



Building an ROI Tool for Diabetes Prevention Programs in the Kingdom of Saudi Arabia

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Introduction

Saudi Arabia ranks among the highest globally in diabetes incidence, underscoring the urgent need for effective diabetes prevention initiatives, especially among prediabetic individuals.

Objectives

This study aimed to develop and validate a return-on-investment (ROI) tool for diabetes prevention programs, tailored to the Saudi healthcare system.

Methods

A comprehensive calculator was built based on both clinical and economic inputs. Clinical data, such as the prevalence of prediabetes, incidence of diabetes, and associated complications were derived from the population health platform at the Ministry of Health, a robust population health management platform covering all Saudi residents and mapping demographic data to geographic locations. Economic inputs applied a direct costing technique using the attributable fraction method, and cost equations were adjusted for the first year of diagnosis as well as for long-term diabetes complications. The model's outputs included the projected number of new diabetes cases, net costs, incremental cost-effectiveness ratios (ICERs), and years of diabetes averted. Statistical analyses were conducted using Python 3.13.1, and AnyLogic 8.9.3 (The AnyLogic Company).

Results

The model was tested using a hypothetical diabetes prevention program costing USD 210 per participant. In a 10-year simulation, medical cost savings per participant increased steadily over time, with a breakeven point reached in the fifth year. Over the full 10-year horizon, the cumulative cost saving was USD 756.35, yielding a net saving of USD 169.03 per participant. In addition, the program conferred significant health benefits, resulting in a cumulative gain of 0.147 QALYs per participant.

Figure. 1 Projected Participants

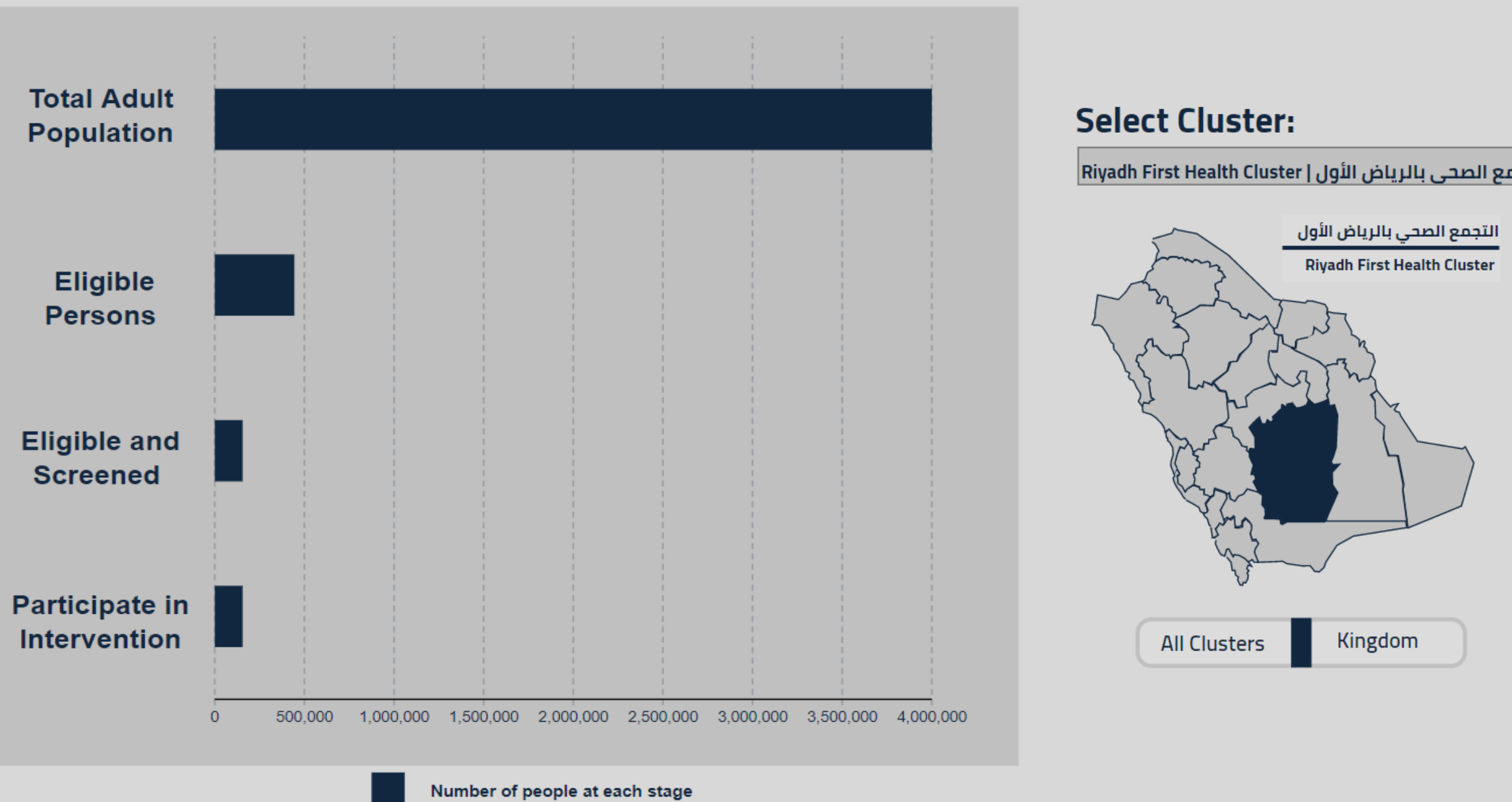


Figure. 2 Cumulative Years with Diabetes Averted for 71484 Projected Participants

