Introduction

Gestational diabetes mellitus (GDM) is a condition of carbohydrate intolerance of varying severity that begins or is first recognized during pregnancy and is one of the most common complications of pregnancy. In some cases, GDM is actually type 2 diabetes that has not previously been diagnosed, but, for most patients, the glucose intolerance disappears soon after delivery. The prevalence of GDM varies because of different screening and diagnostic criteria, populations, race, ethnicity, age, and body composition. Using current testing criteria in the United States, GDM prevalence is estimated to be between 5 percent and 6 percent, affecting approximately 240,000 of the more than 4 million births occurring annually. Multiple studies have shown increases in GDM among diverse populations during the 1990s and early 2000s. This observed increase in GDM nationally is consistent with changes in known risk factors for...
GDM: advanced maternal age, family history of diabetes, and higher body mass index. All of these risk factors have increased in the past 20 years; for example, more than 20 percent of women in the United States are now obese as they enter pregnancy. GDM is more common among certain ethnic groups—such as African American, Asian, Hispanic, and Native American women—compared to non-Hispanic white women. These high-risk groups are not evenly distributed in the United States, with some regions facing a far greater burden.

Adverse short- and long-term health outcomes for both the mother and her offspring have been associated with the diagnosis of GDM. For the mother, these outcomes include gestational hypertension (pregnancy-induced high blood pressure) and preeclampsia (high blood pressure developed in pregnancy). The mother is also at increased risk for the later development of type 2 diabetes and other long-term metabolic complications. Excess glucose crosses the placenta and can cause adverse fetal effects. Fetal hyperinsulinemia (high levels of insulin in the blood) can lead to excess fetal size (increased risk of shoulder dystocia [large infant shoulder that requires additional obstetric manipulation] and cesarean delivery), increased respiratory distress syndrome, and neonatal metabolic conditions.

At this time, most obstetrical providers in the United States screen for GDM with a 50g glucose challenge test (GCT, measuring serum glucose 1 hour after a woman drinks a 50g oral glucose drink) followed by an oral 100g glucose tolerance test (OGTT, in which four blood samples are drawn over a 3-hour period after a woman drinks 100g glucose) if needed. This two-step approach has been recommended by the American College of Obstetricians and Gynecologists.
Depending on which GCT cutoff is chosen, 14 percent to 23 percent of patients will require the diagnostic OGTT.

Despite the near uniformity of current practice in the United States, a number of controversies remain: the value of routine screening, the most appropriate method and glycemic thresholds for diagnosis, and the effects of treatment on the short- and long-term outcomes for women and their children. For example, in 2008 the U.S. Preventive Services Task Force (USPSTF) determined that “the current evidence is insufficient to assess the balance between the benefits and harms of screening women for GDM either before or after 24 weeks’ gestation.” At the same time, others support liberalizing the definitions, which would categorize more pregnant women as having GDM. The International Association of Diabetes and Pregnancy Study Groups (IADPSG) has proposed a one-step approach (fasting, 1-hour and 2-hour glucose measurements), where GDM is diagnosed by one abnormal value. This strategy would increase the number of women labeled as GDM two- to threefold and could increase personal and societal costs. Therefore, clear evidence of substantive benefits from the IADPSG approach is needed to justify a change to that diagnostic technique.

The National Institutes of Health Consensus Development Program is designed to address controversial questions of public health importance when there may be discordance between clinical practice and the available evidence. Consensus Development Conferences address targeted, carefully defined questions, which prompt a thorough review of the available evidence and solicit presentations from subject matter experts. An objective panel then concludes with a Consensus Statement, which addresses the critical questions.
By necessity, this panel, Diagnosing Gestational Diabetes Mellitus, cannot address every controversy surrounding GDM and will focus on diagnosis. However, the panel is cognizant of the fact that most health care providers in the United States currently screen, and will continue to screen, for this common complication. The panel also is aware that health care providers will continue to monitor and treat most patients based on whatever diagnosis of GDM is used, and that those will be expensive undertakings, with potentially negative consequences for those falsely categorized as having GDM. Although those facts may flavor deliberations, the panel will concentrate on the diagnosis of GDM, not on the merits of routine screening or on issues of treatment and its effects. Simultaneously, the USPSTF will re-examine the issue of routine screening. In combination, the panel hopes to clarify an approach to GDM that may resolve key controversies.

1. What are the current screening and diagnostic approaches for gestational diabetes mellitus, what are the glycemic thresholds for each approach, and how were these thresholds chosen?

