Gestational Diabetes: Controversies and Challenges

Kirsten E. Salmeen, MD

I have nothing to disclose.

A Brief History of GDM

1880s: Diabetes may appear during pregnancy, then cease at the end of pregnancy

1950s: Prior stillbirth and macrosomia were more likely in women with diabetes

1960s: 30% of women with GDM develop type 2 DM within 5-6 years of incident pregnancy

GDM screening identified as a tool to reduce this risk

1970s: Suggestion to use 1-hour/50gram OGTT as screening tool for GDM

1960s-1990s: GDM is also associated with worse pregnancy outcomes

2008: Publication of Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study – attempting to inform an evidence-based and universal approach to diagnosis of GDM
2010: IADPSG Consensus Meeting: recommended one-step GDM testing with threshold values based on ORs for poor outcomes of 1.75 (fetal macrosomia, neonatal adiposity, fetal hyperinsulinemia)

2013: NIH Consensus Meeting: recommended two-step testing citing concerns regarding over-medicalization, cost, and inadequate evidence

2014: US Preventative Services Task Force recommends screening for all pregnant woman for GDM at or beyond 24 weeks

2017: ACOG PB 180: “Supports two-step process and recommends that implications of suggested changes be studied before they are proposed at a national level. However, individual practices and institutions may choose to use the IADPSG’s recommendation, if appropriate, for the population they serve.”

Controversies & Challenges:
- Who, how and when to test
- Who, how and when to treat

Why are these things controversial & challenging?

Disagreement about how to define “disease”
What constitutes disease?

Dichotomization of a continuous process is bound to result in disagreement

What primary cesarean section rate defines a bad outcome from disease?

One-Step vs. Two-Step Testing

Two-Step (CC)

Step 1:
Non-Fasting, 50 g, 1 hr serum glucose measurement
≥ 130/140 mg/dL → Step 2

Step 2:
Fasting, 100 g, 3 hr glucose test
2+ abnormal values → GDM

GDM prevalence ~ 5-10%

One-Step (IADPSG)

Fasting, 75 g, 1 & 2 hr serum glucose measurement
1+ abnormal value → GDM

GDM prevalence ~ 20%

Sensitivity v Specificity

One-Step (IADPSG)

More Sensitive, Less Specific
MORE women WITH disease test POSITIVE
MORE women WITHOUT disease test POSITIVE
Diagnosing women who might not actually have clinically important disease

Two-Step (CC)

Less Sensitive, More Specific
FEWER women WITH disease test POSITIVE
FEWER women WITHOUT disease test POSITIVE
Missing a clinically important diagnosis
Why are these things controversial & challenging?

Different patient populations & available resources

Different Patient Populations & Available Resources

- Variability in rates of GDM (3-50%!)
- Variability in overall population health-literacy and health priorities
- Variability in available resources (nutritionists, support staff, diabetes educators)

Why are these things controversial & challenging?

Individual versus population health & concerns about cost of care

COSTS

BENEFITS
1-step screening strategy would:

• Increase frequency of GDM 2-3 fold → 15-20%
• Annually Add:
  – 450,000 patient education visits
  – 1 million prenatal testing appointments
  – 1 million clinic visits
• Increase cost of care for GDM by > $1 billion

Why are these things controversial & challenging?

Worry about over-medicalization of pregnancies without clear data for improved outcomes.

So what do we actually know*?

1 – Increasing blood glucose is associated with worse perinatal outcomes.

* Insomuch as we ever really “know” anything in medicine
### HAPO Results

**Summary of GDM-Related Risks**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Overall %</th>
<th>RR/OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macrosomia</td>
<td>20</td>
<td>RR ~1.4</td>
</tr>
<tr>
<td>Pre-Eclampsia</td>
<td>15</td>
<td>RR ~1.7</td>
</tr>
<tr>
<td>Cesarean Section</td>
<td>Varies</td>
<td>RR ~1.2</td>
</tr>
<tr>
<td>Shoulder Dystocia</td>
<td>3-5</td>
<td>OR ~1.2</td>
</tr>
<tr>
<td>IUFD</td>
<td>~0.05</td>
<td>RR ~2</td>
</tr>
</tbody>
</table>

