

The impact of prevention on the diabetes epidemic

Chiara De Poli (LSE)

c.de-poli@lse.ac.uk

With Mi Jun Keng and Gwyn Bevan (LSE)

Hellish Decisions in Healthcare

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Diabetes prevention – the background

- The **diabetes (T2DM) epidemic**
 - 2.6 million people living with T2DM (4.6 million, about 9.5% of the population, by 2030)
 - About 7 million people are at risk of becoming diabetic
 - About £10 billion, 10% of the NHS budget, spent on diabetes care every year (£16.9 billion by 2035)
- 5-Year Forward View (2014) - **Getting serious about prevention**
- Launch of **The Healthier You: NHS Diabetes Prevention Programme** (NHS DPP) with the ambition to make England “*the first country to implement at scale a national evidence-based diabetes prevention programme*”

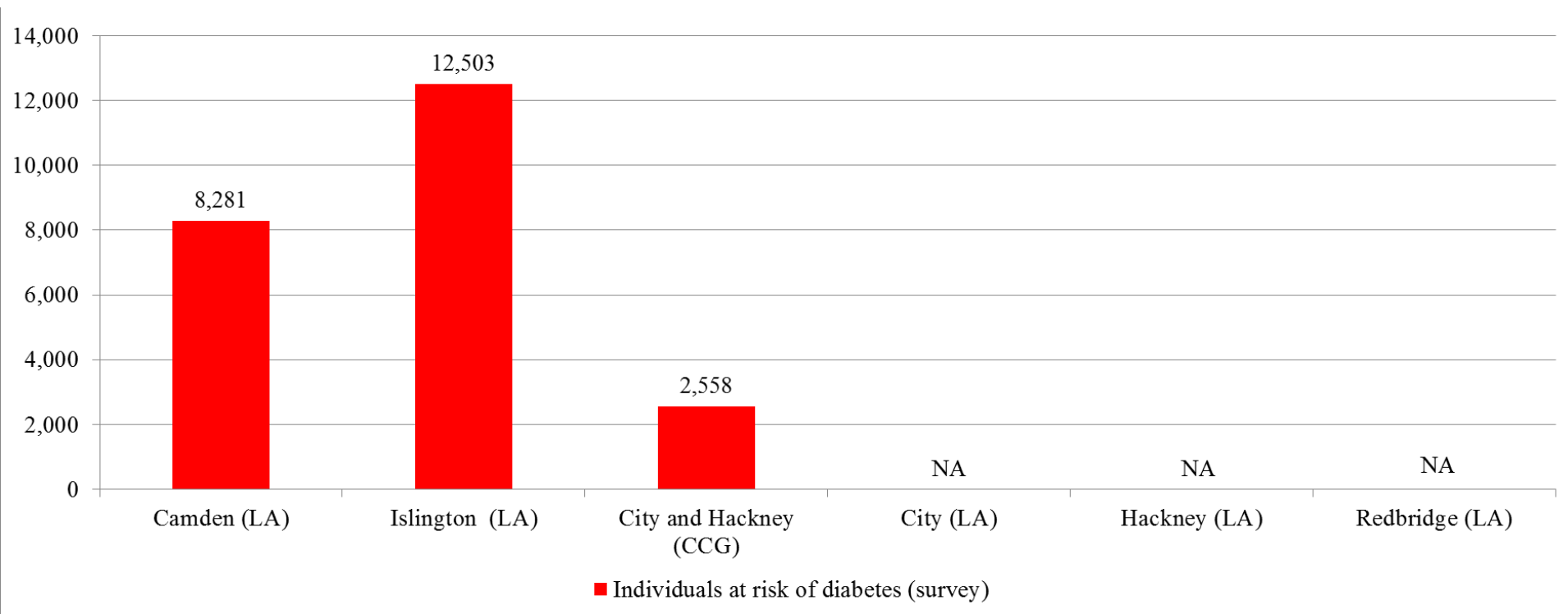
Objectives of our research

1. Map out the interventions to prevent diabetes implemented at the local level → Survey (ongoing)
2. Estimate the impact of the interventions aiming to prevent diabetes → Simulation model

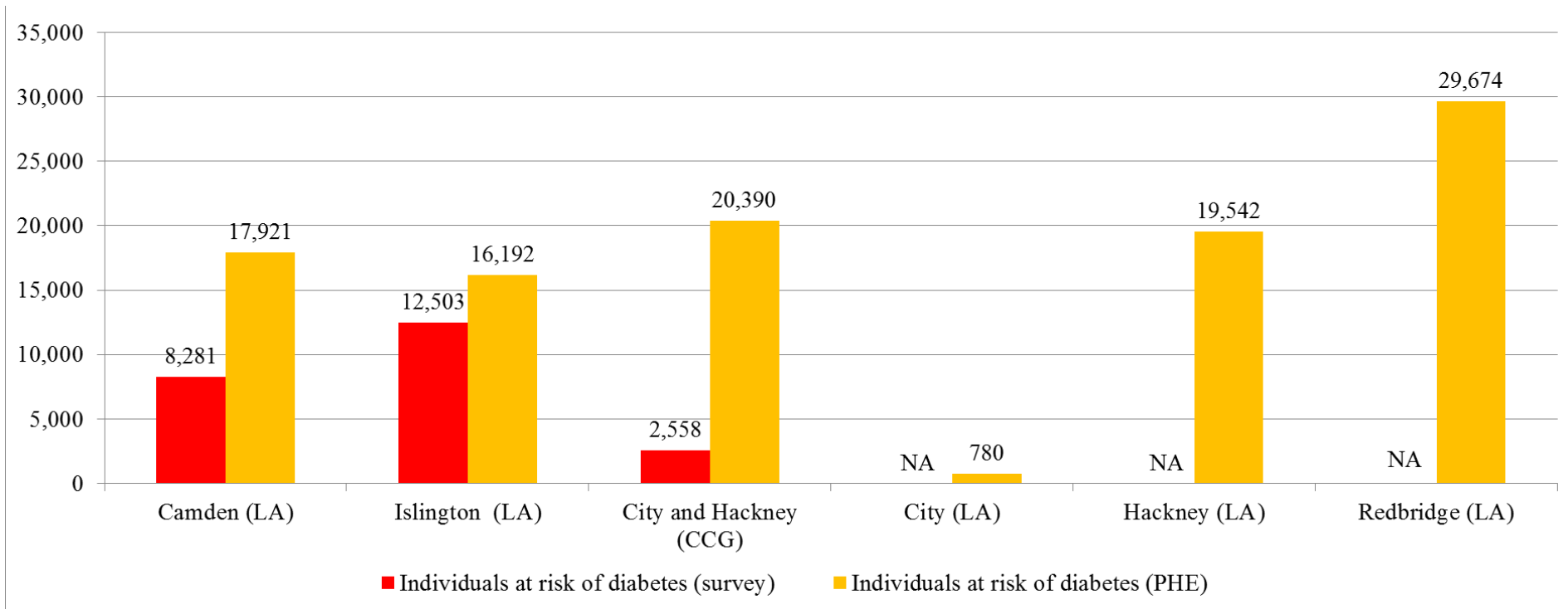
Diabetes Prevention Survey

- Objectives
 - Quantify the local population at risk of diabetes
 - Map out the interventions for the population at risk
 - Type
 - Target population
 - Provider
 - Number of people “using” the intervention (referrals, uptake rate, completion rate)
 - Cost of the intervention
- 6 health economies across London (LAs, CCGs or both) interviewed so far

