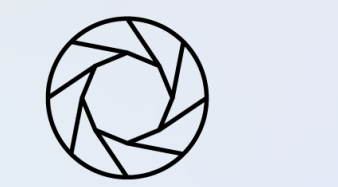


# ASSOCIATIONS BETWEEN BARIATRIC SURGERY AND CARDIOVASCULAR EVENTS, MORTALITY, AND GLYCEMIC CONTROL AMONG DIABETES PATIENTS: EVIDENCE FROM A LARGE EMR NETWORK

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## OBJECTIVE

To use real-world data (RWD) to examine the association between bariatric surgery (BS) and cardiovascular events (CV), glycemic control (GC), and overall survival (OS) among high risk type 2 diabetes (T2D) patients.

## METHODS

Patients were identified and analyzed through the TNX platform, and a large federated electronic medical record (EMR) network, representing over 40M adult patients. T2D patients treated with and without BS were defined as shown in Figure 1 with the first BS code serving as the index event (IE). Definitions were based on ICD9/10, CPT, RxNorm, and LOINC codes. A propensity score (PS) analysis, using 1:1 nearest neighbor greedy matching, examined CV events in the year following the IE, GC (hemoglobin a1c (HbA1c) <6.5%) in the 12-18 months after the IE, and 5-yr OS. Risk ratios (RR; 95% CIs) and Kaplan-Meier (KM) curves were calculated.

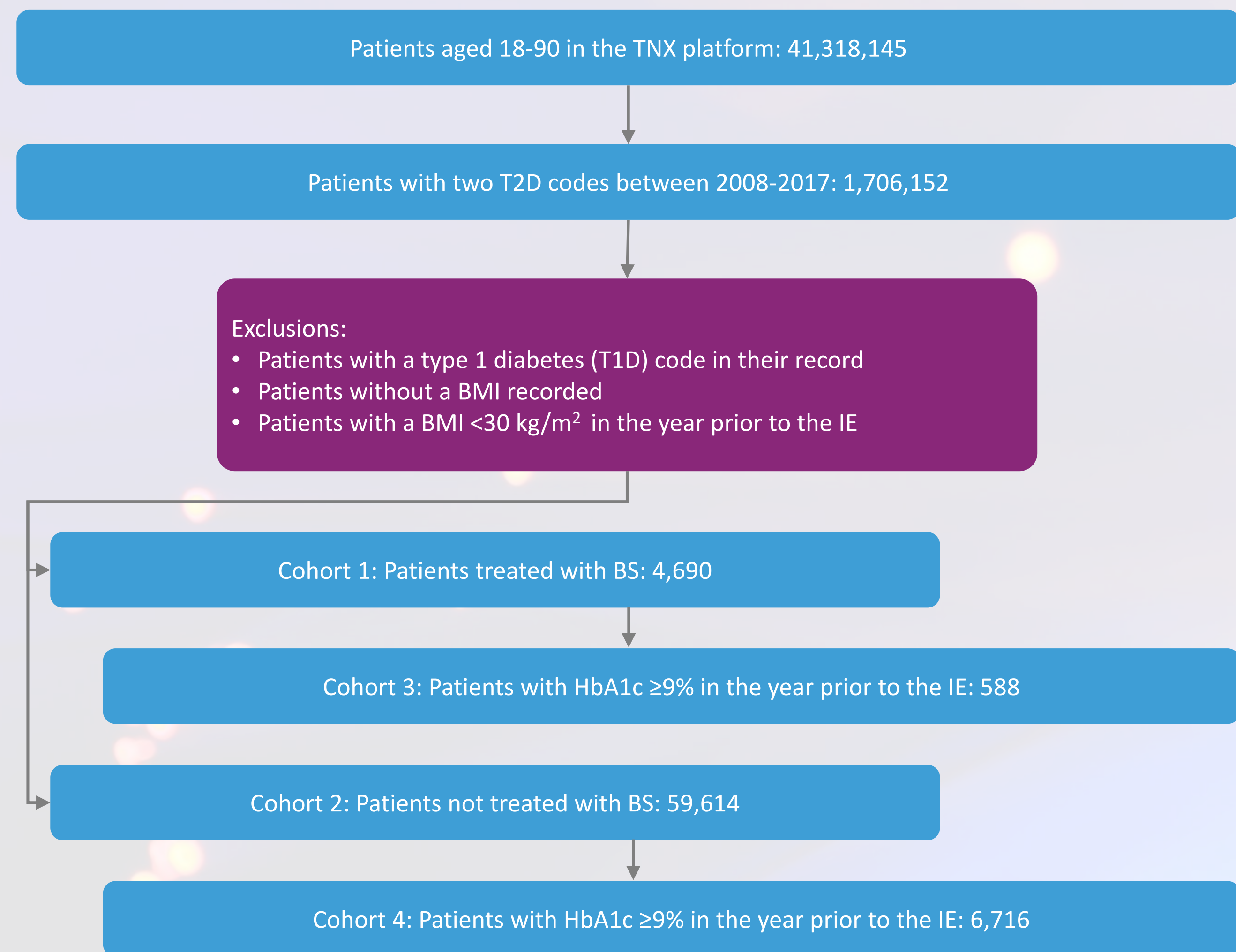


Figure 1. Patient flow diagram (counts before PS matching)