### HAPO Results

**Plasma Glucose Level**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Fast</th>
<th>At 1 Hr</th>
<th>At 2 Hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth weight &gt;90th percentile</td>
<td>1.38</td>
<td>1.38</td>
<td></td>
</tr>
<tr>
<td>Primary cesarean section†</td>
<td>1.11</td>
<td>1.10</td>
<td>1.08</td>
</tr>
<tr>
<td>Clinical neonatal hypoglycemia</td>
<td>1.08</td>
<td>1.13</td>
<td>1.10</td>
</tr>
<tr>
<td>Cord-blood serum C peptide &gt;90% percentile</td>
<td>1.55</td>
<td>1.46</td>
<td>1.37</td>
</tr>
</tbody>
</table>

### Macrosomia

**Maternal Risks**

<table>
<thead>
<tr>
<th>Weight Range</th>
<th>Prolonged Labor (%)</th>
<th>Excess Bleeding (%)</th>
<th>CD (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 – 3999 g</td>
<td>0.9%</td>
<td>0.5%</td>
<td>18</td>
</tr>
<tr>
<td>4000 – 4499 g</td>
<td>1.2%</td>
<td>0.7%</td>
<td>25.5</td>
</tr>
<tr>
<td>4500 – 4999 g</td>
<td>1.3%</td>
<td>0.9%</td>
<td>35.6</td>
</tr>
<tr>
<td>&gt; 5000 g</td>
<td>1.5%</td>
<td>1.1%</td>
<td>50.6</td>
</tr>
</tbody>
</table>
**Macrosomia**

**Neonatal Risks**

<table>
<thead>
<tr>
<th>Weight</th>
<th>Shoulder Dystocia</th>
<th>Mechanical Ventilation &gt; 30 min</th>
<th>5 min Apgar &lt; 3</th>
<th>Neonatal Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 4000 g</td>
<td>6.3-3.7 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4000 – 4449 g</td>
<td>4.9 – 23.1 %</td>
<td>RR = 1.2 – 1.9</td>
<td>RR = 1.3-5.2</td>
<td></td>
</tr>
<tr>
<td>≥ 5000 g</td>
<td>20-50 %</td>
<td>RR = 4.0</td>
<td>RR = 5.2</td>
<td>RR = 2.7</td>
</tr>
</tbody>
</table>

Other Risks:
- Hypoglycemia
- Hypothermia
- Polycythemia
- Birth trauma/asphyxia

---

How do you screen for GDM in your practice?

A. One-step approach (IADPSG)
B. Two-step approach (CC)
C. Variable, depending on the patient
D. No screening
E. Other

---

So what do we actually know*?

2 – Women with GDM by IADPSG criteria have worse pregnancy outcomes than women with normal glucose tolerance

* Insomuch as we ever really “know” anything in medicine

---

Secondary Analysis of HAPO

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Participants in category, n</th>
<th>Participants in category with the outcome</th>
<th>Model I</th>
<th>Model II</th>
</tr>
</thead>
<tbody>
<tr>
<td>No GDM</td>
<td>5,403 7,744</td>
<td>(7.8)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>GDM diagnosed based on IADPSG criteria</td>
<td>877 134</td>
<td>(15.2)</td>
<td>2.31</td>
<td>1.78-2.60</td>
</tr>
<tr>
<td>GDM based on CC</td>
<td>126 50</td>
<td>(20.2)</td>
<td>2.79</td>
<td>2.01-3.96</td>
</tr>
<tr>
<td>Total</td>
<td>3,383</td>
<td>1,314</td>
<td>(39.3)</td>
<td>4.03</td>
</tr>
</tbody>
</table>

Newborn percentage born fat ≥90th percentile:
- No GDM | 3,775 | 396 | (10.5) | 2.00 | 1.45-2.77 |
- GDM diagnosed based on IADPSG criteria | 939 | 101 | (10.9) | 2.85 | 1.81-4.46 |
- GDM based on CC | 189 | 24 | (12.7) | 4.49 | 2.02-9.97 | 1.06 | 1.95-3.57 |
| Total | 4,023 | 441 | (11.0) | 4.02 | 2.56-6.07 | 2.59 | 2.00-3.27 |

