CONCLUSION: Obese patients with T2DM on metformin as an adjunct to insulin required higher insulin doses in the third trimester as compared to patients on insulin only. Use of metformin did not reveal any negative effect on birth outcomes. A key mechanism of action of metformin, increasing insulin sensitivity, would purport that decreased insulin doses would be required, contrary to our conclusions. Prospective trials are needed to elucidate whether empiric metformin can truly decrease insulin needs.

Insulin requirements for the insulin-only and metformin/insulin combination therapy cohorts

Insulin Requirements (units/kg/day)	Insulin Only	Metformin + Insulin	p-value
Obese (n=40)			
Total insulin requirement			
28 weeks	0.9 ± 0.4	1.2 ± 0.7	.03
36 weeks	1.2 ± 0.3	1.6 ± 0.8	.06
NPH dose requirement			
28 weeks	0.5 ± 0.2	0.7 ± 0.3	.06
36 weeks	0.7 ± 0.2	0.8 ± 0.3	.08
Humalog dose requirement			
28 weeks	0.4 ± 0.2	0.5 ± 0.4	.14
36 weeks	0.5 ± 0.2	0.8 ± 0.5	.03
Non-obese (n=19)			
Total insulin requirement			
28 weeks	1.0 ± 0.3	1.0 ± 0.7	1.00
36 weeks	1.3 ± 0.6	1.3 ± 0.6	.91
NPH dose requirement			
28 weeks	0.6 ± 0.1	0.6 ± 0.4	.91
36 weeks	0.8 ± 0.3	0.8 ± 0.3	.79
Humalog dose requirement			
28 weeks	0.4 ± 0.2	0.4 ± 0.3	.88
36 weeks	0.5 ± 0.3	0.5 ± 0.3	.96

Data are mean ± SD.

272 Pregnancy outcomes among women with type 1 diabetes managed with continuous insulin pumps versus multiple injections: a propensity-score based analysis

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OBJECTIVE: Compare pregnancy outcomes among women with type 1 diabetes managed with a continuous subcutaneous insulin pump (pump) to women managed with multiple insulin injections (injections).

STUDY DESIGN: This was a retrospective cohort study of pregnancies among women with type 1 diabetes who delivered at UCSF since 2006. Pregnancies prior to 2006 among women who also delivered after 2006 were included. Outcomes in women who were managed with a pump were compared to women managed with injections using a propensity-score based approach. The propensity to be on a pump was based on age, age at diagnosis, parity, distance from UCSF (> 50 mi or < 50 mi) and median income of the patient's county of residence. Primary outcomes were a composite maternal outcome (vaginal delivery, no antepartum admissions or preeclampsia and peripartum hospitalization ≤ 5 days) and neonatal outcome (delivery ≥ 36 weeks, no hypoglycemia or hyperbilirubinemia, neonatal hospitalization ≤ maternal stay and care in the well-baby nursery).

RESULTS: There were 48 pregnancies included, 35 among women on a pump, 13 among women using injections. Women on pumps were more likely to be older, live closer to UCSF and have a higher median income in their home county. Optimal maternal and neonatal outcomes occurred among 22.7% and 25.7% of women on a pump versus 7.7% of women on injections ($p = 0.2$). When subjects were propensity-score matched, however, women on pumps were more likely to have both optimal maternal and neonatal outcomes ($p < 0.01$).

CONCLUSION: Using propensity-scores for matching, women on insulin pumps appear to have better pregnancy outcomes than women on multiple daily injections. Additional investigation is needed to determine if this association is a function of improved glycemic control or other factors. Although geographic and socioeconomic factors may be important barriers, consideration of initiation of an insulin pump before or even during pregnancy may be warranted.

	Insulin Pump	Multiple Insulin Injections	p
Number of Pregnancies	35	13	
Mean maternal age at delivery (years)	25	32.9	< 0.001
Mean age at diabetes diagnosis (years)	15.8	14.2	0.6
Home > 50 miles from SF (%)	22.9	61.5	0.01
Median Income in Home County ($)	73,035	58,025	0.001
Mean hemoglobin A1c during pregnancy (mg/dl)	6.5	8.3	< 0.001
Mean GA at Delivery (weeks)	36.9	37.1	0.6
Vaginal Delivery (%)	60.0	30.8	0.07
Any Antepartum Stays (%)	31.4	46.2	0.3
Preeclampsia (%)	22.9	38.5	0.3
Neonatal Hyperbilirubinemia (%)	45.7	53.9	0.6
Neonatal Hypoglycemia	40.0	53.9	0.4
Neonatal Stay > Maternal Stay (%)	17.1	38.5	0.1

	Insulin Pump	Multiple Insulin Injections	p	† Propensity Matched Treated	Propensity Matched Untreated	p
Optimal Maternal Outcome (%)	22.7	7.7	0.2	18.8	0	< 0.01
Optimal Neonatal Outcome (%)	25.7	7.7	0.2	25.0	0	< 0.01

† Propensity matching based on maternal age, age at diagnosis, parity, distance from UCSF (> 50 miles or < 50 miles) and median income of the patient's county of residence.