Results - Number of people at risk of T2DM (1)



Results – Number of people at risk of T2DM (2)

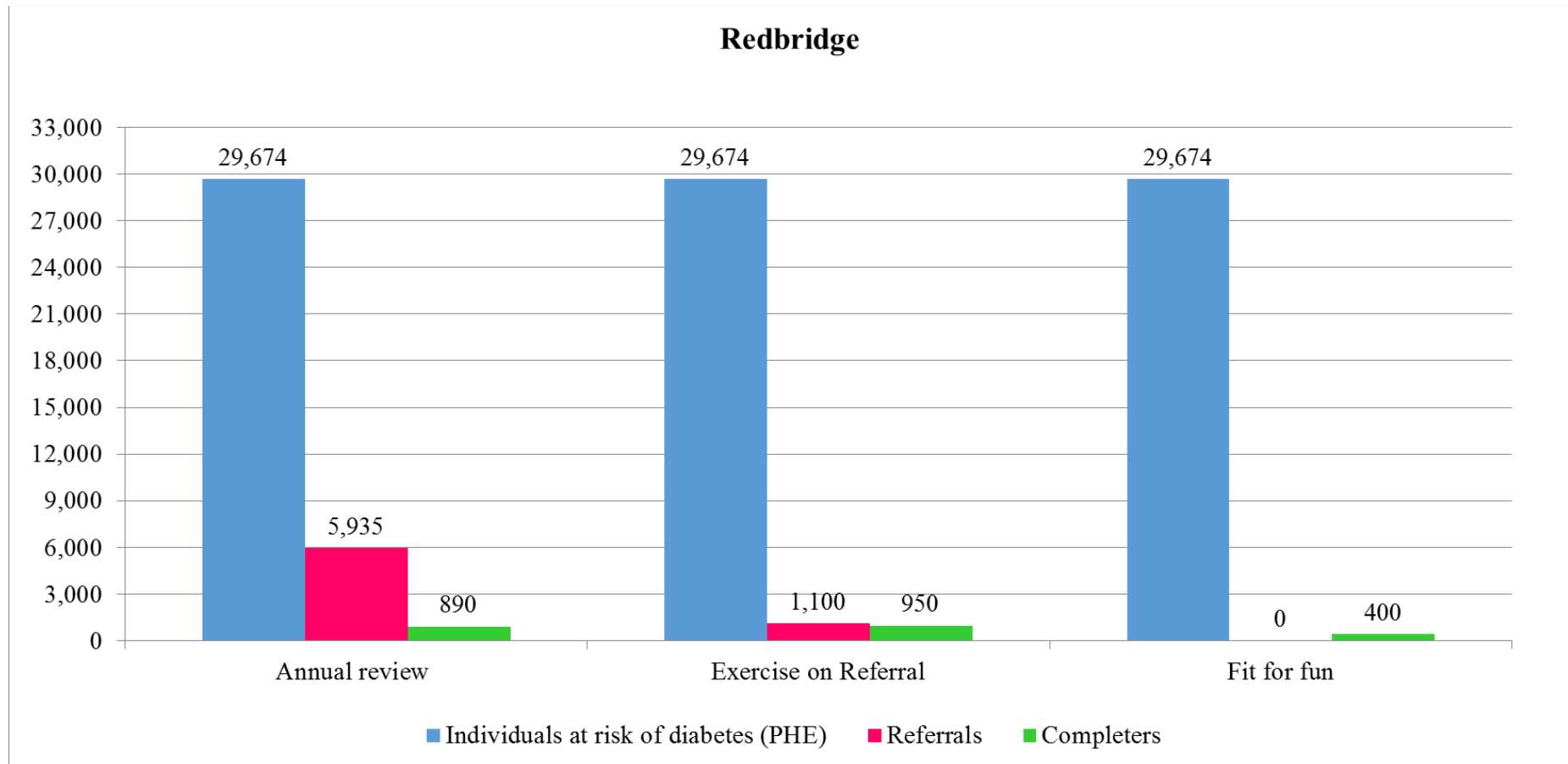


Interventions for the population at risk of T2DM

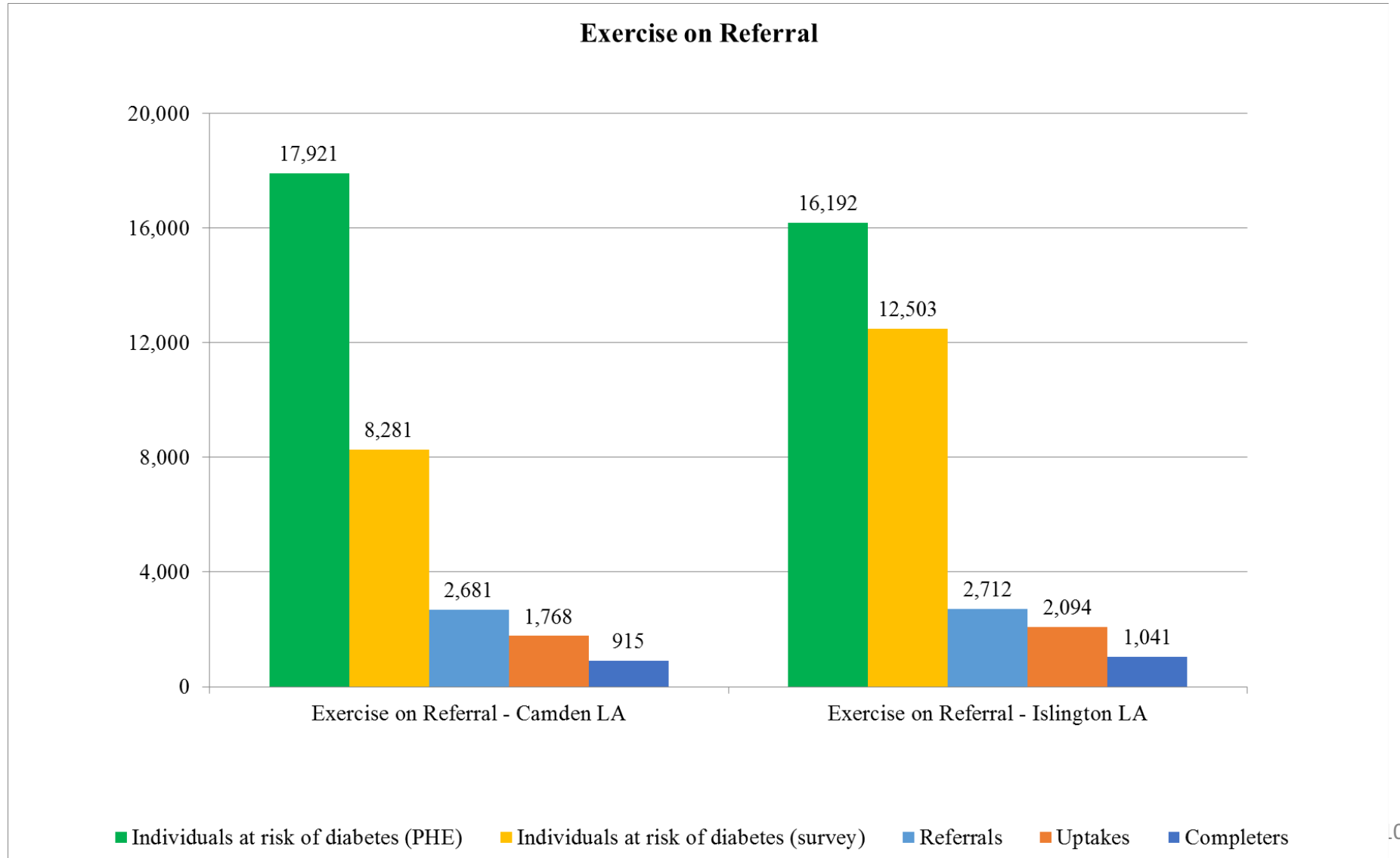
Types

- Primary Care Annual Review
- Physical activity (e.g. Fit for fun, Exercise on Referral)
- Education
- Lifestyle intervention

Results - Interventions for people at risk of T2DM



Results - Interventions for people at risk of T2DM



Conclusions

Individual-based, lifestyle interventions targeting people at risk of T2DM, as currently implemented and offered

- Are not implemented at scale (scale issue)
- Have limited reach (attrition issue)
- At scale, may be unaffordable (affordability issue)

Diabetes prevention model

- Aim: estimate the impact in 20-year time of a set of interventions aiming at preventing T2DM in adults at high risk in an ‘average’ CCG
- Impact on number of T2DM cases (and costs, burden of disease (QALY) – not shown here today)
