



# Comparative Analysis of Health Outcomes in Gestational Diabetes Mellitus: Diet-Controlled vs. Insulin/Hypoglycemic-Controlled Methods

Kayla Delano | Kayla.Delano@trinetx.com, Isatu Kargbo | Isatu.Kargbo@trinetx.com  
TriNetX, LLC, Cambridge, MA, USA.

## OBJECTIVES

This study aims to identify potential differences in health outcomes among patients with Gestational Diabetes Mellitus (GDM), focusing on the severity of the condition. GDM, a common pregnancy complication, has a rising global prevalence and is linked to both obstetric complications and the CDC currently states that 50% of women go on to develop type 2 diabetes.

## METHODS

We analyzed data from patients diagnosed with GDM within the TriNetX federated network, utilizing de-identified electronic medical records (EMR) from 2013-2023. The study involved two cohorts: a diet-controlled cohort (N=96,678), excluding those on insulin or oral hypoglycemics, and an insulin/hypoglycemic-controlled cohort (N=27,155), excluding diet-controlled cases. Both cohorts were matched on a 1:1 basis using propensity scores to adjust for confounding variables. We assessed the risks of various pregnancy-related complications (e.g., type 2 diabetes, pre-eclampsia, postpartum depression) using risk ratios and conducted a Kaplan-Meier analysis for overall survival. All data definitions adhered to ICD9/10, CPT, and RxNorm standards.

Figure 1. Cohort Characteristics

DEMOGRAPHICS	COHORT	MEAN ± SD	PATIENTS	% OF COHORT	P-VALUE	PATIENTS	% OF COHORT	P-VALUE
AGE AT INDEX	1	31.9 ± 6.9	96,072	100%	<0.001	32.2± 6.0	100%	0.941
	2	32.2 ± 6.0	26,913	100%		32.2 ± 6.0	100%	
WHITE	1		54,241	56.5%	<0.001	13,820	51.4%	0.966
	2		13,825	51.4%		13,825	51.4%	
AIAN	1		567	0.6%	<0.001	352	1.3%	0.296
	2		333	1.2%		325	1.2%	
UNKNOWN	1		17,320	18.0%	0.192	4,761	17.7%	0.982
	2		4,759	17.7%		4,759	17.7%	
NHOPI	1		553	0.6%	0.223	135	0.5%	0.856
	2		138	0.5%		138	0.5%	
BLACK	1		8,491	8.8%	<0.001	3,249	12.1%	0.947
	2		3,254	12.1%		3,254	12.1%	
OTHER	1		4,761	5.0%	<0.001	2,126	7.9%	0.987
	2		2,127	7.9%		2,127	7.9%	
ASIAN	1		10,139	10.6%	<0.001	2,462	9.2%	0.823
	2		2,477	9.2%		2,477	9.2%	

Figure 2. Measures of Association Risk Analysis Results for Type 2 Diabetes

COHORT	COHORT NAME	PATIENTS IN COHORT	PATIENTS WITH T2D OUTCOME	RISK
1	Diet-controlled GDM	26,905	1,070	0.039
2	Insulin/Hypoglycemic-controlled GDM	26,905	5,056	0.179