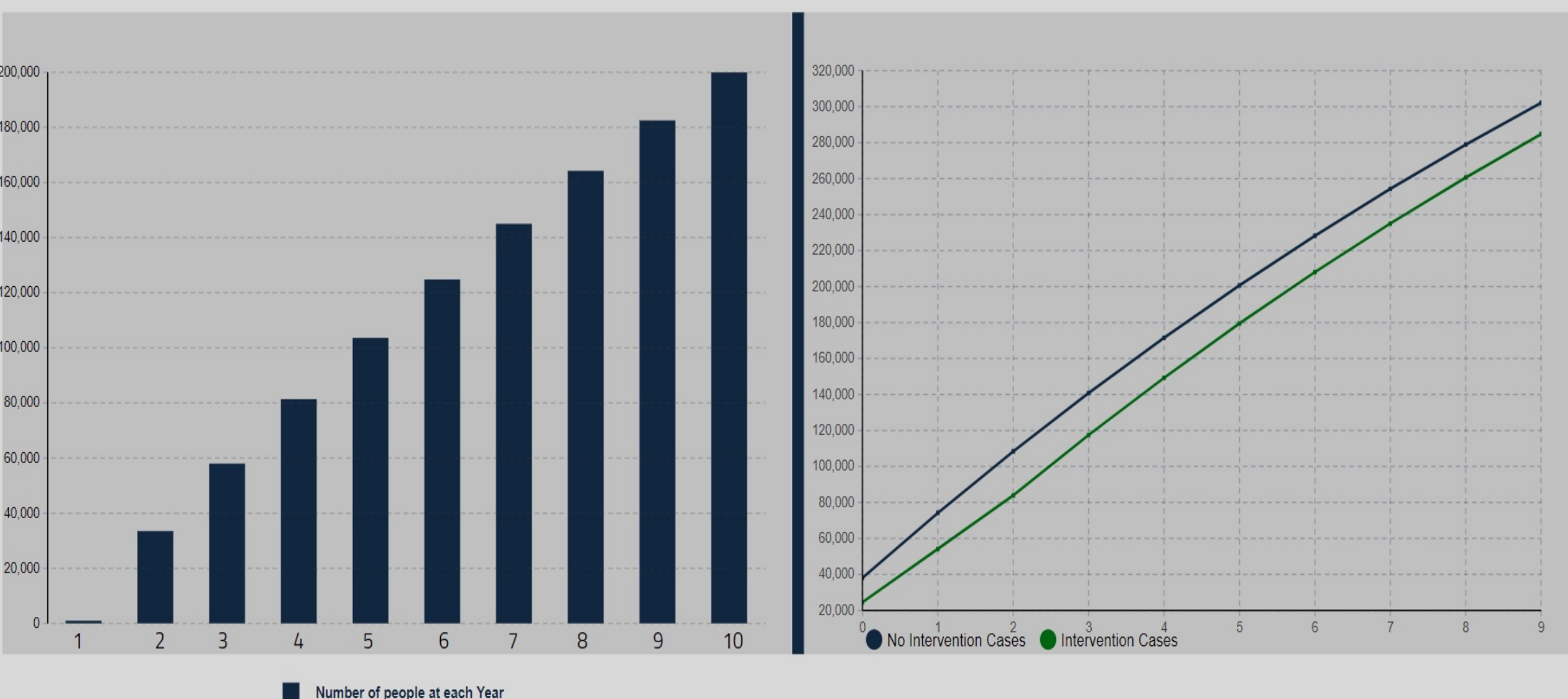


Table. 1 Cumulative Years with Diabetes Averted

Year	Incidence with No Intervention	Incidence with Intervention	Cases averted	Cumulative Cases Averted	Reduction in Diabetes Cases (%)
1	2716	1754	963	963	35%
2	5293	3866	1428	2391	27%
3	7737	5987	1750	4141	23%
4	10054	8386	1668	5809	17%
5	12248	10659	1589	7398	13%
6	14327	12813	1514	8912	11%
7	16294	14852	1442	10353	9%
8	18154	16782	1373	11726	8%
9	19913	18607	1307	13032	7%
10	21575	20332	1243	14276	6%