- Markov chain model
 - Model 1: natural history of T2DM
 - Model 2: effectiveness of the intervention

Interventions modelled

1. Individual-based interventions
 - Exercise on referral schemes
 - The Healthier You Programme (NHS DPP)
2. Pharmacological intervention
 - Metformin, as per NICE guidelines PH38
3. Population-based intervention
 - Sugar tax

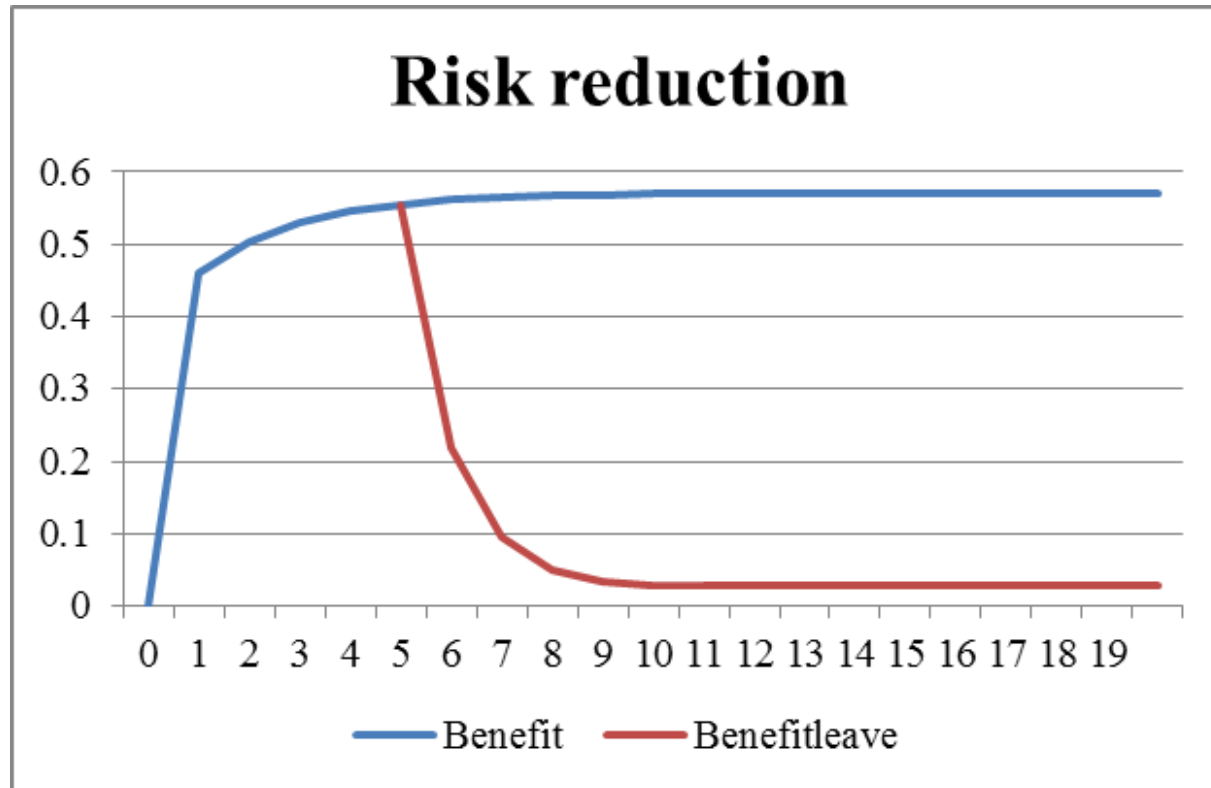
Model Inputs - Exercise on referral

Population	Average CCG population
Intervention population	Individuals who are sedentary or who are believed by their GP to be able to improve health by an increased physical activity level
Intervention	Exercise referral is the practice of referring a person to a tailored programme of physical activity usually lasting from 10 to 12 weeks. In so doing, opportunities for exercise are provided and there is an expectation that levels of physical activity will increase, leading to positive changes in health behaviours over the long term.
Cost	£230
Intervention capacity	500