Perinatal outcome definitions:
- No GDM | 6,461 | 754 | (11.7) | 2.00 | 1.00 |
- GDM diagnosed based on IADPSG criteria | 758 | 174 | (22.9) | 5.65 | 3.36-9.99 | 1.27-5.60 |
- GDM based on CC | 116 | 30 | (26.0) | 2.01 | 1.02-3.99 |
| Total | 5,305 | 1,090 | (20.7) | 5.30 | 2.02-6.06 |

Duran et al: 1,750 women screened using CC criteria, 1,526 women screened using IADPSG

- IADPSG screening resulted in:
  - Decreased rates of gestational hypertension (3.5% vs 4.1%)
  - Decreased cesarean rates (19.7% vs 25.4%)
  - Fewer LGA babies (3.7% vs 4.6%)
So what do we actually know*?

3 – Screening by IADPSG criteria appear to be cost-effective, at least when postpartum care is included.

* Insomuch as we ever really “know” anything in medicine

Cost Effectiveness

• Werner et al: Cost-effectiveness study
  – One-step testing is cost-effective when post-delivery care reduces diabetes incidence.
  – For every 100,000 women screened, 6,178 quality-adjusted life-years are gained
  – ICER (incremental cost-effectiveness ratio) was $20,336 per QALY

Werner et al. Screening for gestational diabetes mellitus: are the criteria proposed by the International Association of the Diabetes and Pregnancy Study Group cost-effective? Diabetes Care 2012;35:529-35.

• Mission et al: Cost-effectiveness study
  – Testing with IADPSG-criteria is more expensive, but more effective
  – $61,503/quality-adjusted life year

• Duran et al: Estimated cost-savings using IADPSG approach was € 14,358


So what do we actually know*?

4 – Treating elevated blood sugars improves outcomes.

* Insomuch as we ever really “know” anything in medicine
### Crowther – Trial of Treatment for GDM

<table>
<thead>
<tr>
<th>Intervention Group</th>
<th>Routine Care Group</th>
<th>Adjusted RR or Treatment Effect</th>
<th>Adjusted p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Any serious perinatal complication</em></td>
<td>1 (4%)</td>
<td>0.33 (0.14 – 0.75)</td>
<td>0.01</td>
</tr>
<tr>
<td>Admission to NICU</td>
<td>71 (61%)</td>
<td>1.13 (1.03 – 1.23)</td>
<td>0.04</td>
</tr>
<tr>
<td>Macrosomia</td>
<td>10 (21%)</td>
<td>0.47 (0.34 – 0.64)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Neonatal hypoglycemia</td>
<td>7 (5%)</td>
<td>1.42 (0.87 – 2.32)</td>
<td>0.16</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>12 (18%)</td>
<td>0.7 (0.51 – 0.95)</td>
<td>0.02</td>
</tr>
<tr>
<td>Cesarean Delivery</td>
<td>31 (32%)</td>
<td>0.97 (0.81 – 1.16)</td>
<td>0.73</td>
</tr>
</tbody>
</table>

* One or more of: death, shoulder dystocia, bone fracture, nerve palsy

### Landon – Trial of Treatment for GDM

<table>
<thead>
<tr>
<th>Intervention Group</th>
<th>Control Group</th>
<th>Relative Risk</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICU Admission</td>
<td>9 (11.6%)</td>
<td>0.77 (0.51 – 1.18)</td>
<td>0.19</td>
</tr>
<tr>
<td>Macrosomia</td>
<td>5.9 (14.3%)</td>
<td>0.41 (0.26 – 0.66)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Neonatal Hypoglycemia</td>
<td>5.3 (6.8%)</td>
<td>0.77 (0.44 – 1.36)</td>
<td>0.32</td>
</tr>
<tr>
<td>Shoulder Dystocia</td>
<td>1.5 (4.0%)</td>
<td>0.37 (0.14 – 0.97)</td>
<td>0.02</td>
</tr>
<tr>
<td>Cesarean Delivery</td>
<td>26.9 (33.8%)</td>
<td>0.79 (0.64 – 0.99)</td>
<td>0.02</td>
</tr>
<tr>
<td>Preeclampsia or GHTN</td>
<td>8.6 (13.6%)</td>
<td>0.63 (0.42 – 0.96)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

### Question

What is your usual first-line agent for women with GDM who fail diet and exercise?