Testing for diabetes in pregnancy has been a routine part of obstetric practice since O’Sullivan published results for the oral glucose tolerance test in pregnancy more than 40 years ago. Currently, most practices use either a one-or two-step approach to GDM diagnosis.

Two-step approaches, proposed by the National Diabetes Data Group (NDDG) and Carpenter & Coustan (C-C) are commonly used in the United States and involve the administration of a
screening 50g glucose challenge test (50g GCT) to the patient without regard to fasting (first step). If the plasma glucose level measured 1 hour after the load is less than a selected cutoff (usually 130, 135, or 140 mg/dL), the woman is considered GDM-negative, and no further testing is required. If the glucose level is greater than the cutoff, then a diagnostic test (second step) is needed to confirm the diagnosis of GDM. This second step involves a 100g oral glucose tolerance test (100g 3-hour OGTT) given while the patient is fasting; the fasting 1-, 2-, and 3-hour post-load glucose levels are measured and compared with recommended diagnostic criteria (C-C or NDDG cutoffs) to confirm or reject the diagnosis of GDM (Table 1). The two-step approaches were not developed to diagnose diabetes in pregnancy per se, but rather to identify women at risk of developing diabetes mellitus later in life.

Table 1: Criteria and glucose thresholds for the diagnosis of GDM

<table>
<thead>
<tr>
<th>Approach</th>
<th>Criteria*</th>
<th>Fasting mg/dL</th>
<th>1-hour mg/dL</th>
<th>2-hour mg/dL</th>
<th>3-hour mg/dL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Step (100g load)</td>
<td>C-C</td>
<td>95 (5.3mmol/L)</td>
<td>180 (10.0mmol/L)</td>
<td>155 (8.6mmol/L)</td>
<td>140 (7.8mmol/L)</td>
</tr>
<tr>
<td></td>
<td>NDDG</td>
<td>105 (5.8mmol/L)</td>
<td>190 (10.5mmol/L)</td>
<td>165 (9.1mmol/L)</td>
<td>145 (8.0mmol/L)</td>
</tr>
<tr>
<td>One Step (75g load)</td>
<td>WHO</td>
<td>110 (6.1mmol/L)</td>
<td></td>
<td>140 (7.8mmol/L)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IADPSG</td>
<td>92 (5.1mmol/L)</td>
<td>180 (10mmol/L)</td>
<td>153 (8.5mmol/L)</td>
<td></td>
</tr>
</tbody>
</table>

* C-C = Carpenter & Coustan; NDDG = National Diabetes Data Group; WHO = World Health Organization; IADPSG = International Association of Diabetes and Pregnancy Study Groups

Single-step approaches proposed by the World Health Organization (WHO) and IADPSG are commonly used outside of the United States to diagnose GDM. In the single-step approach, a
75g oral glucose tolerance test (75g 2-hour OGTT) is administered to the fasting woman. Using the WHO approach, fasting and 2-hour post-load glucose levels are measured, and using the IADPSG approach, fasting, 1-hour, and 2-hour glucose levels are evaluated against recommended criteria to confirm or refute the diagnosis of GDM. Table 1 summarizes the GDM diagnostic glycemic cutoffs for these criteria. Distinctions between the WHO and the IADPSG are (1) the WHO requires one or more abnormal values and the IADPSG considers any single abnormal value as diagnostic of GDM, and (2) the IADPSG consensus cutoffs are the only ones that are based on pregnancy outcomes (glucose values associated with a 1.75-fold increase in selected adverse pregnancy outcomes).

2. What are the effects of various diabetes mellitus screening and diagnostic approaches for patients, providers, and U.S. health care systems?

Patients

Changing to a test that requires a fasting blood glucose and an increased wait time of 2 hours is an additional burden for pregnant women. In addition, the fasting state may be difficult and uncomfortable for some women.

Adopting the IADPSG criteria would substantially increase the proportion of women diagnosed with GDM. The diagnosis of GDM carries considerable inconvenience for patients. They must self-monitor their blood glucose levels several times a day and carefully monitor what they eat. They will need to meet with a registered dietitian and/or a diabetes educator, resulting in
additional appointments. Also, (and despite a lack of clear efficacy), they often undergo fetal
testing such as non-stress testing and additional obstetric ultrasounds. These extra procedures
and provider visits require extra time and create additional challenges regarding transportation,
child care, or work and may result in additional out-of-pocket costs. These problems are likely
enhanced for vulnerable populations.