Figure 3. Measures of Association Risk Analysis Results for Type 2 Diabetes

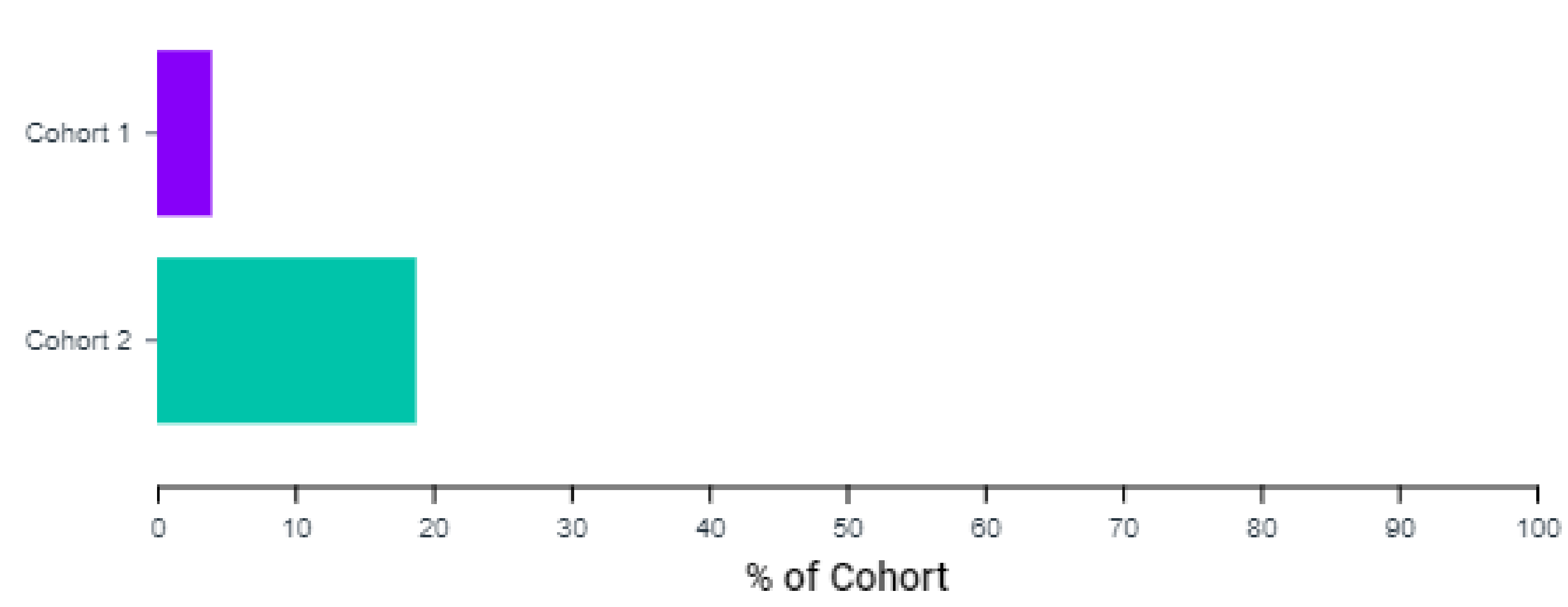


Figure 4. Kaplan-Meier Survival Results for Type 2 Diabetes

COHORT	COHORT NAME	PATIENTS IN COHORT	PATIENTS WITH T2D OUTCOME	MEDIAN SURVIVAL (DAYS)	SURVIVAL PROBABILITY AT END OF TIME WINDOW
1	Diet-controlled GDM	26,905	1,070	--	84.68%
2	Insulin/Hypoglycemic-controlled GDM	26,905	5,056	3,381	48.55%