A. Metformin  
B. Glyburide  
C. Insulin  
D. Other

#### Results

- **A**: 41%  
- **B**: 29%  
- **C**: 0%  
- **D**: 30%

### So what do we actually know*?

5 – Glyburide, Metformin and insulin all have demonstrated efficacy

* Insomuch as we ever really “know” anything in medicine
**Metformin vs Insulin**

**Rowan**

RCT of 751 women: 373 Metformin, 378 insulin

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Metformin Group (N = 373)</th>
<th>Insulin Group (N = 378)</th>
<th>Relative Risk (RR, 95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary composite outcome</td>
<td>130 (35.0)</td>
<td>119 (31.2)</td>
<td>0.99 (0.88-1.12)</td>
<td>0.83</td>
</tr>
<tr>
<td>Gestational diabetes level (≥6.8 mmol/L)</td>
<td>55 (14.8)</td>
<td>50 (13.2)</td>
<td>0.93 (0.59-1.44)</td>
<td>0.99</td>
</tr>
<tr>
<td>Any blood glucose level (≥7.8 mmol/L)</td>
<td>12 (3.2)</td>
<td>10 (2.6)</td>
<td>0.64 (0.23-1.79)</td>
<td>0.99</td>
</tr>
<tr>
<td>Respiratory distress</td>
<td>12 (3.2)</td>
<td>16 (4.3)</td>
<td>0.76 (0.37-1.59)</td>
<td>0.67</td>
</tr>
<tr>
<td>Transient tachypnea</td>
<td>7 (1.9)</td>
<td>9 (2.4)</td>
<td>0.89 (0.38-2.12)</td>
<td>0.81</td>
</tr>
<tr>
<td>Respiratory distress syndrome</td>
<td>4 (1.1)</td>
<td>5 (1.3)</td>
<td>0.54 (0.20-1.43)</td>
<td>0.24</td>
</tr>
<tr>
<td>Sepsis</td>
<td>3 (0.8)</td>
<td>5 (1.3)</td>
<td>0.54 (0.20-1.43)</td>
<td>0.24</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperthermia</td>
<td>19 (5.1)</td>
<td>20 (5.3)</td>
<td>0.95 (0.59-1.53)</td>
<td>0.85</td>
</tr>
<tr>
<td>NUT (nausea)</td>
<td>36 (9.6)</td>
<td>37 (9.8)</td>
<td>0.96 (0.69-1.37)</td>
<td>0.90</td>
</tr>
<tr>
<td>NMD (nausea)</td>
<td>18 (4.8)</td>
<td>21 (5.5)</td>
<td>0.85 (0.48-1.51)</td>
<td>0.63</td>
</tr>
<tr>
<td>Moderate or severe</td>
<td>0</td>
<td>2 (0.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-min Apgar score ≥7 (%)</td>
<td>20 (5.3)</td>
<td>18 (4.8)</td>
<td>0.99 (0.51-1.96)</td>
<td>0.97</td>
</tr>
<tr>
<td>Presence of birth (47 wk of gestation)</td>
<td>44 (11.8)</td>
<td>39 (10.3)</td>
<td>1.16 (0.70-1.92)</td>
<td>0.54</td>
</tr>
<tr>
<td>Maternal indicated</td>
<td>18 (5.0)</td>
<td>12 (3.2)</td>
<td>0.91 (0.50-1.67)</td>
<td>0.75</td>
</tr>
<tr>
<td>Spontaneous</td>
<td>26 (7.0)</td>
<td>15 (4.0)</td>
<td>1.77 (0.85-3.68)</td>
<td>0.17</td>
</tr>
<tr>
<td>Additional neonatal complications</td>
<td>68 (18.3)</td>
<td>72 (19.1)</td>
<td>0.89 (0.60-1.31)</td>
<td>0.43</td>
</tr>
<tr>
<td>Admission to level 2 or 3 neonatal intensive care unit</td>
<td>46 (12.5)</td>
<td>45 (12.3)</td>
<td>1.06 (0.75-1.51)</td>
<td>0.73</td>
</tr>
<tr>
<td>Neonatal intensive care unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus level (mg/dL)</td>
<td>7.28 ± 2.67</td>
<td>7.24 ± 2.67</td>
<td>0.31</td>
<td></td>
</tr>
</tbody>
</table>