Providers

Increasing the proportion of women with GDM by two- to threefold has considerable
implications for health care providers. Two randomized clinical trials saw an increase in either
prenatal visits or visits to a health care provider. These visits would require additional clinical
resources as well as the services of registered dietitians and diabetes educators. In one study of
two large hospitals in Australia, it was estimated that the workload would increase approximately
30 percent if new diagnostic criteria for GDM were implemented. One estimate is that the
IADPSG criteria would result in 450,000 more patient education visits, 1 million more clinic
visits, and 1 million more prenatal testing appointments each year in the United States.

U.S. Health Care Systems

Adopting the IADPSG criteria for the diagnosis of GDM would increase the proportion of
women with GDM with attendant implications for hospitals and health care systems. The
additional outpatient visits and testing described above also will affect hospitals and payers.
There may be capacity constraints relating to additional volume of laboratory tests. Other more
difficult to quantify factors include increased time spent on labor and delivery suites due to 
inductions and increased time spent in postpartum rooms due to more frequent cesarean 
deliveries.

Published results suggest that direct medical and patient time costs would both be higher if the 
IADPSG protocol were adopted. In 2009, it was estimated that the annual cost in the United 
States for the care of GDM would increase from $636 million to $2 billion. Economic analyses 
that weigh the tradeoff between costs, health benefits, and potential harms vary widely and do 
not provide sufficient information to compare the various approaches, likely due to uncertainty 
regarding the health benefits of increased diagnosis of GDM.

3. In the absence of treatment, how do health outcomes of mothers who meet various 
criteria for gestational diabetes mellitus and their offspring compare with those who 
do not?

Many high-quality studies have evaluated maternal and fetal outcomes among women with 
untreated GDM compared to those without GDM. Although these studies employed various 
diagnostic criteria, several findings have been consistent. In terms of maternal outcomes, studies 
have shown that a diagnosis of GDM increases risks of cesarean delivery, preeclampsia, and 
gestational hypertension.

In terms of fetal outcomes, methodologically strong studies have shown a continuous 
relationship between increasing glucose levels and increasing incidence of large-for-gestational
age infants and infants with macrosomia (a condition in which the newborn is significantly larger than average). In addition, a consistently higher risk of shoulder dystocia has been found among women with a diagnosis of GDM compared to those without GDM; shoulder dystocia can lead to rare but important outcomes such as brachial plexus injury. Some studies report neonatal hypoglycemia (low blood glucose) and hyperbilirubinemia (excess bilirubin in the blood) among neonates born to women with GDM, although the evidence supporting these associations has not been consistent. A relationship between GDM and subsequent childhood obesity has been found in some but not all studies. The effect on longer term outcomes in the offspring, including type 2 diabetes mellitus, is unclear.

The Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study demonstrated that the magnitudes of maternal and fetal risks increase with the severity of maternal hyperglycemia (low blood glucose). The HAPO study evaluated glucose tolerance at 24 to 32 weeks during pregnancy in 25,505 pregnant women from 15 centers in 9 countries, providing information on a heterogeneous, multinational, ethnically diverse group of women. For women with less severe hyperglycemia during pregnancy, increasing maternal glucose levels were related to increased infant birth weight, body fat, and cord C-peptide (a measure of insulin resistance in the infant) above the 90th percentile, and increased primary cesarean delivery rates. In addition, these women also had increased risks for premature delivery, preeclampsia, shoulder dystocia or birth injury, and hyperbilirubinemia. Neonatal hypoglycemia and admissions to neonatal intensive care units also were more common in infants born to mothers diagnosed with GDM.
Of note, these risks have been defined using the traditional two-step approach. Milder forms of GDM diagnosed through newer strategies may not be associated with these adverse outcomes to the same degree as noted in prior studies.

4. Does treatment modify the health outcomes of mothers who meet various criteria for gestational diabetes mellitus and their offspring?

Very few well-designed, high-quality studies have attempted to estimate the benefit of treatment of GDM compared with no treatment. These treatments included self-blood glucose monitoring, medical nutrition therapy, and insulin in some patients. Criteria for the diagnosis of GDM varied. Women with more severe forms of GDM were not included in the studies.

