

Indian Health Diabetes Best Practice Diabetes and Pregnancy

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Best Practice Guidelines

What is diabetes and pregnancy?

Diabetes and pregnancy refers to a pregnancy complicated by hyperglycemia (high blood glucose). This includes pregnancies among:

- women with pre-gestational diabetes (exists before pregnancy) or pre-diabetes
- women at risk for diabetes during pregnancy, and
- women with gestational diabetes mellitus (GDM) during pregnancy.

Diabetes and pregnancy is of great concern, due to risks that exist before a woman becomes pregnant, and because of potential perinatal and long-term adverse effects to the well-being of mother and infant.

Why is diabetes and pregnancy important?

During the last two generations, the prevalence of diabetes during pregnancy has increased significantly in American Indian and Alaska Native (AI/AN) women. The burden of diabetes in women is unique in that the disease affects both mothers and their unborn children during pregnancy, at delivery, and throughout the life span of both individuals (IHS *Standards of Care for Adults with Type 2 Diabetes*, 2009)

Managing blood glucose to target levels—before a woman becomes pregnant and throughout her pregnancy—is essential to reduce the risk of birth defects and to ensure a healthy pregnancy. Women with diabetes and good glycemic control can look forward to pregnancy outcomes that are comparable to the general population (IHS *Standards of Care for Adults with Type 2 Diabetes*, 2009).

Potential health benefits or health impacts of this best practice include:

- Prevention and early intervention before a woman becomes pregnant, and earlier initiation of perinatal and prenatal care, can decrease:
 - risk during pregnancy
 - perinatal mortality and morbidity associated with hyperglycemia, and
 - the number of caesarean deliveries.
- More active use of pregnancy planning and contraception can help ensure improved health status before a woman gets pregnant.
- Appropriate screening, diagnosis, and active management of blood glucose before and during pregnancy can decrease adverse perinatal outcomes associated with hyperglycemia and excessive weight gain during pregnancy.

- Improved blood glucose control, as measured by the A1c test at initiation of pregnancy, can lead to a decrease in fetal loss and anomaly.
- Gestational diabetes can be prevented in some women who implement lifestyle improvement and achieve weight loss.

There are no potential health harms associated with implementing this best practice.

Key Recommendations

Key Clinical Recommendations
1. Develop a diabetes and pregnancy team of professionals who can provide education, case management, medical nutrition therapy (MNT), and medical management.
2. Maintain a case management system and active registry for women with pregnancies complicated by diabetes and their infants. Conduct clinical outcome and program evaluations for these cases.
3. Identify women at risk for pregnancies complicated by diabetes, and provide contraception information, preconception counseling, weight management, and medical management.
4. Screen high-risk women who do not have diabetes for gestational diabetes (GDM) at the onset of pregnancy.
5. Identify, assess health status, and refer women with pre-gestational diabetes who become pregnant.
6. Provide perinatal care for women with pre-gestational diabetes.
7. Provide perinatal care for women with gestational diabetes Class A-1.
8. Provide perinatal care for women with gestational diabetes Class A-2.
9. Provide postpartum counseling and assessment for all women with pregnancies complicated by diabetes.

Scope and Purpose

This best practice provides guidelines for programs that seek to improve screening for and care of women at risk for pregnancies complicated by diabetes. The target population is women of reproductive age who are at risk for or are experiencing a pregnancy complicated by diabetes, including:

- women who are planning a pregnancy or are likely to become pregnant
- women who currently have diabetes or pre-diabetes
- women with a history of or who currently have gestational diabetes (GDM), and
- women who are currently pregnant.

This best practice addresses the following questions:

How can health care systems at varying levels of services develop a multi-disciplinary diabetes in pregnancy program?

How can women at risk for a pregnancy complicated by diabetes be identified?

What pre-pregnancy services can decrease the incidence and risk of complications for these women and their infants?

How are women screened for and diagnosed with gestational diabetes?

How are health status assessments and medical management interventions developed and implemented for women with pre-gestational diabetes?

When pregnancies are complicated by diabetes, what services can health care organizations and their programs implement to provide active, multi-disciplinary perinatal management for these women and their infants?

How can health care systems provide postpartum counseling and assessment, screening for pre-diabetes and type 2 diabetes, and referral to medical and lifestyle management services for women with pregnancies complicated by diabetes?

What are the benefits, challenges, and processes required for maintaining an active registry and conducting clinical outcome and program evaluations for women with pregnancies complicated by diabetes and their infants?

What can health care systems, communities, and leadership partners do to raise awareness of diabetes in pregnancy? How can they raise awareness of preconception, perinatal, and postpartum prevention and medical services?

The best practice objectives* are to:

- Identify, monitor, refer, educate, and counsel women at risk for developing diabetes, including women with a history of gestational diabetes.
- Identify, monitor, refer, and educate women of reproductive age with pre-gestational type 1 or type 2 diabetes.
- Conduct preconception counseling and promote contraception.
- Provide care for women with pregnancies complicated by diabetes during the perinatal cycle.
- Address actions that organizations and communities can take to raise awareness of diabetes in pregnancy and to address the health burdens involved.