273 Gestational diabetes screening: do neonatal outcomes differ based on one-step or two-step methods in a high risk population?

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OBJECTIVE: Our inner city obstetrical clinic changed their routine gestational diabetes screen from the 2 step 1 hour (1H) 50 g glucose screen to the one step 2 hour (2H) 75 g screen in July 2011. We sought to determine the effect of this change on neonatal outcomes.

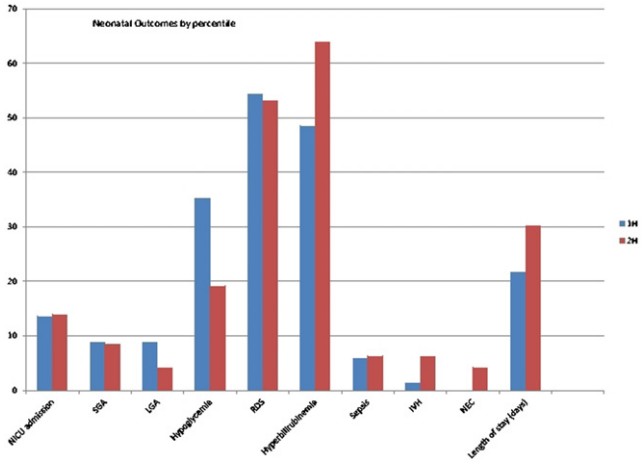
STUDY DESIGN: A retrospective chart review was performed for the nine months preceding the change in screening method through the first six months of the 2H one-step screen. Delivery date and results of diabetic screen were collected. We also collected infant outcomes including rates of NICU admission, small for gestation age (SGA), large for gestational age (LGA), hypoglycemia, hyperbilirubinemia, respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), culture proven sepsis, and necrotizing enterocolitis (NEC).

RESULTS: There were 837 patients who delivered during the study period. Of these patients, 501 delivered during the 1H testing period and 336 delivered during the 2H testing period. During the 2H testing period there was an increase in the diagnosis of gestational diabetes from 7% to 11.7%. Rates of NICU admission, SGA, LGA, hypoglycemia, hyperbilirubinemia, RDS, IVH, culture proven sepsis, and NEC were similar between the two groups (see figure). The rate of hypoglycemia was 35.3% during the 1H testing period and 19.2% during the 2H testing period. This was not statistically significant.

CONCLUSION: Screening for gestation diabetes using the 2 step process does not result in a change in neonatal outcomes despite a high risk population. There was a trend towards decreased rates of hypoglycemia but this was not statistically significant.

Neonatal outcomes

	NICU admission	SGA	LGA	Hypoglycemia	RDS	Hyperbilirubinemia	Sepsis	IVH	NEC	Length of Stay
1H screen	13.57%	8.82%	8.82%	35.29%	54.41%	48.53%	5.88%	1.47%	0.0%	21.8 days
2H screen	13.99%	8.51%	4.26%	19.15%	53.19%	63.83%	6.38%	6.38%	4.26%	30.3 days



274 Association of the Pro12Ala polymorphism of PPARγ2 with mild gestational hyperglycemia and gestational diabetes

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OBJECTIVE: To determine the prevalence of the Pro12Ala polymorphism in pregnant women with normoglycemia, mild gestational hyperglycemia, and gestational diabetes (GDM).

STUDY DESIGN: Diagnosis of GDM was made using the 100g oral glucose tolerance test according to the ADA criteria. Gestational hyperglycemia was diagnosed using the glycemic profile test, during which a standardized 2,840 calorie diet is administered across five meals, with measurement of glucose levels fasting and two hours following each meal. Mild gestational hyperglycemia was diagnosed with one or more abnormal values of fasting glucose >90 mg/dL or postprandial glucose >130 mg/dL. Genotyping for the Pro12Ala allele was performed on DNA from maternal serum samples by the RFLP method using the BstU1 restriction endonuclease. Patients were classified as Pro/Pro homozygotes (single 244 base pair (bp) segment), Pro/Ala heterozygotes (244, 223, and 21 bp segments), or Ala/Ala homozygotes (223 and 21 bp segments). Genotype frequencies were compared between groups using the Chi-Square test with $p<0.05$ for statistical significance.