Maternal Outcomes

Treatment of GDM reduced the risk for hypertensive disorders of pregnancy by approximately 40 percent. Shoulder dystocia risk was reduced with treatment by approximately 60 percent; however, as shoulder dystocia was a rare event, the absolute risk changed from only 3.5 percent (untreated) to 1.5 percent (with treatment). Another consistent finding among the studies was that the treatment of GDM did not increase the risk of cesarean delivery.

Results were not consistent among studies for maternal weight gain and risk for induction of labor; therefore, the panel could draw no conclusions on the effect of treatment on these two maternal outcomes. Evidence was lacking or insufficient to conclude whether there is an effect
of treatment of GDM on birth trauma, body mass index at delivery, and long-term maternal outcomes including type 2 diabetes mellitus, obesity, and hypertension.

**Fetal, Neonatal, and Child Outcomes**

A pooled meta-analysis of five randomized clinical trials found a 50 percent reduction in macrosomia in infants born to mothers who received treatment for GDM, although the absolute difference in mean birth weight was less than 150g in the two largest studies. Similarly, randomized trials have demonstrated that infants of mothers who received treatment for GDM were less likely to be large for gestational age (absolute risk reduction 6 percent). Randomized trials, however, have not shown a decrease in neonatal hypoglycemia in response to maternal treatment of GDM. There are no sufficient data available to conclude whether treatment of GDM modifies neonatal morbidities such as prematurity, admission to neonatal intensive care units, or mortality. More studies are needed to evaluate the long-term metabolic outcomes (obesity and risk of type 2 diabetes mellitus) of children born to women with GDM.

The panel strongly recommends caution when applying these results to clinical practice for several reasons. First, participants in clinical trials typically are highly motivated individuals who are eager to adhere to even complex protocols in academic medical center venues with very favorable staff-to-patient ratios. These factors are not usually present in the average clinical practice. Second, not all treatments employed in current daily practice were studied. Oral anti-diabetic agents, such as glyburide and metformin, are notable in their absence. Third, differing thresholds for criteria to diagnose GDM may change the size of the effect of the treatments for
the entire group in unpredictable ways. Milder forms of GDM may not benefit from treatment.

Finally, application of treatments purely for the sake of the benefits without regard for the costs would be inappropriate.

5. What are the harms of treating gestational diabetes, and do they vary by diagnostic approach?

A potential harm of increased diagnosis of mild GDM is patient anxiety. It is generally accepted that patients experience short-term stress and anxiety when receiving a new diagnosis of a serious condition, including GDM, which could adversely affect their health. Nonetheless, it is unclear if long-term stress and anxiety are increased. In part, this is due to a paucity of data. Also, it is possible that women may adapt to their diagnosis with diabetes management, thereby decreasing their anxiety level. In addition to anxiety, women with a diagnosis of GDM have reported feelings of loss of control, shock, depression, fear, and disappointment.

Few studies directly addressed the emotional impact of screening for and diagnosis of GDM. One study noted a lower sense of well-being, less positive experience of their pregnancy, and more concern about their health in women with GDM compared to those without the condition. Another group noted that women with GDM had increased concern about their baby’s health and their own health as well as a fear of losing personal control over their health. Also, the over-diagnosis of GDM may lead to the “medicalization of pregnancy,” which transforms an otherwise normal pregnancy into a disease.
There is considerable variability in the 2-hour glucose tolerance test. Results may differ in as many as 25 percent of women if performed at different times. Thus, a one-step test is likely to result in more “false positive” results than a two-step test. In turn, positive tests will further increase cost, inconvenience, and anxiety.

The harms of medical therapy for GDM are well known. Medications such as insulin and anti-diabetic agents may cause hypoglycemia and other side effects. There are also obstetric “harms” associated with an increased risk of GDM.

One randomized controlled trial has shown higher induction of labor rates in women with GDM compared to normal controls. Women with GDM are more likely to undergo increased maternal and fetal monitoring. Subjective interpretation of ultrasound findings and fetal non-stress tests produces a high rate of false positives and is a factor in unnecessary induction of labor leading to failed inductions and cesarean delivery. Data regarding the effect of changing the diagnostic criteria for GDM on inductions are uncertain.

Cesarean rates may be higher in women given the diagnosis of GDM, and it is uncertain whether treatment can mitigate this increase. Cesarean delivery is associated with a higher rate of short- and long-term complications. There is concern about the rising cesarean rate by many groups; the present rate in the United States is 32.9 percent. Since the vaginal birth after cesarean rate is now less than 10 percent, most women who delivered by cesarean will again deliver by repeat cesarean. With each subsequent pregnancy, the rate of placenta previa (which occurs when an infant placenta partially or totally covers the mother’s cervix) and placenta accreta (a serious
pregnancy condition that occurs when blood vessels and other parts of the placenta grow too
depth into the uterine wall) increase dramatically. These conditions result in serious
complications such as hemorrhage, infection, emergency hysterectomy, and even death.