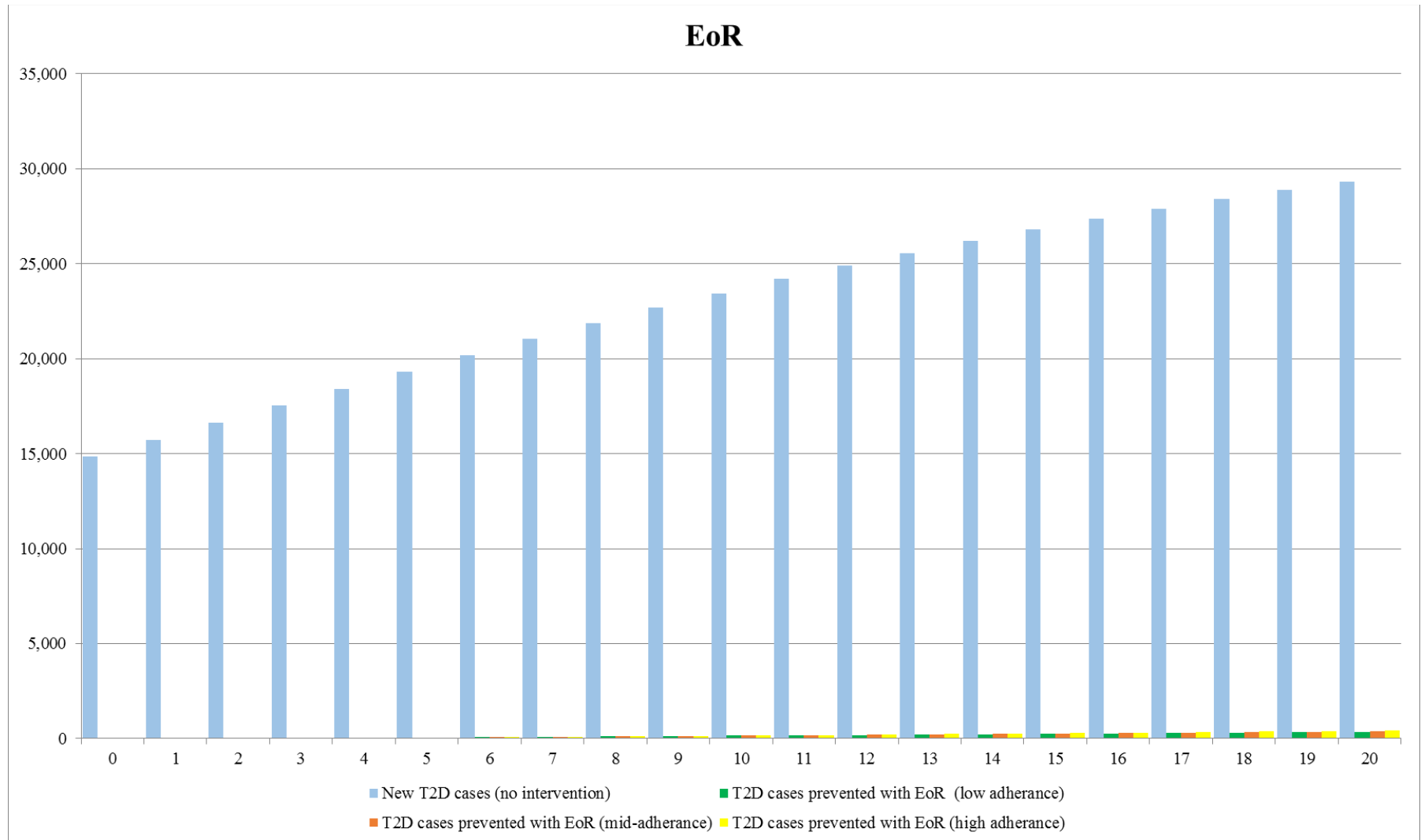
Model Inputs - Exercise on referral

Model input	Description	Parameter
Completion rate	% of people referred to the intervention who complete the intervention (attended more than 70% of sessions)	50%
Long term adherence rate	Adherence to the EoR scheme in the long run, from year 2	20%
Min long term adherence rate	Minimum adherence rate to the EoR scheme in the long run, from year 2	0-5%-10% *
Risk reduction		46%
Max. reduction	Max. reduction achievable through EoR	57%
Risk reduction for those who complete the 1-year intervention	Risk reduction for those who complete the intervention over 1 year	46%
Risk reduction for those who do not complete the 1-year intervention		0%
Max risk reduction achievable for those who don't adhere in the long run	Max risk reduction achieved in those who are not compliant over time	5%
Number of years before min achieved for those who don't adhere in the long run	Number of years before min risk reduction is achieved in those who are not compliant over time	5

