

Gestational Diabetes Update

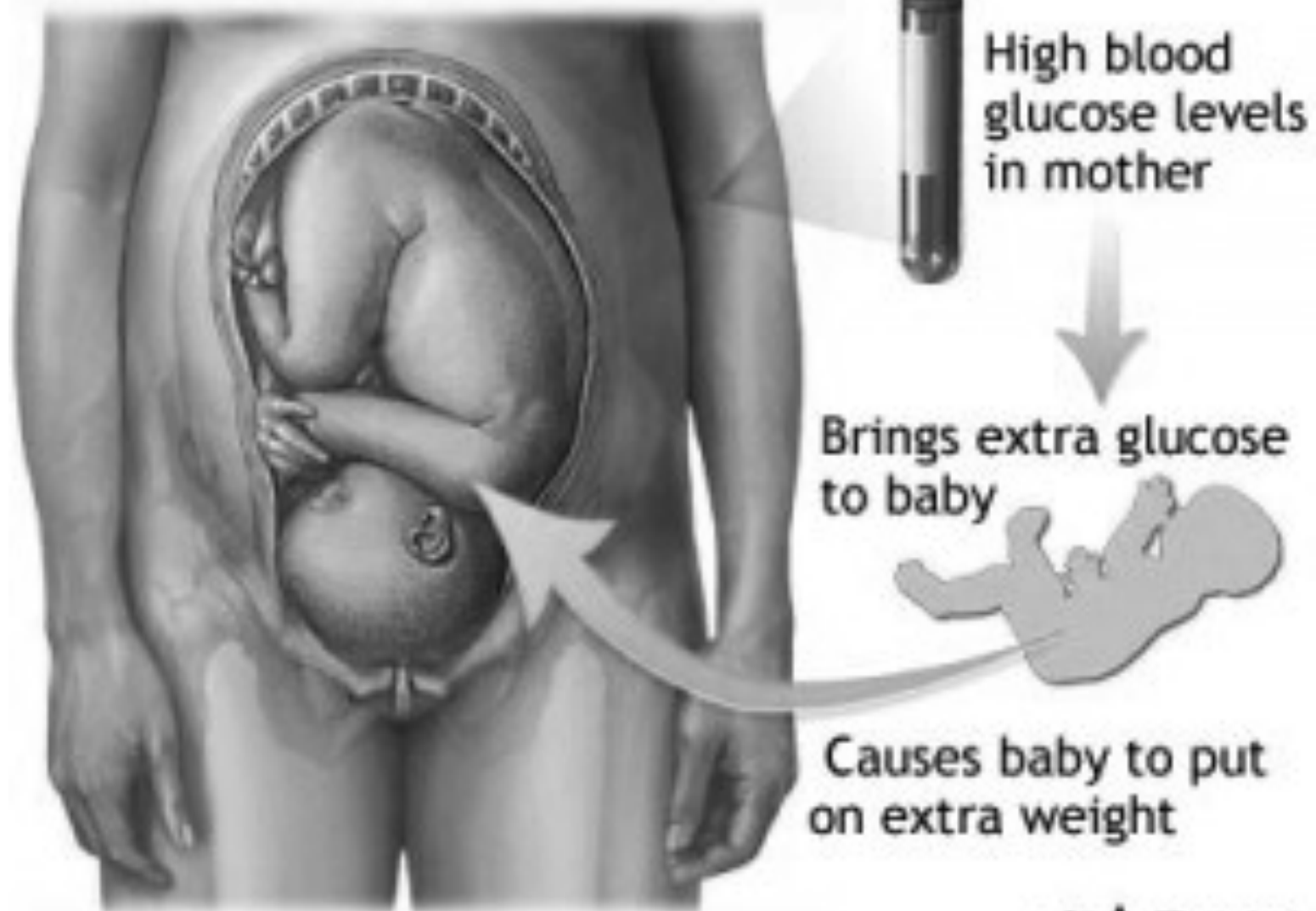
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WHAT IS GESTATIONAL DIABETES?



Carbohydrate intolerance that begins or is first recognized in pregnancy

Gestational Diabetes



 ADAM.