A diagnosis of GDM may lead to more intensive neonatal care, potentially separating mother and
infant. One study indicated that infants born to mothers with the diagnosis of GDM were more
frequently admitted to an intermediate care nursery. It is important to note that protocols for
increased surveillance vary among hospitals. There is theoretical risk for small for gestational
age fetuses in patients treated for GDM; however, the two largest randomized clinical trials have
not demonstrated this risk.

6. Given all of the above, what diagnostic approach(es) for gestational diabetes mellitus
should be recommended, if any?

At present, GDM is commonly diagnosed in the United States using a 1-hour screening test with
a 50g glucose load followed by a 3-hour 100g glucose tolerance test (a two-step approach) for
those found to be abnormal on the screen. This approach identifies approximately 5 percent to
6 percent of the population as having GDM. The diagnostic threshold criteria for this test were
originally predicated not on perinatal outcomes, but on the likelihood that a woman would
develop diabetes mellitus several years subsequent to pregnancy. Subsequently, evidence has
accumulated that the GDM identified by this system is associated with an increased risk of
adverse maternal and perinatal outcomes.
In contrast, newly proposed diagnostic strategies rely on the administration of a 2-hour glucose
tolerance test (a one-step approach). Each of these strategies is based on a one-step approach
with a fasting component, a 75g glucose load, and 2 hours of testing. However, these tests differ
on whether a 1-hour sample is included, whether two abnormal values are required, and the
diagnostic cutoffs that are used. Most recently, the IADPSG has proposed diagnostic thresholds
based on demonstrated associations between glycemic levels and an increased risk of obstetric
and perinatal morbidities.

The panel considered whether a one-step approach to the diagnosis of GDM should be adopted
in place of the two-step approach. The one-step approach offers certain operational advantages.
The current two-step approach is not used other than during pregnancy and is largely restricted to
the United States. There would be value in a consistent diagnostic standard across the lifespan
within the United States and during pregnancy around the world. This unification would allow
better standardization of best practices in patient care and comparability of research outcomes.
The one-step approach also holds potential advantages for women and their health care providers
as it would allow a diagnosis to be achieved within the context of one visit as opposed to two.

To determine whether the advantages of the one-step approach should lead to its adoption,
several criteria need to be fulfilled:

- There should be evidence that the additional women who are identified by the one-step
approach have an increased frequency of maternal and/or perinatal morbidities.
• There should be evidence that these morbidities can be decreased by intervention.

• There should be evidence that the benefits of the decrease in morbidities outweigh the harms incurred (including maternal, perinatal, and societal).

There is good evidence that increasing glycemic levels during pregnancy are associated with greater maternal and perinatal morbidities. There is no single cutoff below which these associations are absent. These associations have been best demonstrated for the outcomes of shoulder dystocia, cesarean delivery, macrosomia, large-for-gestational-age birth weight, neonatal adiposity, neonatal hypoglycemia, and elevated umbilical cord blood C-peptide. It is not as clear whether associations exist for other important outcomes such as brachial plexus palsy, perinatal mortality, childhood obesity, or subsequent maternal metabolic complications.

There also is evidence that treatment of women with GDM—diagnosed either by the one-step or two-step approach—may improve some outcomes. Outcomes that have been improved with treatment include the frequencies of macrosomia, large-for-gestational-age birth weight, shoulder dystocia, and hypertensive disease of pregnancy. Despite improvements in these intermediate outcomes, the frequencies of composite neonatal morbidity and cesarean delivery have not been consistently improved with treatment. Long-term outcomes for mothers and their offspring have not been improved in the few studies that have been performed.

The one-step approach, as proposed by the IADPSG, is anticipated to increase the frequency of the diagnosis of GDM by two- to threefold, to a prevalence of approximately 15 percent to
20 percent. There are several concerns regarding the diagnosis of GDM in these additional women. It is not well understood whether they will benefit from treatment, and if so, to what extent. Moreover, the care of these women will generate additional direct and indirect health care costs. Such costs include increased utilization of registered dietitians and diabetes educators, prenatal care visits, and fetal assessments with modalities such as ultrasound and prenatal testing. There is also evidence in some studies that the labeling of these women may have unintended consequences, such as an increase in cesarean delivery and more intensive newborn assessments. In addition, increased patient costs, life disruptions, and psychosocial burdens have been identified. Currently available studies do not provide clear evidence that a one-step approach is cost-effective in comparison with the current two-step approach.