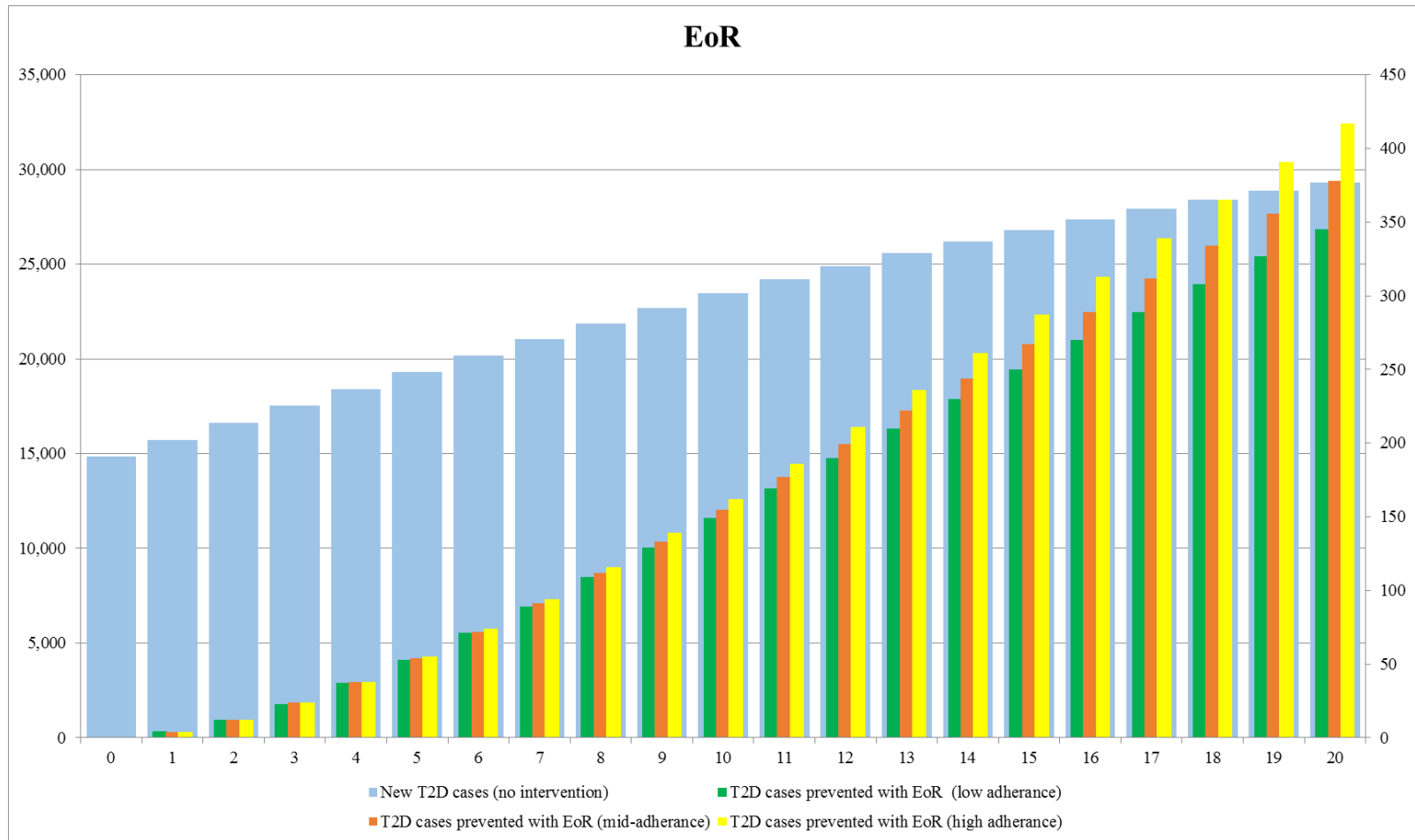
Exercise on Referral – Risk reduction profile