WHY DO WE CARE?

Complications of GDM

Table 4
Health risks of gestational diabetes

Mother	Fetus	Newborn	Child/Adult
Birth trauma	Hyperinsulinemia	Respiratory distress syndrome	Obesity
Increased cesarean delivery	Cardiomyopathy	Hypoglycemia	Type 2 diabetes
Preeclampsia/ Gestational hypertension	Stillbirth	Hypocalcemia	Metabolic syndrome
Type 2 diabetes	Large for gestational age/ macrosomia	Hypomagnesemia	
Metabolic syndrome	Birth trauma	Hyperviscosity	
		Polycythemia	
		Hyperbilirubinemia	
		Cardiomyopathy	

The HAPO Study

- Hyperglycemia and Adverse Pregnancy Outcome Study, 2008
- Prospective, blinded 10 year study
- 25,000 nondiabetic gravida's
- 15 centers, 9 countries
- Published in 2008

The Question...

- What adverse outcomes are associated with maternal hyperglycemia in?
- In non-diabetic pregnant women, what level of glucose intolerance is associated with adverse outcomes?

The OGTT

- Subjects did a 75 gram 2-h OGTT between 24-28 weeks of gestation
- Excluded from the blinded cohort if
 - fasting plasma glucose of >105 mg/dL
 - 2 hr value >200 mg/dL

HAPO Study

Primary Outcomes

- Birthweight > 90th percentile
- Primary cesarean delivery
- Clinical neonatal hypoglycemia
- Cord serum C-peptide > 90th percentile

Secondary Outcomes

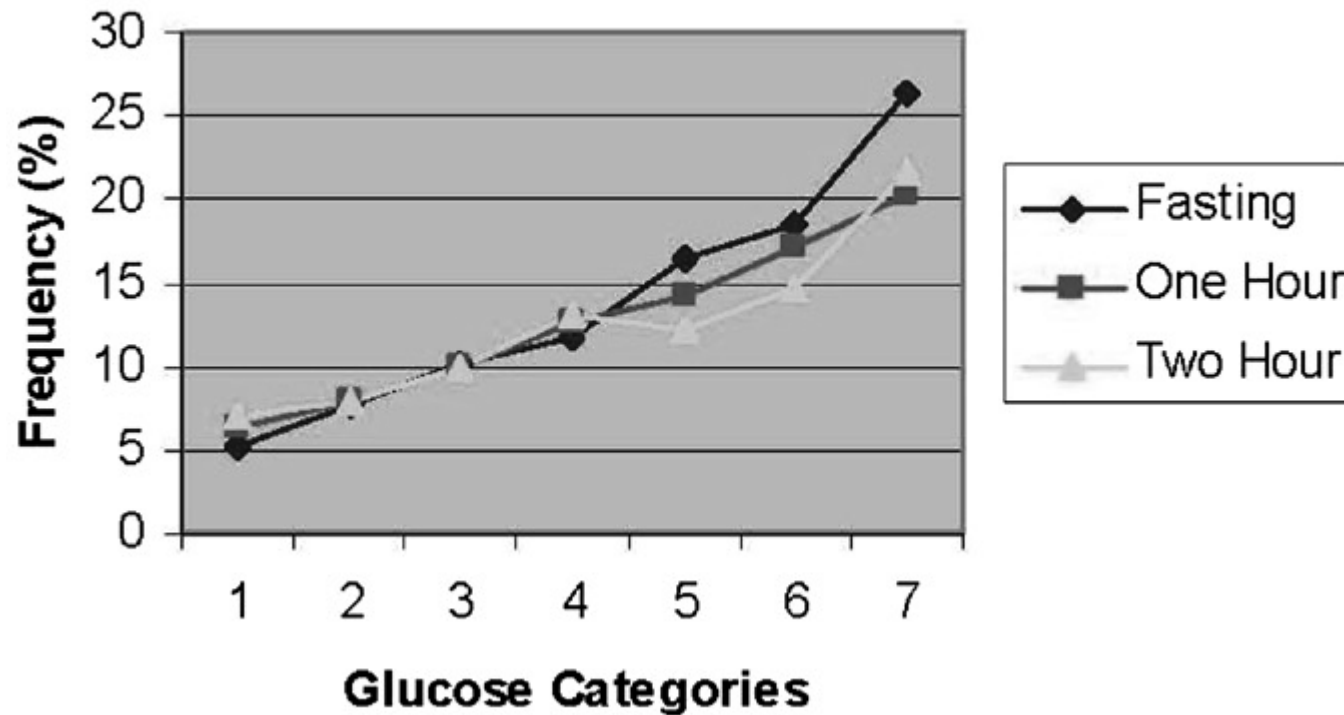
- Birth < 37 weeks
- Shoulder dystocia and/or birth injury
- Sum of skinfold thickness >90th percentile for gestational age
- NICU Admission
- Hyperbilirubinemia
- Preeclampsia

