Impact of integrated care for pregnancies complicated by diabetes in South Carolina: "SC MOMs"

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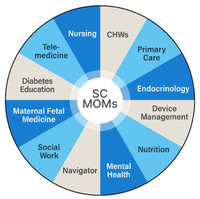
Introduction & Objective

In South Carolina (SC), risks of diabetic pregnancy are amplified by racial, economic, and geographic disparities, and by adverse social determinants of health (SDOH). Expert team-based care is essential: it must be equitable and feasible for both patients and providers, and must address real-life needs.

Objective: To improve pregnancy outcomes through a 'Management of Maternal (MOMs) Diabetes Program', implemented at three centers across SC ("SC MOMs"). To emphasize a 'one stop shop', team-based approach, reducing disparities while optimizing the use of new technologies.

SC MOMs Program locations

SC MOMs Model Schema



Methods

SC MOMs programs were implemented in 2020 at the Medical University of SC (Charleston), and at two Prisma Health locations: Midlands (Columbia, Sumter) and Upstate (Greenville). The team approach aimed to enhance patient-provider communication, educate everyone, utilize new technologies, reduce clinic visits & travel, and address SDOH.

Outcomes were compared with a standard-care cohort (COMP, n=944) from the Medical University of South Carolina perinatal database (2017–2019). Maternal age distributions were similar between groups; however, COMP included a higher proportion of Black patients and a lower proportion with type 1 diabetes. For comparison, therefore, data were adjusted for diabetes type within race groups, and for both race and diabetes type in the overall cohort.

Twin pregnancies (n=66) were excluded. Neonatal analyses were restricted to live births with complete data (n=3,100). Denominators varied slightly by outcome due to missing data. Group comparisons were conducted using two-tailed, two-proportion Z-tests, with p<0.05 considered statistically significant.

Maternal Age: Median (25th, 75th Percentile)

	T1DM	T2DM	A2 GDM	A1GDM	All
COMP	30 (25-34)	32 (28-36)	32 (29-36)	31(27-35)	31 (25-36)
MOMs	28(24-31)	32(27-36)	30 (25-35)	31(27-35)	30(25-34)

DM Type N (%)

	T1DM	T2DM	A2 GDM	A1 GDM	All
MOMs	322(9.8)	920 (28.0)	1186 (36.1	854 (26.0)	3282 (100)
COMP	84 (8.9)	238 (25.2)	331 (35.1)	291 (30.8)	944 (100)

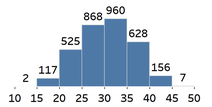
Race N (%)

	Black	White	Hispanic	Other	All
COMP	413(43.8)	392 (41.5)	72 (7.6)	67 (7.1)	944 (100)
MOMs	957 (29.2)	1453 (44.3)	679 (20.7)	193 (5.9)	3282 (100)

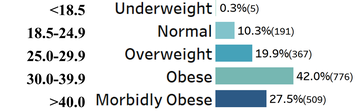
Results: SC MOMs Cohort

Demographics

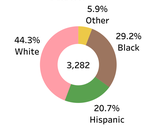
Maternal Age



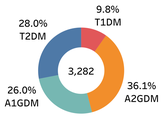
Pre-pregnancy BMI



Race

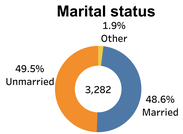


Diabetes type



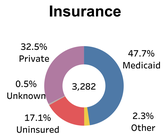
Social Determinants of Health

Marital status



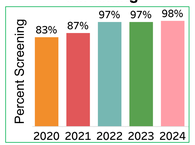
Language

Insurance

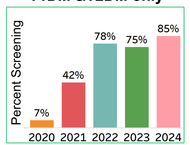


Changes in Diabetes Care, 2020-2024*

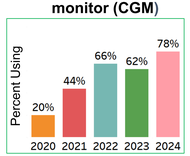
Mental health screening



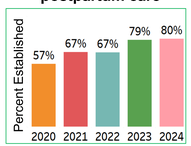
Retinal screening T1DM &T2DM only



Use of continuous glucose monitor (CGM)



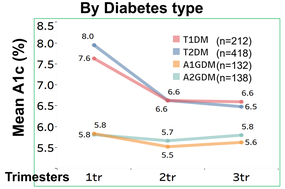
Establishment of postpartum care



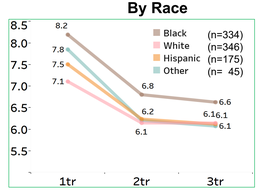
* CGM and PP data exclude A2GDM, MUSC telemedicine, and Prisma MFM patients due to limited data

HbA1c changes through the pregnancy *

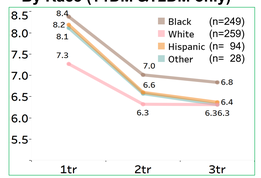
By Diabetes type



By Race



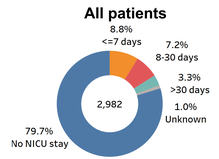
By Race (T1DM &T2DM only)



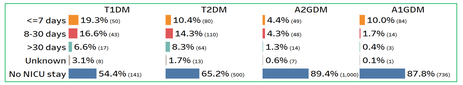
* Include patients with both 2nd and 3rd trimester A1c data, 1st trimester A1c data is not required.