RESULTS: One hundred fifty-one pregnant women were included in the study. Fifty-four women were normoglycemic, 32 had mild gestational hyperglycemia, and 65 were classified as GDM. There were no Ala/Ala homozygotes in any group. The frequency of Pro/Ala heterozygotes was significantly lower in women with mild gestational hyperglycemia relative to normoglycemic women (9.4% vs. 17.3%, $p<0.05$), and in women with GDM relative to normoglycemic women (10.9% vs. 17.3%, $p<0.05$). The frequency of heterozygotes did not differ between patients with mild gestational hyperglycemia and GDM.

CONCLUSION: The prevalence of Pro12Ala was higher among normoglycemic women, suggesting that this polymorphism may be protective against hyperglycemia in pregnancy. Further investigation is needed to elucidate the effect of this polymorphism on adverse maternal and neonatal outcomes associated with these conditions.

275 A1C at the first prenatal visit: is it useful?

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OBJECTIVE: To evaluate A1C at the first prenatal visit as a triaging tool for deciding when to test for GDM.

STUDY DESIGN: An A1C was obtained at the first prenatal visit. ADA guidelines were used in which A1C ≥ 6.5% is considered diabetes and an A1C between 5.7-6.4% is glucose intolerance. Enrollment occurred between August 2011 and March 2012. All women had the first prenatal visit prior to 20 weeks. Women with an A1C ≥ 6.5% (group 1) were instructed on diet and daily self monitoring of blood glucose. Women with an A1C between 5.7-6.4% (group 2) were tested immediately for GDM and if necessary, again at 24-28 weeks. Women with an A1C < 5.7% (group 3) were tested at 24-28 weeks. Patients were started on medication if they failed to meet glycemic goals of fasting ≤ 95 mg/dl and 2 hour postprandial ≤ 120 mg/dl.

RESULTS: 296 patients were included in the study. There were 16 patients in group 1. 15/16 (95%) required medication to achieve euglycemia. The mean gestational age at which medication was required in group 1 was early at 14 ± 6 weeks; Postpartum, 14/16 patients (87%) remained diabetic. Group 2 contained 75 patients. 60 patients (80%) were given a diagnosis of GDM and 48 patients (64%) required medication. The mean gestational age at which medication was started in group 2 was 20 ± 7.8 weeks. This is 4 to 8 weeks earlier than if these patients had received testing at the standard time of 24-28 weeks. There were 205 patients in group 3. 18 patients in group 3 (8.7%) were diagnosed with GDM and 13 patients (6%) required medication.

CONCLUSION: A1C at the first prenatal visit can be used to optimize the timing of screening for gestational diabetes. An A1C ≥ 6.5% identifies women with a degree of hyperglycemia consistent with preexisting diabetes who may benefit from diet and daily glucose monitoring. A1C between 5.7-6.4% identifies women with a degree of glucose intolerance who may benefit from early testing. A1C <5.7% is associated with minimal glucose intolerance and testing may be undertaken at the usual 24-28 weeks.

276 Examining gestational weight gain recommendations in diabetic pregnancy

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OBJECTIVE: The Institute of Medicine (IOM) does not make recommendations for gestational weight gain (GWG) specific to diabetic women. We aimed to assess the impact of GWG outside the IOM recommendations on pregnancy outcomes in diabetic women.

STUDY DESIGN: Secondary analysis of a prospective, 4-year cohort of women with gestational or Type 2 diabetes. Women were approached for enrollment at entry to care & excluded for Type 1 DM, multiple gestation, fetal anomalies, unknown body mass index (BMI), unknown GWG & incomplete delivery records. Primary neonatal outcomes were fetal growth restriction (FGR), defined as birthweight <10th percentile on Alexander growth standard, & macrosomia, defined as birthweight >4000g. Maternal outcomes were cesarean delivery (CD) & preeclampsia. Secondary neonatal outcome was a composite of: delivery <37 wks, admission to level 3 nursery, respiratory distress syndrome, shoulder dystocia, 5-minute Apgar≤3, cord pH<7.1, & cord base excess <−12. Women were classified as GWG within (WITHIN), less than (LESS), or greater (MORE) than IOM