The Big Picture

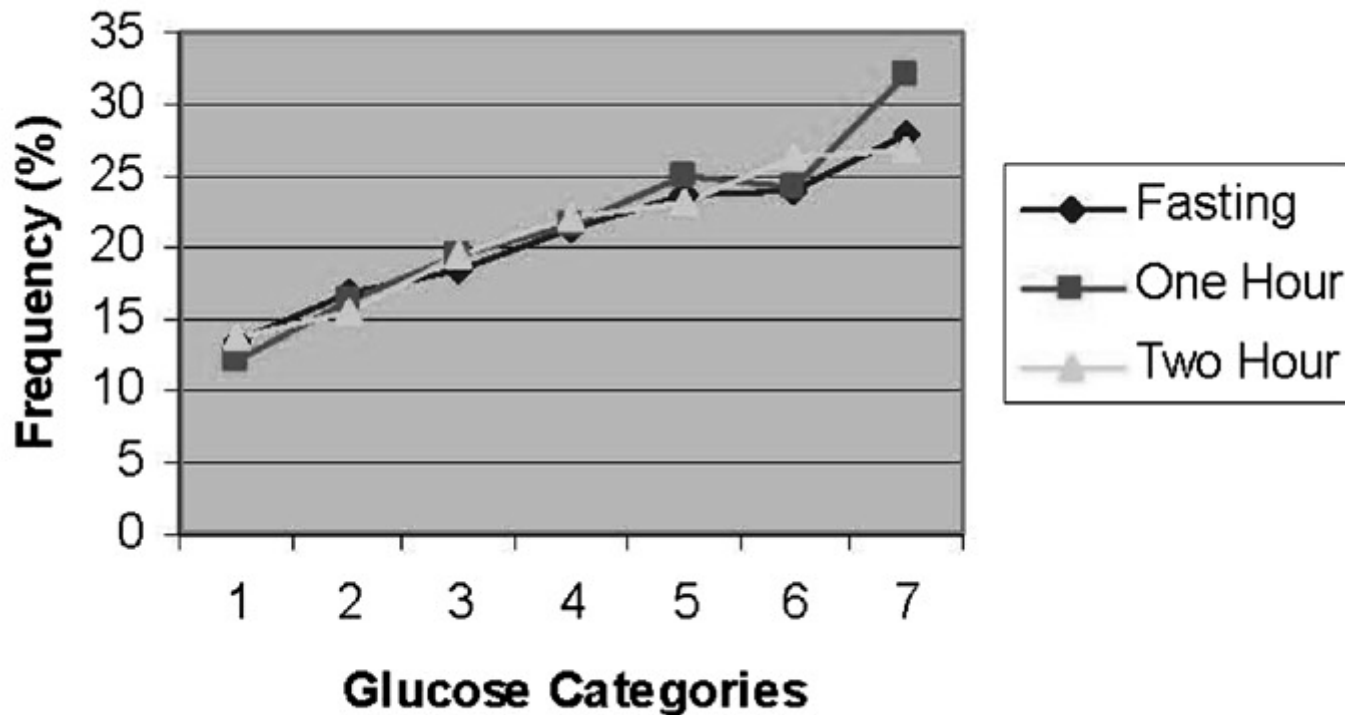
There were continuous graded relationships between higher maternal glucose and increasing frequency of the primary outcomes, independent of other risk factors