Infants: Duration of NICU stay (days)

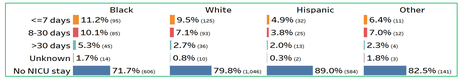
All patients



By diabetes type



By race



Results: SC MOMs vs. COMP

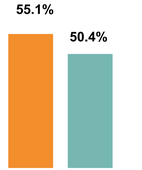
	All races			Black			White			Hispanic			Other		
	COMP	MOMs	p value	COMP	MOMs	p value	COMP	MOMs	p value	COMP	MOMs	p value	COMP	MOMs	p value
Toal numbers of pregant patients	n=944	n=3282		n=413	n=957		n=392	n=1453		n=72	n=679		n=67	n=193	
Maternal outcomes															
Total c-section	55.1%	50.4%	0.01	63.9%	57.1%	0.02	49.5%	46.9%	0.37	50.0%	44.2%	0.35	38.8%	36.4%	0.72
Newborn outcomes															
Neonatal intensive care unit (NICU)	28.3%	22.0%	<0.001	32.7%	28.0%	0.09	26.2%	18.8%	<0.01	24.3%	11.7%	<0.01	17.9%	14.3%	0.48
Neonatal LOS >7 days	19.7%	13.3%	<0.001	23.3%	17.7%	0.02	17.0%	10.2%	<0.001	17.1%	9.0%	0.03	16.4%	9.3%	0.12
Neonatal Hypoglycemia	37.7%	19.9%	<0.001	37.0%	21.9%	<0.001	40.8%	19.1%	<0.001	30.6%	18.4%	<0.001	31.3%	14.3%	<0.001
Preterm birth (<37wks)	31.3%	27.1%	0.01	41.2%	33.5%	<0.01	24.0%	23.5%	0.83	25.0%	18.2%	0.16	19.4%	18.0%	0.80
Preterm birth (<34wks)	9.6%	6.7%	<0.01	12.3%	9.6%	0.14	7.4%	5.1%	0.08	9.7%	2.3%	<0.001	6.0%	2.4%	0.16
Preterm birth (<32wks)	4.2%	3.1%	0.08	6.1%	4.9%	0.37	2.3%	1.9%	0.67	5.6%	1.6%	0.02	3.0%	0.3%	0.06
Low 5-minute APGAR score (<7)	8.4%	4.8%	<0.001	10.7%	6.1%	<0.01	6.9%	4.1%	0.02	8.3%	2.6%	<0.01	3.0%	3.6%	0.81
Low 5-minute APGAR score (<3)	2.3%	0.7%	<0.001	2.2%	1.0%	0.08	2.0%	0.5%	<0.01	5.6%	0.2%	<0.001	1.5%	1.7%	0.92
Small for gestational age	8.9%	6.2%	<0.01	12.4%	8.4%	0.02	4.6%	3.4%	0.27	6.9%	5.3%	0.55	14.9%	10.2%	0.30
Large for gestational age	19.3%	16.4%	0.04	16.5%	14.3%	0.31	21.7%	20.4%	0.59	30.6%	17.9%	<0.01	10.4%	4.5%	0.09
Low birthweight (<2,500g)	17.1%	12.3%	0.01	25.4%	19.9%	0.03	9.7%	8.0%	0.28	13.9%	8.6%	0.14	11.9%	13.2%	0.79
Macrosomia (4,000+g)	8.1%	7.5%	0.14	5.1%	4.4%	0.60	10.5%	9.3%	0.48	15.3%	9.0%	0.09	4.5%	2.5%	0.41

Notes: Statistical significance is denoted in red font ($p < 0.05$, $p < 0.01$, $p < 0.001$).

Estimated Cost saving (South Carolina, yearly)

About **6,000** deliveries each year are complicated by diabetes in SC. If MOMs care provided statewide:

Saving for C-section delivery



Reduction by **4.7 percentage points**

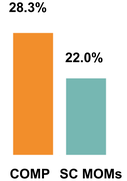
≡ **282** C-sections annually.

Cost saving per C-section: $4,681

Total saving each year:

$1.3M

Saving for NICU admission



Reduction by **6.3 percentage points**

≡ **378** NICU admissions yearly

Cost per NICU admission (estimated): $71,158

Total saving each year:

$26.9M

To these short-term savings may be added many long-term, durable benefits and health-related cost savings for mother and child, extending years and decades into the future.

Summary

Implementation of the SC MOMs program was associated with fewer C-sections, NICU admissions, pre-term births and episodes of neonatal hypoglycemia - and improved APGAR scores. However, emphasizing the continuing challenge of racial disparities and the need for redoubled effort, birth outcomes were generally better for White and Hispanic than for Black patients, although relative improvements were similar in all three groups.

Acknowledgements

Diabetes Free SC recognizes the outstanding skill and commitment of the team leaders and members at the three SC MOMs sites. SC MOMs Programs are funded by the BlueCross BlueShield of South Carolina Foundation to support the goals of Diabetes Free SC. MUSC MOMs Program was also supported by The Duke Endowment.

SCMOMs
Diabetes care for a healthy pregnancy