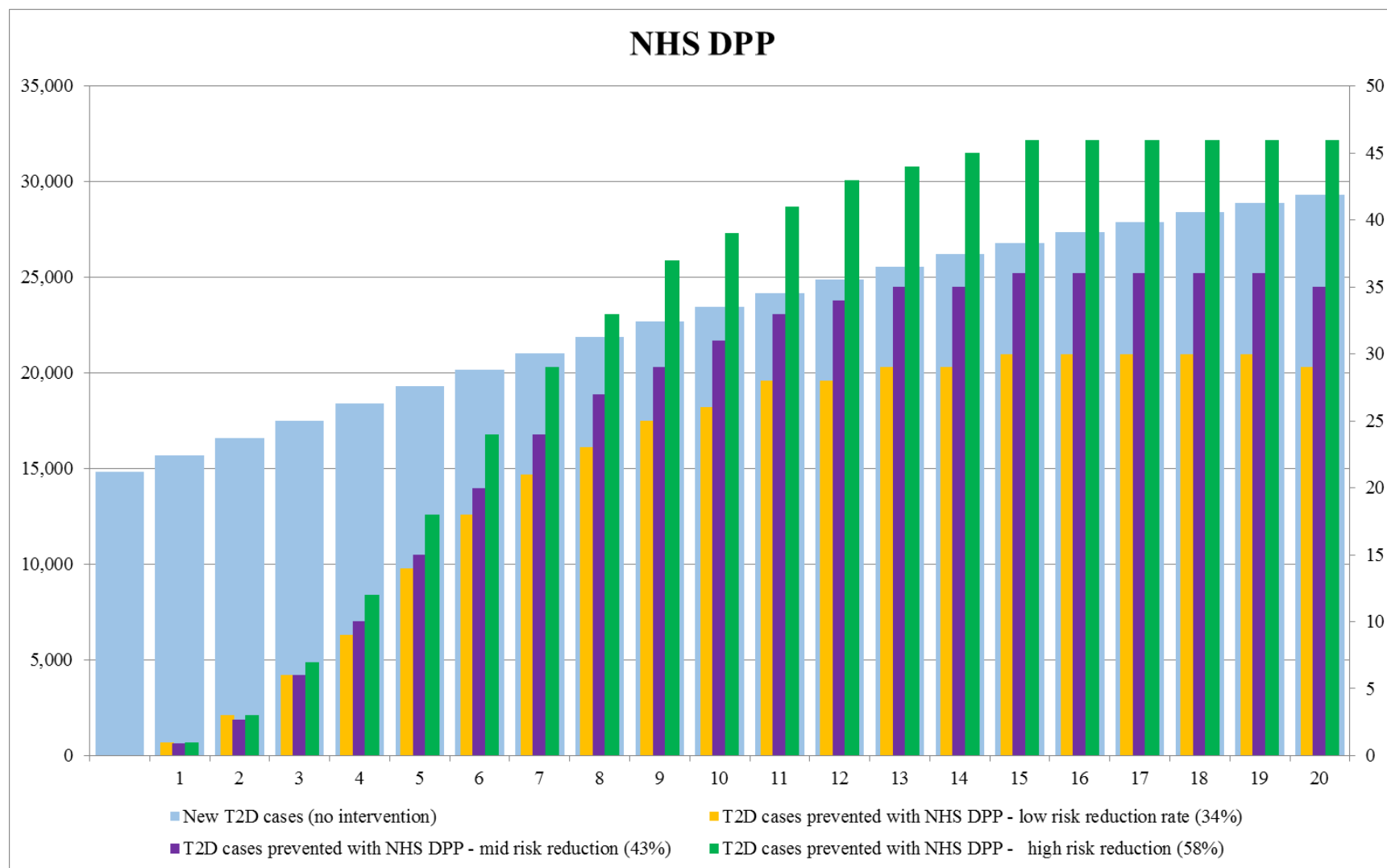
Exercise on Referral - Results



Exercise on Referral - Results

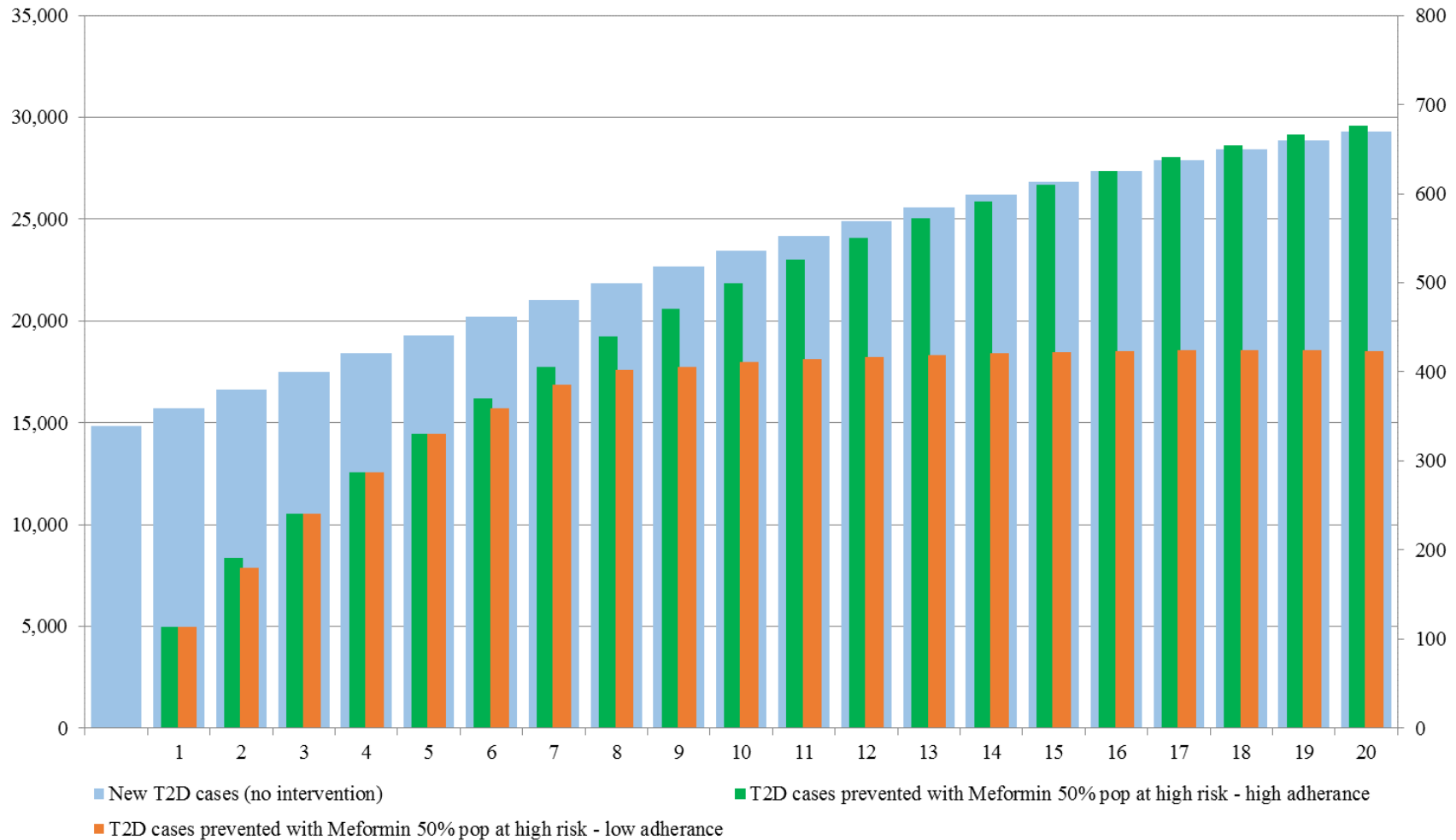


The Healthier You Programme – Results

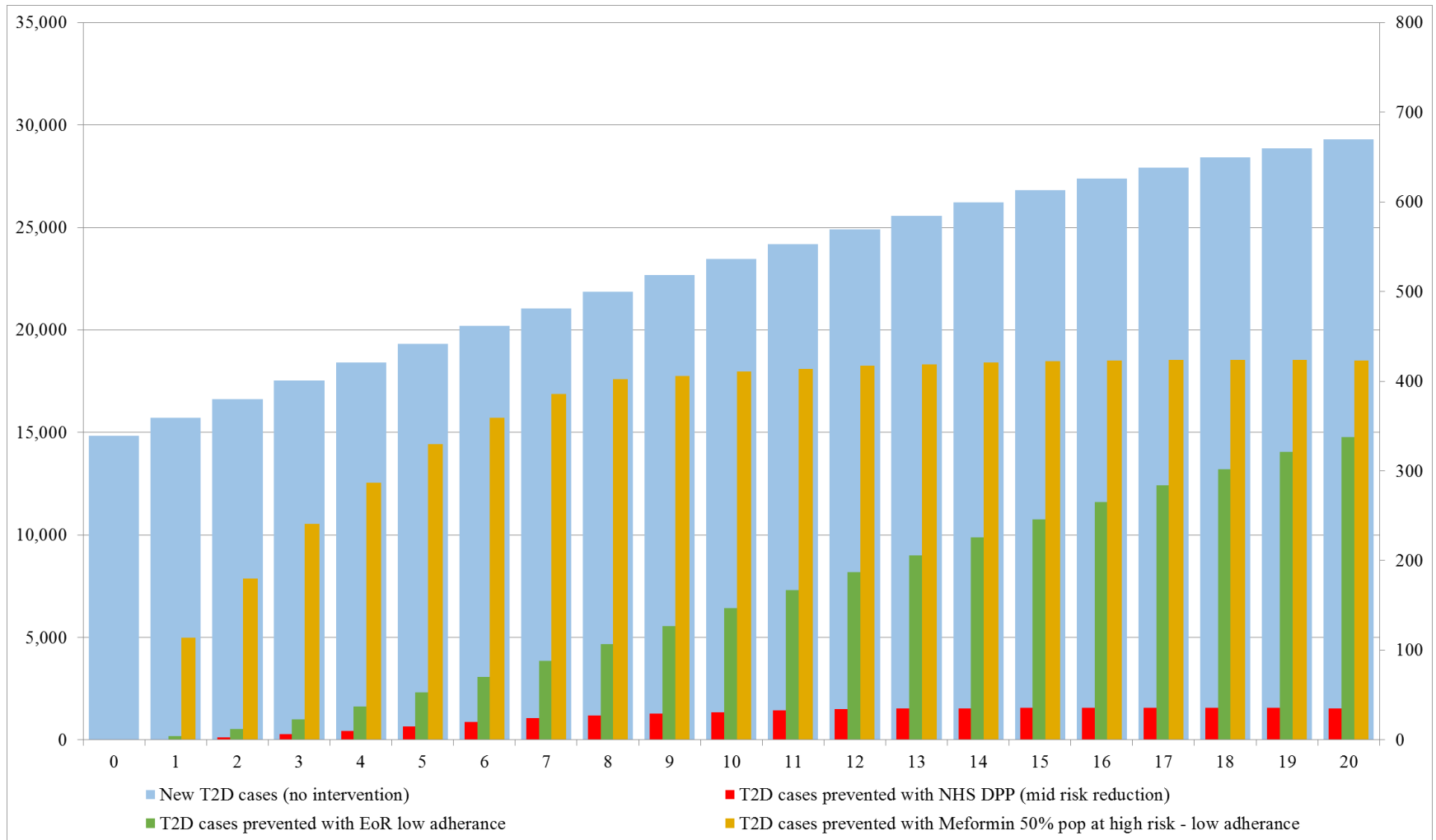


Metformin - Results

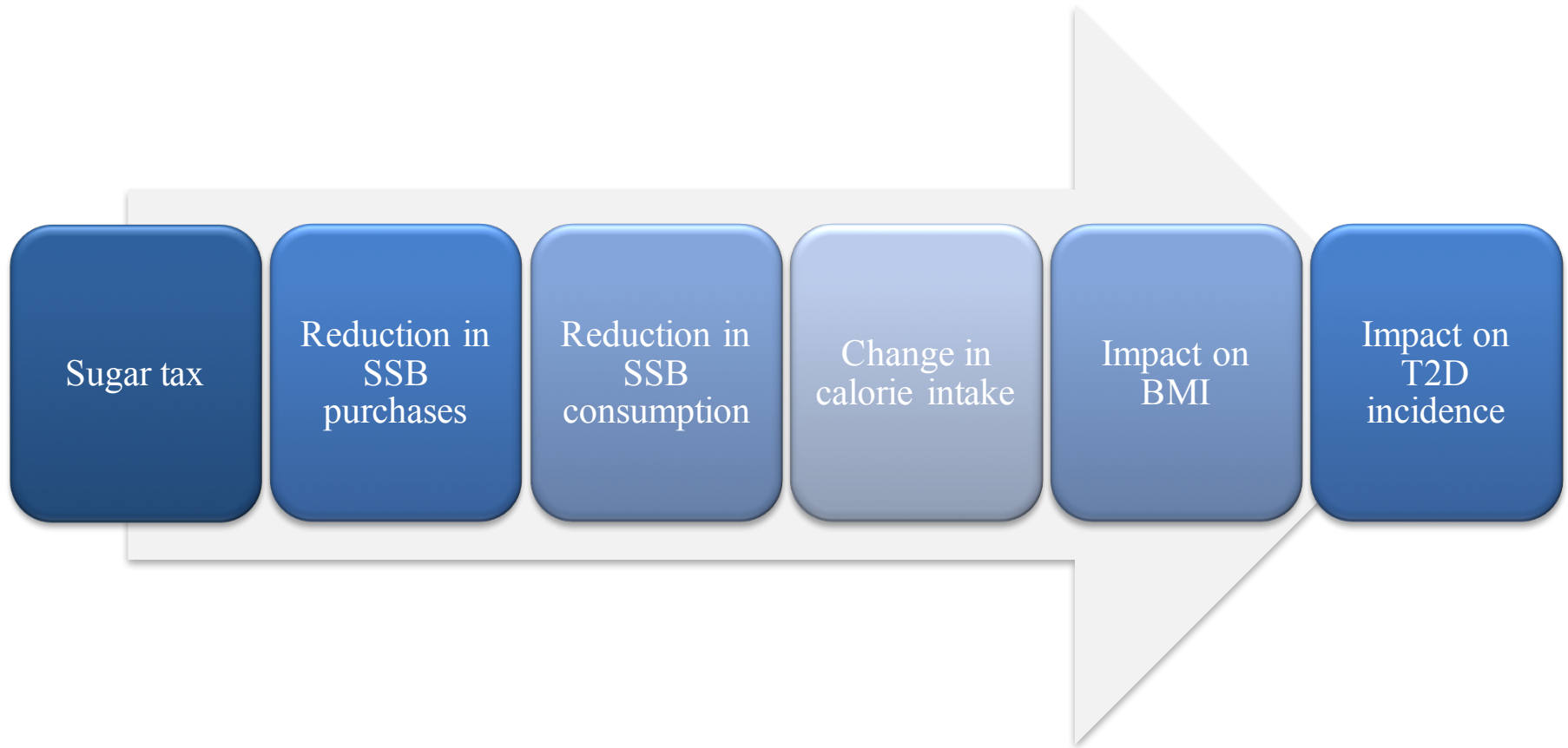
Metformin 50% pop at high risk



Results for individual-based interventions and metformin