	Cohort 1		Cohort 2	
	n / mean	% / SD	n / mean	% / SD
<b>Total (n)</b>	2,785		2,785	
<b>Demographics</b>				
Age at Index (mean / SD)	52.1	10.9	51.5	14.0
Female (n / %)	1,876	67	1,900	68
White (n / %)	1,778	64	1,797	65
Black or African American (n / %)	600	22	583	21
Hispanic or Latino (n / %)	268	10	256	9
<b>Diagnoses</b>				
Primary hypertension (n / %)	2,180	78	2,174	78
Hyperlipidemia, unspecified (n / %)	1,381	50	1,385	50
Other hyperlipidemia (n / %)	1,147	41	1,153	41
Pure hypercholesterolemia (n / %)	602	22	594	21
Mixed hyperlipidemia (n / %)	237	9	254	9
Pure hyperglyceridemia (n / %)	95	3	99	4
Nicotine dependence (n / %)	283	10	276	10
Tobacco use (n / %)	45	2	47	2
Chronic kidney disease (CKD) (n / %)	247	9	240	9
Acute kidney failure (AKF) (n / %)	157	6	145	5
Other peripheral vascular disease (PVD) (n / %)	73	3	75	3
<b>Medications</b>				
CV medications (n / %)	1,864	67	1,856	67
Metformin (n / %)	1,152	41	1,133	41
Insulin (n / %)	783	28	781	28
<b>Labs</b>				
Estimated glomerular filtration rate (eGFR; MDRD) (mean / SD)	75.5	33.3	77.1	35.2
Creatinine (mean / SD)	1.0	1.0	1.0	1.8
Body mass index (BMI) (mean / SD)	43.9	8.4	42.7	9.2
Systolic blood pressure (SBP) (mean / SD)	132.8	17.8	131.4	18.8
Diastolic blood pressure (DBP) (mean / SD)	75.6	11.6	75.3	11.6
Low-density lipoproteins (LDL) cholesterol (mean / SD)	98.0	37.0	91.7	34.8
Cholesterol (mean / SD)	174.2	41.3	166.3	43.0
Triglyceride (mean / SD)	181.4	163.0	180.2	154.2
High-density lipoprotein (HDL) cholesterol (mean / SD)	43.5	12.3	42.6	14.3

Note: all standardized mean differences (SMDs) <10%

Table 1. PS model characteristics after matching

## RESULTS

- Patients undergoing BS were 32% (3-55%) less likely to experience a CV event (Cohort 1 = 47 events and Cohort 2 = 70 events).
- The 5-year OS was 97% in Cohort 1 compared to 94% in Cohort 2 (p<0.01; Figure 3).
- In a sub cohorts of patients with an HbA1c greater than 9% in the year prior to the IE, the majority of patients treated with BS had an HbA1c < 6.5% in the 12-18 months after following (Figure 4).
- Patients undergoing BS were 3.6 (2.4-5.5) times more likely to achieve a HbA1c of < 6.5 in the 12-18 months after the IE.