**Metformin vs. Insulin**

**Spaulonci**

RCT of ~100 women: ~50 insulin, 50 metformin

**TABLE 2**

Neonatal outcomes in the metformin and insulin group for continuous variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Metformin group</th>
<th>Insulin group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age at birth</td>
<td>38.33 ± 1.45</td>
<td>38.24 ± 1.53</td>
<td>.776</td>
</tr>
<tr>
<td>1-min Apgar score</td>
<td>9 (4-10)</td>
<td>9 (0-10)</td>
<td>.980</td>
</tr>
<tr>
<td>5-min Apgar score</td>
<td>10 (0-10)</td>
<td>10 (0-10)</td>
<td>.188</td>
</tr>
<tr>
<td>Umbilical arterial pH at birth</td>
<td>7.22 ± 0.07</td>
<td>7.22 ± 0.08</td>
<td>.824</td>
</tr>
<tr>
<td>Newborn weight</td>
<td>3143.7 ± 446.6</td>
<td>3237.6 ± 586.8</td>
<td>.390</td>
</tr>
</tbody>
</table>

Results are reported as the mean ± standard deviation for parametric variables and median (min-max) for nonparametric variables.


**TABLE 3**

Neonatal outcomes in the metformin and insulin group for categorical variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Metformin group</th>
<th>Insulin group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macrosomia</td>
<td>0 n (%)</td>
<td>0 n (%)</td>
<td>.242</td>
</tr>
<tr>
<td>Neonatal hypoglycemia</td>
<td>6.5 n (%)</td>
<td>10 n (%)</td>
<td>.032</td>
</tr>
<tr>
<td>Respiratory distress syndrome</td>
<td>7 n (%)</td>
<td>7 n (%)</td>
<td>.964</td>
</tr>
<tr>
<td>Hyperbilirubinemia</td>
<td>4 n (%)</td>
<td>5 n (%)</td>
<td>.739</td>
</tr>
</tbody>
</table>

• RCT of ~150 women – 75 women metformin, 74 women Glyburide


<table>
<thead>
<tr>
<th>Variable/Outcome</th>
<th>Glyburide (N = 201)</th>
<th>Insulin (N = 203)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Dose</td>
<td>9 ± 6 mg/day</td>
<td>85 ± 48 units/day</td>
<td></td>
</tr>
<tr>
<td>Fasting Blood Glucose</td>
<td>98 ± 13 mg/dL</td>
<td>96 ± 16 mg/dL</td>
<td>0.17</td>
</tr>
<tr>
<td>Postprandial Blood Glucose</td>
<td>113 ± 22 mg/dL</td>
<td>112 ± 15 mg/dL</td>
<td>0.6</td>
</tr>
<tr>
<td>LGA</td>
<td>12%</td>
<td>13%</td>
<td>0.76</td>
</tr>
<tr>
<td>Neonatal hypoglycemia</td>
<td>9%</td>
<td>6%</td>
<td>0.25</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>6%</td>
<td>6%</td>
<td>1</td>
</tr>
</tbody>
</table>

Secondary analysis: No differences when stratified by disease severity.


• 26 patients (34.7%) in the Metformin group and 12 patients (16.2%) in the Glyburide group failed treatment and required insulin therapy.

If you prescribe Metformin or Glyburide do you counsel women that they cross the placenta?