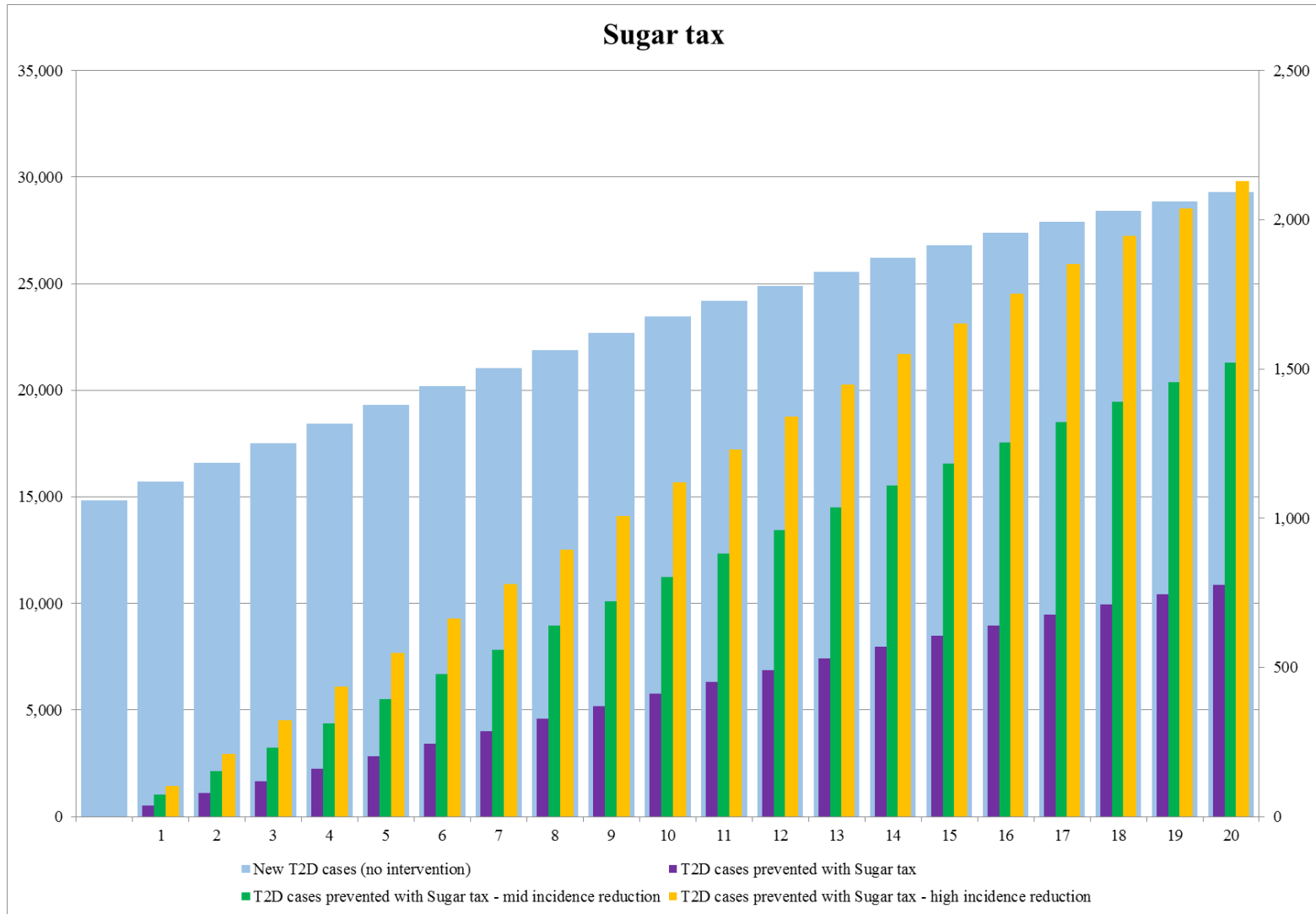


Sugar tax

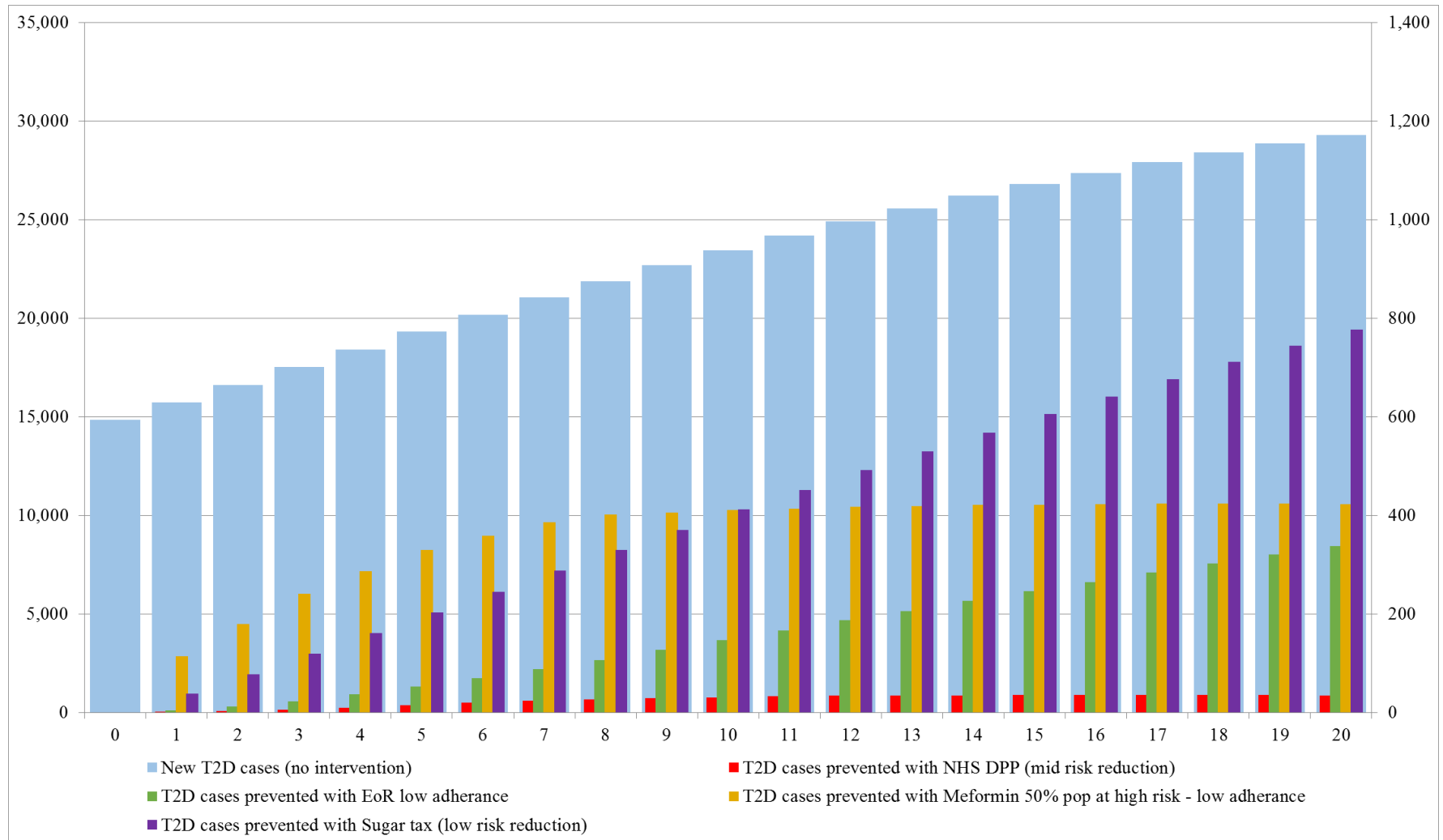


* Sánchez-Romero LM, Penko J, Coxson PG, Fernández A, Mason A, Moran AE, Ávila-Burgos L, Odden M, Barquera S, Bibbins-Domingo K. [Projected Impact of Mexico's Sugar-Sweetened Beverage Tax Policy on Diabetes and Cardiovascular Disease: A Modeling Study](#). PLoS Med. 2016 Nov 1;13(11):e1002158. doi: 10.1371/journal.pmed.1002158. eCollection 2016

Sugar tax- Results



Results of interventions including Sugar tax



Conclusions

- Current individual-based, lifestyle interventions are not enough – how can we implement these at scale?
- Metformin as an (acceptable?) option
- Population-based interventions (e.g. a sugar tax) as the only way forward - how (politically) feasible?



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