*Measures of progress toward these objectives need to occur before the intervention and at designated times thereafter.

The intended users of the best practice for diabetes and pregnancy are:

- health care providers
- primary health care teams
- leaders of health care organizations, and
- community stakeholders.

There are three fundamental questions to address as you plan and implement your best practice. These questions are:

- 1. What are you trying to accomplish by implementing this best practice?**
- 2. How will you know if what you do makes things better?**
- 3. What can you do to make things better?**

See Appendix A for sample answers to these questions specifically related to diabetes and pregnancy.

Monitoring Progress and Outcomes

A registry should be in place to track the care and outcomes for women at risk for a pregnancy complicated by diabetes and their infants. The following measures can be used to monitor the effects of implementing the best practice:

- percentage of target population that has been identified, documented, and reached with the best practices you have implemented, using available data systems such as Q-man queries, registries, audits, etc.
- percentage of staff caring for pregnant women with diabetes and pre-diabetes who have received up-to-date training and have access to the latest diabetes technology and clinical information
- documentation of multi-disciplinary use of standards of care management policies for women of reproductive age with diabetes and for women with pregnancies complicated by diabetes
- number of preconception and contraceptive counseling visits that have occurred in the target population
- percentage of women with diabetes whose pregnancies were identified early and who achieved lower A1c levels (below seven percent) throughout pregnancy
- percentage of women of reproductive age with diabetes who achieved lower A1c levels (below seven percent) before becoming pregnant
- percentage of women who received prenatal care and screening for gestational diabetes (GDM) soon after positive pregnancy test
- percentage of women who received follow-up testing for gestational diabetes (GDM) soon after receiving an elevated score on a gestational diabetes screening test
- percentage of women with gestational diabetes and carbohydrate intolerance who received postpartum screening for pre-diabetes and diabetes, and
- percentage of women with a history of gestational diabetes and carbohydrate intolerance and their infants who are accurately identified on their Resource and Patient Management System (RPMS)/electronic health record (EHR) problem list.

Key Measures

Key Measures for Monitoring Progress and Outcomes
<p>The following measures are of primary importance:</p> <ol style="list-style-type: none">1. A registry is in place that is used to track patients, their needs, and their clinical outcomes.2. Percentage of women of childbearing age with pre-gestational diabetes or pre-diabetes and women with diagnosed gestational diabetes mellitus (GDM) who have received documented diabetes and pregnancy education in the past twelve months.

Clinical Recommendations

1. Develop a diabetes and pregnancy team of professionals who can provide education, case management, medical nutrition therapy (MNT), and medical management.

Why?

Pregnant women with diabetes, or those at risk for a pregnancy complicated by diabetes, are best monitored and managed by highly skilled health care professionals who have received up-to-date training and have access to the latest diabetes technology and information. A health system that develops a multi-disciplinary service to meet current standards of care is most likely to obtain positive outcomes. Treatment of diabetes during pregnancy has been associated with a reduction in poor maternal and infant outcomes (Crowther et al., 2005; Mello et al., 2000).

How?

A. Develop a diabetes and pregnancy team:

- 1) Establish a diabetes and pregnancy team that meets on a regular basis and assists in determining how the diabetes and pregnancy best practice fits in the organizational infrastructure.
- 2) On the team and/or in the role of program planning, include a medical social worker, behavioral health professional, public health nurse, pharmacist, and managers from laboratory and/or wellness center.

- 3) Identify team member roles and develop written position descriptions and defined performance standards including patient education, appropriate referrals, and scheduling responsibilities.
- 4) Designate a case manager/program coordinator—usually a nurse educator, registered nurse, medical coordinator, or registered dietitian. The case manager will arrange and monitor referrals, provide continuity of care during and beyond the pregnancy, design case management interventions, create and maintain a registry, track outcomes, and assist with diabetes and pregnancy audits (see Key Clinical Recommendation #2).
- 5) Ensure that communications are ongoing between the case manager, primary care providers, and specialists. Appoint a liaison or an on-call provider for the case manager to contact for discussing patient needs when the primary care provider is not available.
- 6) Create (or adopt existing) scopes of service, standards of care, and specific curricula for diabetes and pregnancy.
- 7) Develop written clinical and non-clinical policies and procedures, including but not limited to: standing orders, practice guidelines, clinical pathways, and standards of care for management and referral of pregnant women with diabetes and women of childbearing age at risk for pregnancy complicated by diabetes.
- 8) Develop referral systems that emphasize ongoing communication among providers and staff.
- 9) As a team, develop clearly defined expectations for clinical outcomes and program goals.
- 10) Identify or establish a resource to refer women who are at risk for a pregnancy complicated by diabetes for medical nutrition therapy (MNT) and physical activity training.
- 11) Develop a team approach that allows for scheduled and unscheduled access to clinical services.
- 12) Develop a specific care plan to be followed by providers and specialists, and develop documentation pathways in the patient's medical chart to ensure continuity of care.
- 13) Use materials from the IHS Integrated Diabetes Education Recognition Program (IDERP) to help develop a diabetes team.