Figure 5. Kaplan-Meier Survival Curve for Type 2 Diabetes

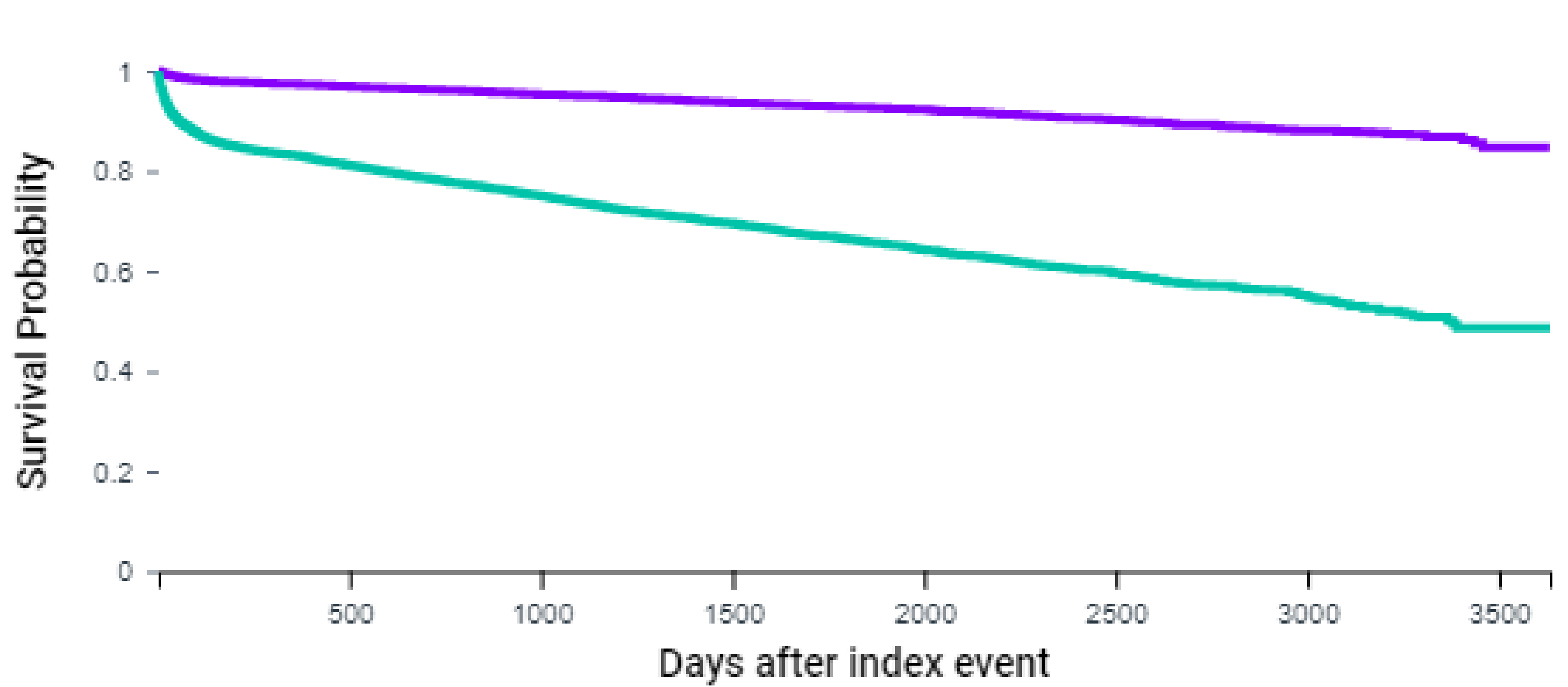


Figure 6. Measures of Association Risk Analysis Results for Pre-eclampsia

COHORT	COHORT NAME	PATIENTS IN COHORT	PATIENTS WITH PRE-ECLAMPSIA OUTCOME	RISK
1	Diet-controlled GDM	26,905	1,542	0.057
2	Insulin/Hypoglycemic-controlled GDM	26,905	2,471	0.092

Figure 7. Measures of Association Risk Analysis Results for Cesarean delivery

COHORT	COHORT NAME	PATIENTS IN COHORT	PATIENTS WITH CESAREAN DELIVERY OUTCOME	RISK
1	Diet-controlled GDM	26,905	5,971	0.222
2	Insulin/Hypoglycemic-controlled GDM	26,905	7,613	0.283

## RESULTS

In the matched analysis (N=26,905), the incidence of type 2 diabetes post-GDM was markedly higher in the insulin/hypoglycemic-controlled cohort (18.79%) compared to the diet-controlled cohort (3.97%, RR=0.212). Similar trends were observed for risks of pre-eclampsia (9.18% v. 5.73%, RR=0.624) and cesarean section (28.29% v. 22.19%, RR=0.784), with the insulin/hypoglycemic-controlled cohort showing higher risks. However, no significant differences were noted in overall survival, postpartum depression, hemorrhage, or perineal lacerations between the two groups.

## CONCLUSIONS

Patients with GDM managed with insulin or hypoglycemics exhibited higher risks of developing type 2 diabetes, pre-eclampsia, and requiring cesarean sections than those managed by diet alone. Given the results between the two cohorts, it may be beneficial for physicians to have a patient centric focus while presenting options regarding prenatal care and labor and delivery options that are also cost effective and less burdensome.

1. Gestational Diabetes: United States, 2024 [Internet]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK545196/>  
2. U.S. Centers for Disease Control and Prevention – Gestational Diabetes: United States, 2024 [Internet]. Available from: <https://www.cdc.gov/diabetes/about/gestational-diabetes.html>