Similar outcomes were seen in the secondary outcomes

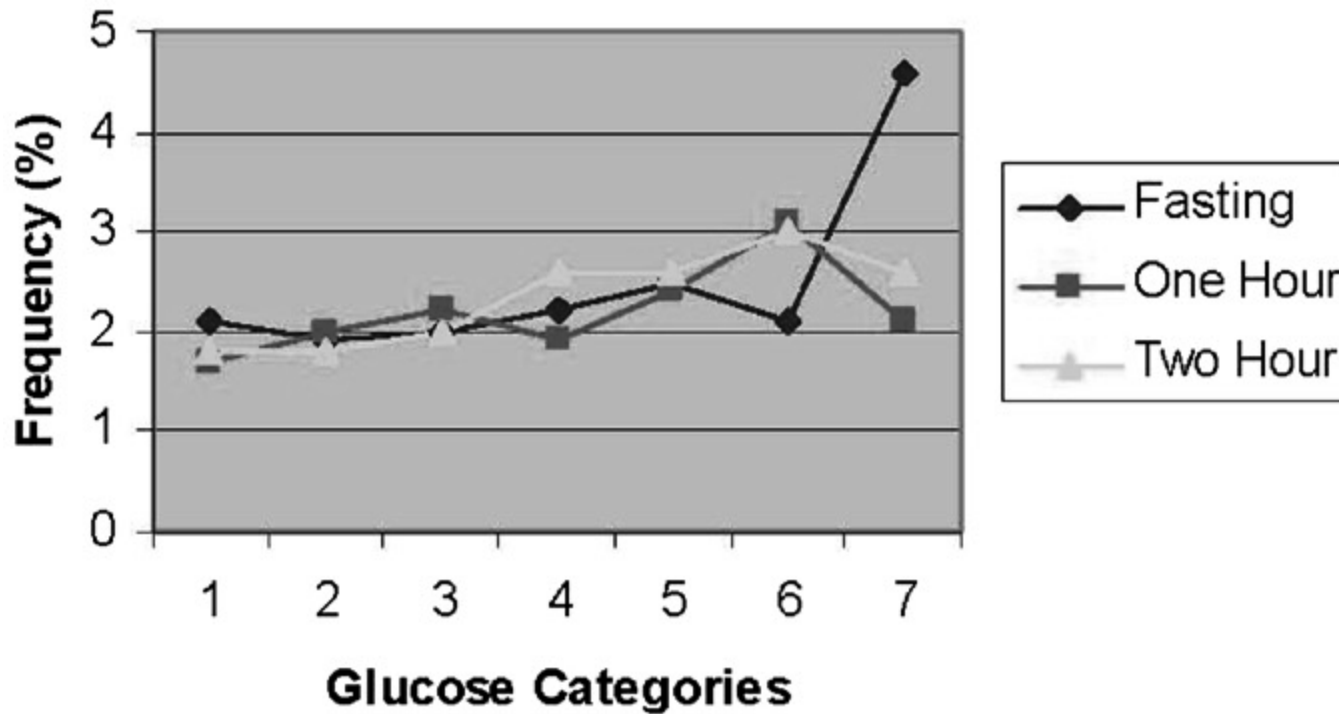
Birthweight > 90th Percentile



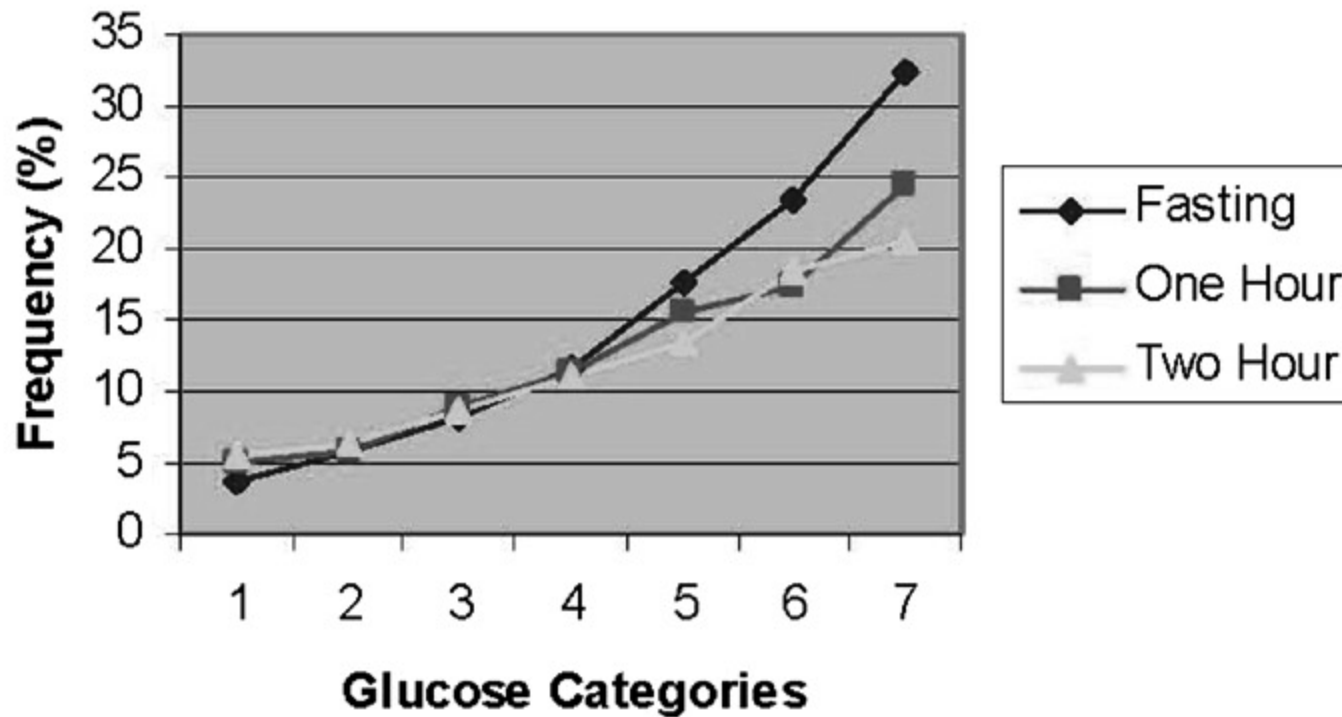
Primary Cesarean Section



Clinical Hypoglycemia



Cord C-Peptide > 90th Percentile





**HOW DO WE DECIDE IF SOMEONE
HAS GESTATIONAL DIABETES?**

IADPSG

- International Association of Diabetes and Pregnancy Study Group met to consider reclassification of GDM in light of new research
- Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy

**ADA has endorsed the new guidelines,
ACOG has not**



Screening for gestational diabetes

The Old and the New

2 step screening

- Screen by history, clinical risk factors or 1-hour glucose challenge
- Diagnosis of GDM by 100 g 3-hr OGTT done with women with a positive screen
- 2 abnormal values
- Incidence of GDM 7% (ACOG)

1 step screening

- Screen at initial prenatal visit by FPG, random plasma glucose or HgbA1c
- 75 g 2-hr OGTT for all women between 24-28 weeks gestation
- 1 abnormal value
- Universal lab screening
- Incidence of GDM 17.8% (IADPSG)

Screening at the initial visit

- Fasting plasma glucose ≥ 126 *mg/dL*
- Hemoglobin A1C greater than 6.5%
- Random plasma glucose ≥ 200 *mg/dL*

These levels are used to diagnose overt
Diabetes Mellitus

Threshold Comparison

Sample time	100 g 3-h ACOG, mg/dL	75 g 2-h ADA Previous, mg/dL	75 g 2-h ADA NEW, mg/dL
Fasting	95	95	93
1-h	180	180	180
2-h	155	155	153
3-h	140	n/a	n/a

WHY THE CHANGE?