Round to Closest Integer

Figure. 4 Cumulative Quality-Adjusted Life Years (QALYS) Gained for 71484 Projected Participants

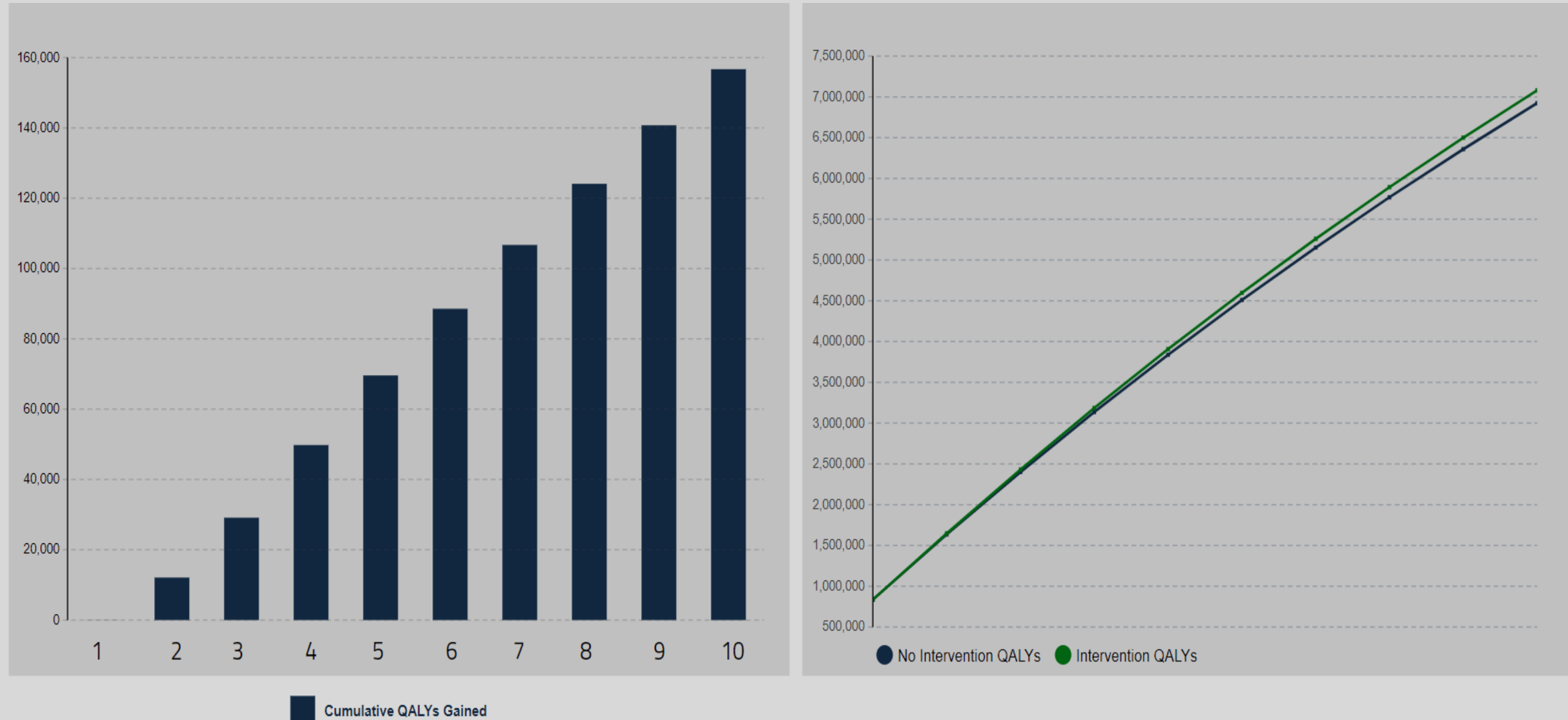


Table. 2 Cumulative Quality-Adjusted Life Years (QALYS) Gained for 71484 Projected Participants

Year	QALYs with No Intervention	QALYs with Intervention	Cumulative QALYs Gained
1	2716.39	1753.58	962.81
2	5293.44	3865.72	1427.72
3	7737.25	5986.94	1750.32
4	10053.69	8385.75	1667.94
5	12248.35	10659.23	1589.12
6	14326.60	12812.89	1513.71
7	16293.58	14852.02	1441.57
8	18154.21	16781.66	1372.55
9	19913.18	18606.66	1306.52
10	21575.01	20331.66	1243.35

Disclaimer: This is simulated data for demonstration only. For any inquiries, please contact Lean at info@lean.sa

Conclusion

The newly developed ROI tool demonstrates robust capacity for the economic evaluation of diabetes prevention programs. Leveraging region-specific data from Yamamah enabled accurate, context-relevant estimates of cost savings and health outcomes. This tool can inform policymakers and other stakeholders in designing and prioritizing diabetes prevention strategies across the Kingdom of Saudi Arabia.