Based on the above considerations, the panel believes that there are benefits from standardization within the United States and between the United States and the world with regard to the diagnostic approach to GDM. Nevertheless, at present, the panel believes that there is not sufficient evidence to adopt a one-step approach, such as that proposed by the IADPSG. The panel is particularly concerned about the adoption of new criteria that would increase the prevalence of GDM, and the corresponding costs and interventions, without clear demonstration of improvements in the most clinically important health and patient-centered outcomes. Thus, the panel recommends that the two-step approach be continued. However, given the potential benefits of a one-step approach, resolution of the uncertainties associated with its use would warrant reconsideration of this conclusion.
7. **What are the key research gaps in the diagnostic approach of gestational diabetes mellitus?**

The panel identified the following research needs for GDM diagnosis:

- Develop an approach to diagnosis in the United States that is more consistent with international diagnostic approaches. This requires further research to define the optimal strategy that will improve health in the most cost-effective manner.

- Determine whether the additional women categorized as having diabetes by the IADPSG model, who would be considered normal in the two-step strategy, accrue any benefit from treatment. This question would be best answered by a randomized controlled trial that, ideally, would use clinically important health and patient-centered outcomes.

- Conduct cost-benefit, cost-effectiveness, and cost-utility analyses to more fully understand the resource implications of changing the thresholds for a diagnosis of GDM.

- Given that the different approaches represent different burdens for patients, conduct research to understand patient preferences and the psychological consequences of the diagnosis of GDM.

- Perform well-conducted prospective cohort studies of the “real world” impact of GDM treatment on care utilization and practice patterns.
• Assess lifestyle interventions during pregnancy that may improve maternal and fetal outcomes in women with GDM.

• Assess the long-term impact that a label of GDM may have for future pregnancy planning, future pregnancy management, and future insurability.

• Conduct further study of the long-term metabolic, cardiovascular, developmental, and epigenetic (inherited changes in phenotype [appearance] caused by mechanisms other than changes in DNA) impact on offspring whose mothers have been treated for GDM.

• Assess interventions to decrease the subsequent risk of the occurrence of metabolic syndrome, diabetes, and cardiovascular disease in women with GDM.

A single standard for screening and diagnostic thresholds for GDM should be established by professional organizations.
Consensus Development Panel

James Peter VanDorsten, M.D.
Panel and Conference Chairperson
Lawrence L. Hester, Jr. Professor
Division of Maternal-Fetal Medicine
Department of Obstetrics and Gynecology
Medical University of South Carolina
Charleston, South Carolina

William C. Dodson, M.D., FACOG
Chief
Division of Reproductive Endocrinology and Infertility
Milton S. Hershey Medical Center
Professor
Department of Obstetrics and Gynecology
Penn State College of Medicine
Hershey, Pennsylvania

Mark A. Espeland, Ph.D., FASA, FSCT
Professor of Public Health Sciences
Department of Biostatistical Sciences
Division of Public Health Sciences
Wake Forest School of Medicine
Winston-Salem, North Carolina

William A. Grobman, M.D., M.B.A.
Professor and Vice-Chair
Department of Obstetrics and Gynecology
Northwestern University
Feinberg School of Medicine
Chicago, Illinois

Jeanne Marie Guise, M.D., M.P.H.
Director
Building Interdisciplinary Research Careers in Women’s Health (BIRCWH) and Mentored Clinical Scientists Comparative Effectiveness Development K12 Programs
Oregon Institute for Patient-Centered Comparative Effectiveness Co-Director
Oregon Health & Science University Simulation Associate Director
Scientific Resource Center for Evidence-based Practice Center and Developing Evidence To Inform Decisions About Effectiveness Program
Community Practice and Research for the Oregon Clinical and Translational Research Institute
Professor
Departments of Obstetrics and Gynecology, Medical Informatics and Clinical Epidemiology, and Public Health and Preventive Medicine
Oregon Health & Science University Portland, Oregon

Brian M. Mercer, M.D.
Professor and Chairman
Reproductive Biology
Case Western Reserve University–MetroHealth Campus
Chairman
Department of Obstetrics and Gynecology
MetroHealth Medical Center
Cleveland, Ohio

