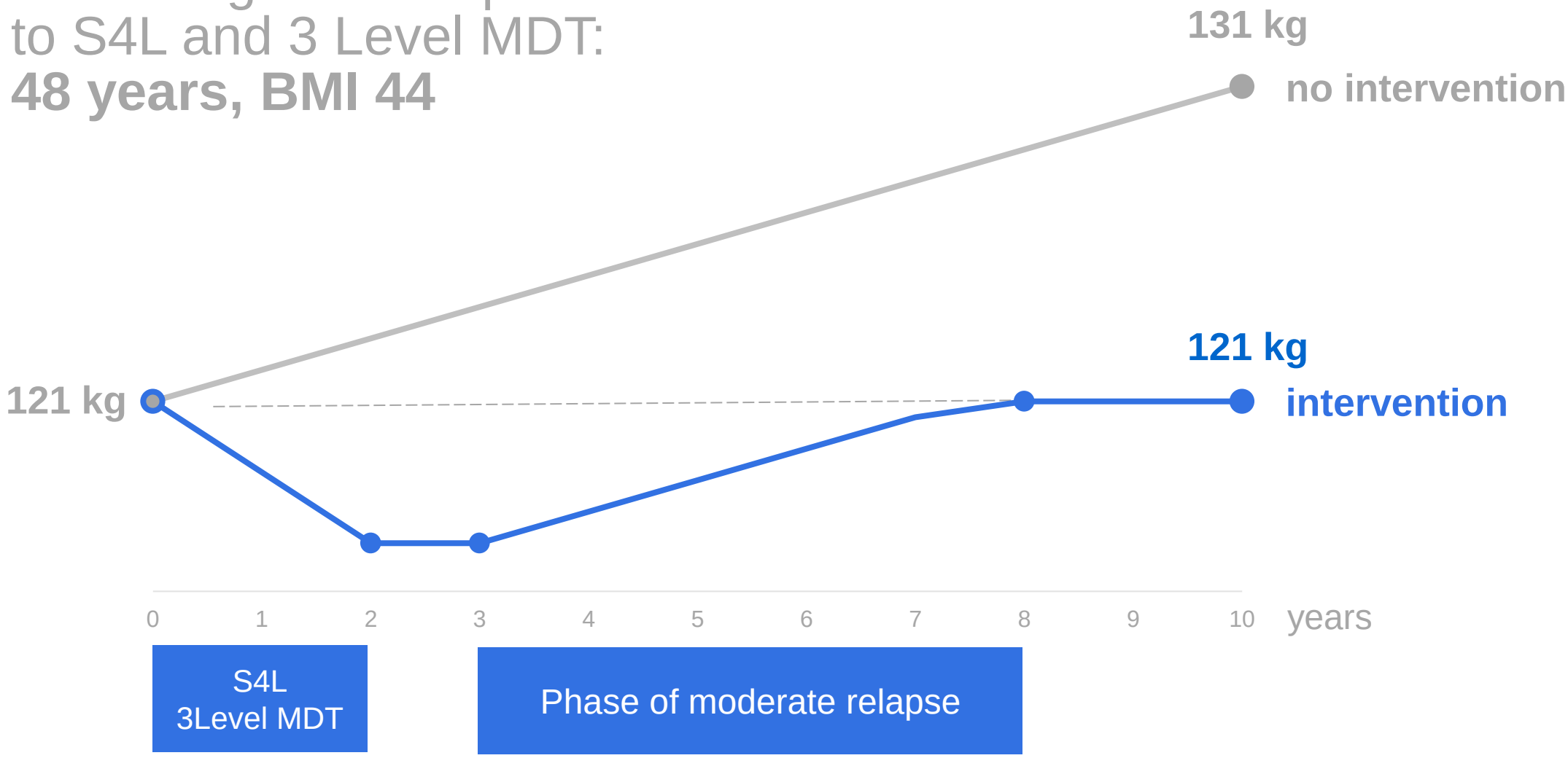


*draw random numbers*

# Assumed weight progression

for average female patient enrolled to S4L and 3 Level MDT:

**48 years, BMI 44**



**After 10 years**

our average patient (female, now: **58 years**, **BMI 44**)
has already experienced