A. Always  
B. Sometimes  
C. Only if a woman asks  
D. Never
6 – Glyburide and Metformin cross the placenta, long-term outcomes are not well known, and may be associated with worse outcomes.

* Insomuch as we ever really “know” anything in medicine

2-year olds exposed to metformin or insulin:
No difference in:
- Bayley Scales
- Hammersmith Infant Neurological Examination
- Receptive communication
- Expressive communication
- Fine motor scale
- Gross motor scale


Jacobson:
- Outcomes among 268 women treated with insulin vs. 236 women treated with Glyburide
- Equivalent: Birthweight, mode of delivery, hyperbilirubinemia, neonatal hypoglycemia
- Twice as many women in the Glyburide group developed pre-eclampsia (12% vs 6%; p = 0.02)
- More infants in the Glyburide group required phototherapy (9% vs 5%; p = 0.05)


Balsells et al: Systematic review & meta-analysis of Glibencalmide (Glyburide), metformin & insulin

Compared to insulin, Glyburide was associated with:
- Macrosomia: RR 2.62 (1.35 – 5.08)
- Neonatal hypoglycemia: RR 2.04 (1.30 – 3.20)
- No difference in pre-eclampsia
- Failure rate for Glyburide = 6.7%

**Glyburide Outcomes**

Poolsup et al: Meta-Analysis of 13 studies, including 2,151 patients

Compared to insulin, Glyburide was associated with:
- Macrosomia: RR 3.07 (95% CI 1.14 – 8.23)
- Neonatal hypoglycemia: RR 2.30 (95% CI 1.28 – 4.11)
- No difference in pre-eclampsia risk

**Metformin Outcomes**

Balsells et al:

Compared with insulin, Metformin was associated with:
- Less maternal weight gain (-1.14 kg)
- Preterm birth: RR 1.50 (95% CI 1.04 – 2.16)
- Less PIH: RR 0.53 (95% CI 0.31 – 0.90)
- Failure rate for Metformin: 33.8%

**Metformin Outcomes**

Poolsup et al:

Compared with insulin, metformin was associated with:
- No difference in risk of macrosomia
- Preterm birth: RR 1.51 (95% CI 1.04 – 2.19)
- Reduced risk of gestational hypertension: RR 0.54, 95% CI 0.31 – 0.91

So what do we actually know*?

- Women with GDM may benefit from delivery between 39-40 weeks

* Insomuch as we ever really “know” anything in medicine
Induction of Labor

- Rosenstein: Infant mortality rates at 39 weeks are lower than overall mortality risk of expectant management.

So what do we actually know*?

8 – Postpartum interventions reduce long-term risk of type 2 diabetes

* Insomuch as we ever really “know” anything in medicine

Prevention of Diabetes

Ratner et al - 350 women with history of GDM compared to 1,416 women without GDM randomized to lifestyle intervention, metformin or usual care

So what do we actually KNOW?

1 – Increasing blood glucose is associated with worse perinatal outcomes.

2 – Women with GDM by IADPSG criteria have worse pregnancy outcomes than women with normal glucose tolerance.

3 – Screening by IADPSG criteria appear to be cost-effective, at least when postpartum care is included.

4 – Treating elevated blood sugars improves outcomes.

5 – Glyburide, Metformin and insulin all have demonstrated efficacy.

6 – Glyburide and Metformin cross the placenta, long-term outcomes are not well known, and may be associated with worse outcomes.

7 – Women with GDM may benefit from delivery between 39-40 weeks.

8 – Postpartum interventions reduce long-term risk of type 2 diabetes.
What We Don’t Know

• Optimal diet
• Ideal threshold for initiating medical therapies
• Best medical treatment(s)
• Impact of exercise, optimal exercise regimens

What Is NOT Controversial

Perinatal risks go up with increasing blood sugar.

There is no risk of harm from encouraging women to follow a healthy diet and get regular physical activity.

SOME portion of women will change their behavior after being made aware of an increased risk of disease.

What I Think You Should Do

Determine what testing & treatment strategies generally fit your circumstances best

Be flexible!

Thank You