Howard L. Minkoff, M.D., FACOG
Chairman
Department of Obstetrics and Gynecology
Maimonides Medical Center
Professor of Obstetrics and Gynecology
State University of New York Downstate Medical Center
Brooklyn, New York

20
Brenda Poindexter, M.D., M.S., FAAP  
Professor of Clinical Pediatrics  
Department of Pediatrics  
Director of Clinical Research  
Section of Neonatal-Perinatal Medicine  
Indiana University School of Medicine  
Riley Hospital for Children at Indiana University Health  
Indianapolis, Indiana

Lisa A. Prosser, Ph.D.  
Associate Professor  
Department of Pediatrics and Communicable Diseases  
Department of Health Management and Policy Director  
Program in Comparative Effectiveness, Decision Science, and Child Health  
CHEAR Unit, General Pediatrics  
University of Michigan  
Ann Arbor, Michigan

George F. Sawaya, M.D.  
Professor  
Obstetrics, Gynecology, and Reproductive Sciences and Epidemiology and Biostatistics  
The University of California, San Francisco  
San Francisco, California

James R. Scott, M.D.  
Professor and Chair Emeritus  
Department of Obstetrics and Gynecology  
Editor-in-Chief  
Obstetrics and Gynecology  
The University of Utah School of Medicine  
Salt Lake City, Utah

Robert M. Silver, M.D.  
Professor  
Department of Obstetrics and Gynecology  
Chief  
Division of Maternal-Fetal Medicine  
Medical Director  
Department of Labor and Delivery  
The University of Utah Health Sciences Center  
Salt Lake City, Utah

Lisa Smith, M.A.  
Public Representative  
American Diabetes Association  
Tulsa, Oklahoma

Alyce Thomas, R.D.  
Perinatal Nutrition Consultant  
Department of Obstetrics and Gynecology  
St. Joseph’s Regional Medical Center  
Paterson, New Jersey

Alan T.N. Tita, M.D., Ph.D.  
Associate Professor  
Department of Obstetrics and Gynecology  
Division of Maternal-Fetal Medicine and Center for Women’s Reproductive Health  
The University of Alabama at Birmingham  
Birmingham, Alabama
Speakers

William H. Barth, Jr., M.D.
Chief
Division of Maternal Fetal Medicine
Obstetrics and Gynecology Service
Massachusetts General Hospital
Associate Professor of Obstetrics, Gynecology
and Reproductive Biology
Harvard Medical School
Boston, Massachusetts

William M. Callaghan, M.D., M.P.H.
Chief
Maternal and Infant Health Branch
Division of Reproductive Health
National Center for Chronic Disease Prevention
and Health Promotion
Centers for Disease Control and Prevention
Atlanta, Georgia

Brian M. Casey, M.D.
Gillette Professorship
Obstetrics and Gynecology
The University of Texas Southwestern Medical Center
Dallas, Texas

Patrick M. Catalano, M.D.
Professor
Reproductive Biology
Director
Center for Reproductive Health
Department of Obstetrics and Gynecology
MetroHealth Medical Center
Case Western Reserve University
Cleveland, Ohio

Aaron B. Caughey, M.D., Ph.D., M.P.P., M.P.H.
Professor and Chair
Department of Obstetrics and Gynecology
Oregon Health & Science University
Portland, Oregon

Ilana R. Azulay Chertok, Ph.D., M.S.N., R.N., IBCLC
Associate Professor
West Virginia University School of Nursing
Morgantown, West Virginia

Donald R. Coustan, M.D.
Professor of Obstetrics and Gynecology
Warren Alpert Medical School
Brown University
Division of Maternal-Fetal Medicine
Women & Infants Hospital of Rhode Island
Providence, Rhode Island

Timothy Cundy, M.D.
Professor of Medicine
Faculty of Medical and Health Sciences
The University of Auckland
Auckland
New Zealand

Lois E. Donovan, M.D., FRCPC
Clinical Associate Professor and Medical Director
Diabetes in Pregnancy
Division of Endocrinology and Metabolism
Department of Obstetrics and Gynecology
University of Calgary
Alberta Health Services
Calgary, Alberta
Canada

Matthew W. Gillman, M.D., S.M.
Director
Obesity Prevention Program
Professor
Department of Population Medicine
Harvard Medical School
Harvard Pilgrim Health Care Institute
Boston, Massachusetts
Alan E. Guttmacher, M.D.
Director
Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Institutes of Health
Bethesda, Maryland