**10 kg less than without intervention**
**= a loss of body mass of**

8%

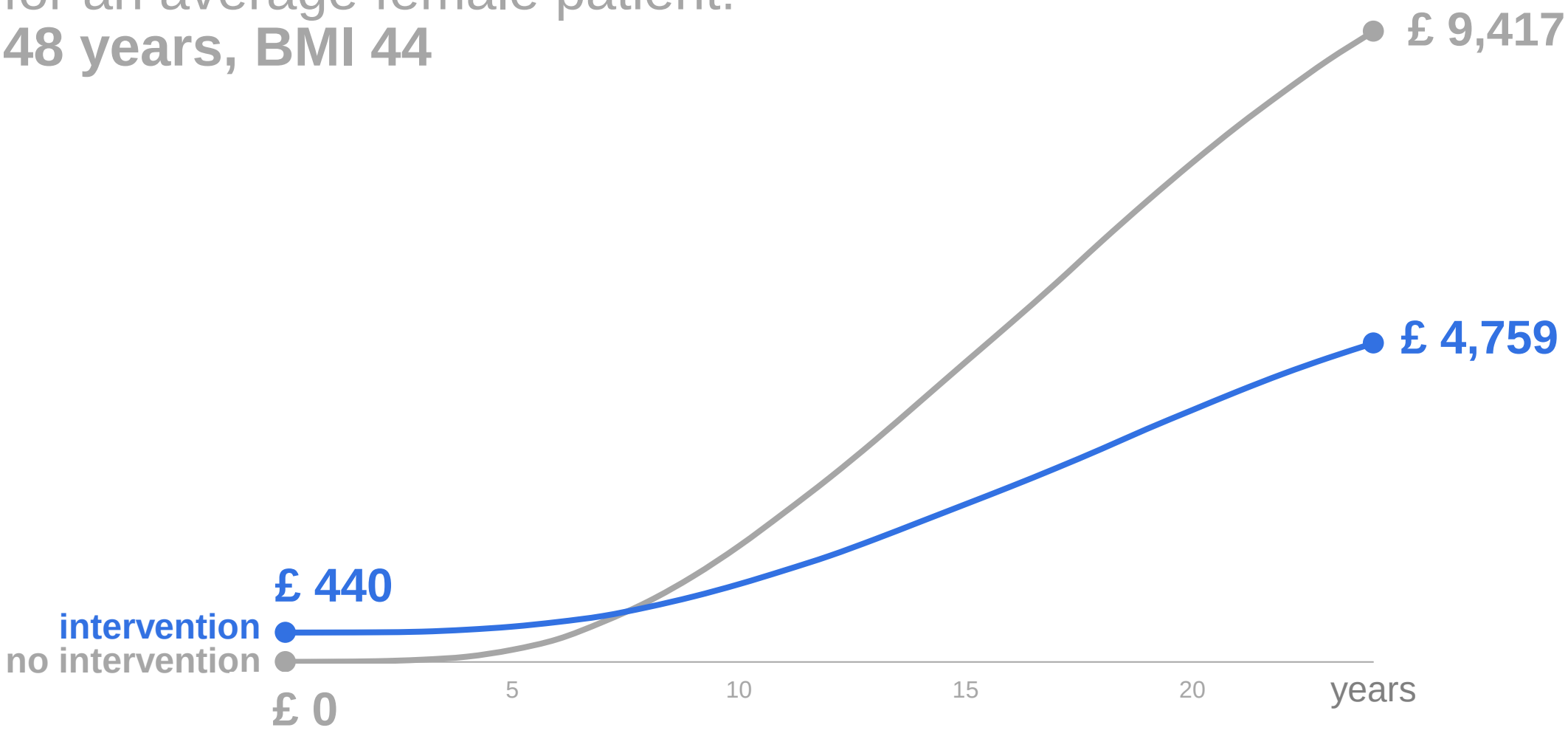
**a reduction in the**
**risk of acquiring diabetes type II by**

59%

**a raise in the**
**probability of surviving year 10 by**

33%

# Cost progression
for an average female patient:
**48 years, BMI 44**



Intervention costs are recouped

# in 5-12 years

for AWMS patients at

**high risk of type II diabetes**

while long-term healthcare cost savings for diabetes patients are not significant.

# Thank you!