The 2-step screening guidelines

40 year old data

Designed to predict future
diabetes in the mother

1-step screening

Designed to identify and treat women with overt diabetes at initial prenatal visit

And to avoid adverse pregnancy outcomes in women with milder forms of hyperglycemia

The ACOG response...

There is no evidence that diagnosis using the 1-step criteria in the IADPSG guidelines leads to clinically significant improvement in maternal or newborn outcomes and it would lead to a significant increase in health care cost

ACOG Committee Opinion No. 504, September 2011

U.S. Preventive Services Task Force

- There is insufficient evidence to recommend for or against routine screening for diabetes in pregnancy, 2008

CAN WE IMPROVE OUTCOMES?

Preventable?

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		Polycythemia	
		Hyperbilirubinemia	
		Cardiomyopathy	

Treatment Study #1

Australian Carbohydrate Intolerance Study in
Pregnant Women, or ACHOIS
published in the NEJM 2005

ACHOIS

- 1000 women with impaired glucose tolerance
- Identified as GDM using 75 g 2-h OGTT
 - Fasting level below 140 mg/dL
 - 2 hour level between 140 and 198 mg/dL

ACHOIS

Risk reduction

Combined rate of serious outcomes for babies, defined as one or more of the following: death, shoulder dystocia, bone fracture or nerve palsy

4% in the control group
1% in the intervention group
NNT 34

Increased risk

Intervention group
(unblinded)
10% more NICU admissions
10% more inductions

No Difference

Jaundice requiring
phototherapy
Cesarean Section

Treatment trial #2...

A Multicenter, Randomized Trial of Treatment for Mild Gestational Diabetes

Mark B. Landon, M.D., Catherine Y. Spong, M.D., Elizabeth Thom, Ph. D, et. al.
Maternal-Fetal Medicine Units Network, NEJM October, 2009

Maternal-Fetal Medicine Units Network

- Treatment of mild GDM identified using a 100 g 3-h OGTT
 - fasting levels normal, at < 95 mg/dL
 - 2/3 of the other values elevated

Maternal-Fetal Medicine Units Network

Reduction in...

Macrosomia

Neonatal fat mass

Shoulder dystocia

Preeclampsia and GH

Cesarean section

No Reduction in...

perinatal mortality

Hypoglycemia, NN

hyperbilirubinemia

Hyperinsulinemia, NN

birth trauma

Which are potentially preventable?

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		Polycythemia	
		Hyperbilirubinemia	
		Cardiomyopathy	

What about non-obstetric outcomes?

- 29% of the US adult population currently has diabetes or pre-diabetes

Risk of type 2 diabetes mellitus

- 15-50% of women diagnosed with GDM will develop type 2 diabetes in the decades following pregnancy

England LJ, Dietz PM, Njoroge T, et al.: Preventing type 2 diabetes: public health implications for women with a history of gestational diabetes mellitus. *Am J Obstet Gynecol* 2009; 200(4): 365 e1-8.

REDUCTION IN THE INCIDENCE OF TYPE 2 DIABETES WITH LIFESTYLE INTERVENTION OR METFORMIN

- 58% reduction in incidence of diabetes with lifestyle reduction in pre-diabetic people
 - 7% weight loss
 - 150 minutes a week of exercise
- Metformin reduced the incidence by 31%

Diabetes Prevention Program Research Group NEJM Feb 2002

How does the diagnosis of GDM affect care?



Unnecessary interventions?

- Induction
 - Iatrogenic prematurity
- Limiting provider perception of liability
 - More cesarean sections
 - Unwillingness to offer assisted vaginal delivery
 - Vigorous attempts to facilitate delivery
 - More NICU admissions



From A Mom's Perspective...

Mom's perspective...

- Mom's often report feeling ill from the fasting glucose test
- The diagnosis and management of GDM can be very stressful!
- Fear of being labeled "high risk" and starting a cascade of interventions

Mom's perspective...

- Pregnancy is a time of high motivation
- Glucose monitoring provides bio-feedback
- Lasting changes in diet and exercise
- Opportunity to lower the risk of obesity and diabetes in both herself and her baby



The End