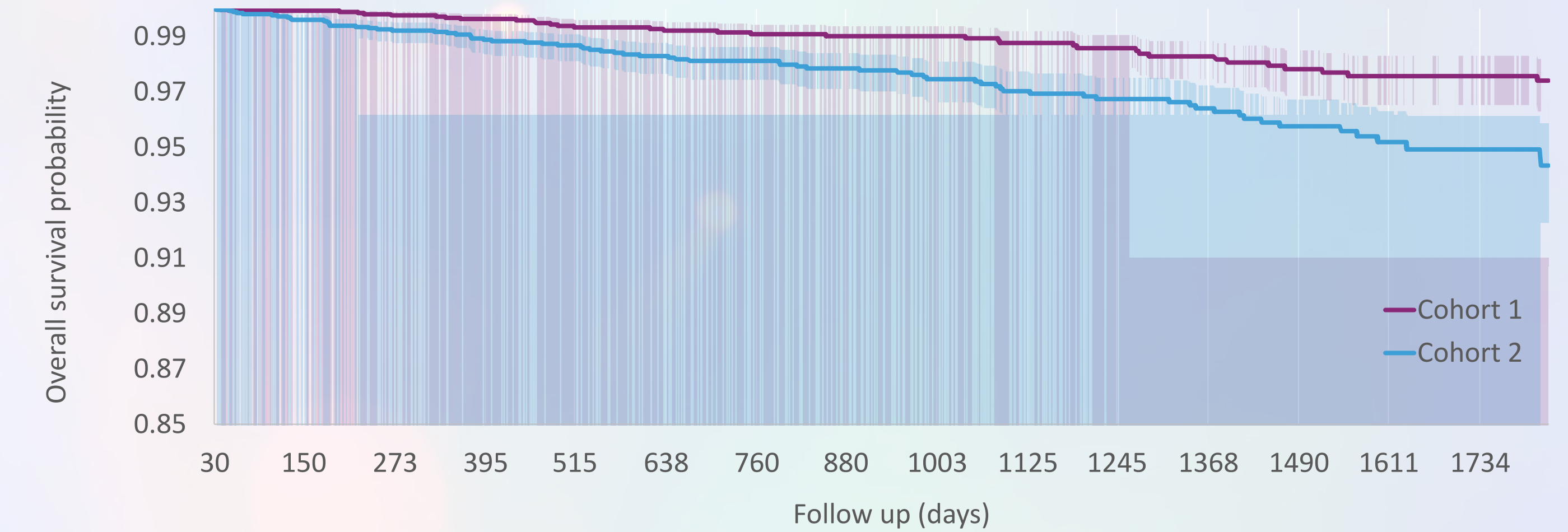


Figure 3. Kaplan-Meier Curve showing 5-year OS

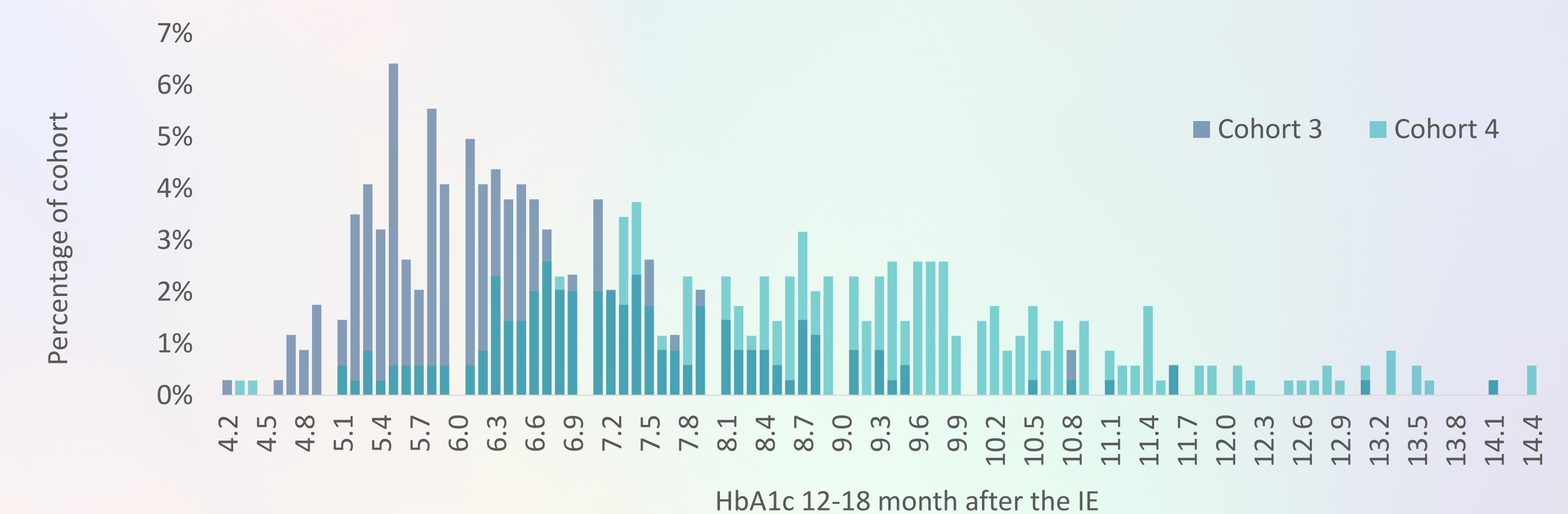


Figure 4. Distribution of HbA1c values

## CONCLUSION

This analysis provides real-world evidence (RWE) to support a growing body of literature showing BS reduces the risk of CV events and mortality, and increase glycemic control, among high risk T2D patients.