Lisa Hartling, Ph.D.
Assistant Professor
Department of Pediatrics
Director
University of Alberta Evidence-based Practice Centre
Alberta Research Centre for Health Evidence
University of Alberta
Edmonton, Alberta
Canada

Mark B. Landon, M.D.
Richard L. Meiling Professor and Chair
Department of Obstetrics and Gynecology
The Ohio State University College of Medicine and Wexner Medical Center
Columbus, Ohio

Boyd E. Metzger, M.D.
Emeritus Professor
Department of Medicine
Division of Endocrinology, Metabolism and Molecular Medicine
Northwestern University
Feinberg School of Medicine
Chicago, Illinois

David M. Murray, Ph.D.
Associate Director for Prevention and Director
Office of Disease Prevention
National Institutes of Health
Bethesda, Maryland

Wanda Nicholson, M.D., M.P.H., M.B.A.
Director
Diabetes and Obesity Core
Center for Women’s Health Research
Associate Professor
Department of Obstetrics and Gynecology
The University of North Carolina School of Medicine
Chapel Hill, North Carolina

David J. Pettitt, M.D.
Senior Scientist
Sansum Diabetes Research Institute
Santa Barbara, California

Edmond A. Ryan, M.D.
Professor
Department of Medicine
Division of Endocrinology
University of Alberta
Edmonton, Alberta
Canada

Catherine Y. Spong, M.D.
Associate Director
Extramural Programs
Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Institutes of Health
Bethesda, Maryland
Planning Committee

Catherine Y. Spong, M.D.
Chief
Pregnancy and Perinatology Branch
Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Institutes of Health
Bethesda, Maryland

William H. Barth, Jr., M.D.
Chief
Division of Maternal Fetal Medicine
Obstetrics and Gynecology Service
Massachusetts General Hospital
Boston, Massachusetts

Lisa Begg, Dr.P.H., R.N.
Director of Research Programs
Office of Research on Women’s Health
Office of the Director
National Institutes of Health
Bethesda, Maryland

Patrick M. Catalano, M.D.
Professor
Reproductive Biology
Director
Center for Reproductive Health
MetroHealth Medical Center/Case Western Reserve University
Cleveland, Ohio

Christine S. Chang, M.D., M.P.H.
Medical Officer
Center for Outcomes and Evidence
Agency for Healthcare Research and Quality
Rockville, Maryland

Donald R. Coustan, M.D.
Professor of Obstetrics and Gynecology
Brown University Warren Alpert Medical School
Women & Infants Hospital of Rhode Island
Providence, Rhode Island

Patricia Dietz, Dr.P.H.
Team Leader
Research and Evaluation Team
Applied Sciences Branch
Division of Reproductive Health
Centers for Disease Control and Prevention
Atlanta, Georgia

Judith E. Fradkin, M.D.
Director
Division of Diabetes, Endocrinology, and Metabolic Disease
National Institute of Diabetes and Digestive and Kidney Diseases
National Institutes of Health
Bethesda, Maryland

Gilman Drew Grave, M.D.
Acting Director
Endocrinology, Nutrition and Growth Branch
Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Institutes of Health
Bethesda, Maryland

Stephen C. Groft, Pharm.D.
Acting Director
Office of Medical Applications of Research
Office of the Director
National Institutes of Health
Bethesda, Maryland

Alan E. Guttmacher, M.D.
Director
Office of the Director
Eunice Kennedy Shriver National Institute of Child Health and Human Development
National Institutes of Health
Bethesda, Maryland

Suchitra Iyer, Ph.D.
Health Scientist Administrator
Agency for Healthcare Research and Quality
Rockville, Maryland

Planning Committee members provided their input at a meeting held April 3–5, 2011. The information provided here was accurate at the time of that meeting.
Planning Committee members provided their input at a meeting held April 3–5, 2011. The information provided here was accurate at the time of that meeting.
Planning Committee members provided their input at a meeting held April 3–5, 2011. The information provided here was accurate at the time of that meeting.
Conference Sponsors

Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH
Office of Disease Prevention, NIH

Conference Cosponsors

National Institute of Diabetes and Digestive and Kidney Diseases
Office of Research on Women’s Health
National Institute of Nursing Research

Conference Partners

Centers for Disease Control and Prevention
Health Resources and Services Administration