B. Maintain competency of the diabetes and pregnancy team:

- 1) Allocate adequate staff time for clinical and non-clinical duties.
- 2) Provide education and training in motivational interviewing, understanding the social factors surrounding parenting and pregnancy, and identifying social barriers to self-care. Motivational interviewing is an active listening counseling style that aims to change behavior by addressing the patient's difficulties in setting and meeting behavior change goals. (Miller and Rollnick, 1995).
- 3) Maintain current knowledge of guidelines and practice bulletins on preconception care, gestational diabetes (GDM), pre-gestational diabetes, and perinatal diabetes in pregnancy care (see the References section).
- 4) Attend the IHS/ACOG Obstetric, Neonatal, and Gynecological Care Postgraduate Course, and ALSO Course. (ACOG stands for the American College of Obstetricians and Gynecologists)
- 5) Attend professional conferences or training specific to diabetes and pregnancy (e.g., Sweet Success Annual Research Conference and Regional Trainings.)
- 6) Include registered dietitians, pharmacists, medical social workers, and behavioral health staff in training appropriate to their fields.

C. Design a delivery system for diabetes and pregnancy:

- 1) Conduct preconception (and inter-conception) monitoring of blood glucose levels.
- 2) Conduct universal screening for diabetes in pregnancy for all American Indian and Alaska Native women with the first prenatal laboratory panel.
- 3) Provide intensive diabetes management to women at risk, including laboratory studies and comprehensive education focused on clinical, behavioral, and self care measures.
- 4) Provide prenatal and perinatal care that meets current standards of care.
- 5) Accommodate same-day ("walk-in") appointments.
- 6) Offer flexible scheduling and timely lab services for pregnant women.
- 7) Offer care in family-friendly environments.
- 8) Offer enrollment assistance with Medicaid or other third-party payer assistance.
- 9) Provide or refer women to necessary obstetrics and neonatal services.
- 10) Address and manage pregnant women with diagnosed or anticipated complications with referrals, as necessary.

- 11) Provide or refer women at risk for complete diagnostic and management services, including advanced diagnostic imaging capabilities.
- 12) Refer at risk women for advanced perinatal services.
- 13) Accept referrals from other sites when providing higher level of care at your facility.
- 14) When necessary, establish a rural clinic with intermittent provider services and daily health education services.
- 15) Arrange for a public health nurse to follow-up in the clinic or in the home.
- 16) Arrange preventive services through individual education or group education with community health representatives.

2. Maintain a case management system and active registry for women with pregnancies complicated by diabetes and their infants. Conduct clinical outcome and program evaluations for these cases.

Why?

Case management is the strategy of assigning a health care professional to be case manager, in order to serve as a guide for the patient and as a facilitator for the care process. In a diabetes and pregnancy program, the case manager is generally a non-physician such as a nurse educator, nurse, or dietitian. Case management duties also can include coordinating patient data, managing the data aspects of the program over time, and maintaining registries and tracking systems.

The goal of case management is to achieve specific outcomes such as improvement in patient satisfaction, resource utilization, and efficient coordination of services. Case management has been well researched, carefully analyzed, and applied in many settings, including the Indian health system (the term “Indian health system” includes the IHS, Tribal, and Urban Indian health organizations). Patients who received case management have experienced improvement in their level of blood glucose control, satisfaction with services, understanding of treatment goals, resource use, continuity of care, and efficiency and coordination of services (Norris et al., 2002; Wilson et al., 2005).

How?

A. Develop a case management position and appoint staff:

- 1) A current staff member or a new hire may be designated as case manager, or in larger facilities, there may be a position for diabetes in pregnancy case manager. Adequate clinical time apart from patient care duties must be allocated for this work.

- 2) Use peer leaders and program champions who can support case managers.
 - 3) Ensure providers are educated about case management and supportive of the approach.
 - 4) Identify processes for involving physicians in case management.
 - 5) Establish standing orders, practice guidelines, and clinical pathways that are demonstrable and agreed-upon.
- B. Identify the population of women at risk for complications of diabetes and pregnancy and target specific subsets who can benefit from case management, including:
- 1) women with pre-diabetes, poorly controlled diabetes, a history of GDM, obesity, polycystic ovary syndrome (PCOS), or other diabetes risk factors
 - 2) women with a high utilization of services as determined by number of visits or health care costs—for example, admissions with elevated blood glucose/A1c, history of macrosomic infants, use of neo-natal care unit (NICU) after a pregnancy complicated by diabetes, etc., and
 - 3) women in the subsets listed above who do not use contraception, increasing the risk of a pregnancy complicated by diabetes.
- C. Target patients more effectively through use of registries, RPMS/EHR, Diabetes Management Summary, diabetes audit information, and other available data to perform the five essential case management functions:
- 1) Identify, conduct outreach, and recruit women at risk.
 - 2) Assess women at risk in the context of their readiness for care, and also in the context of the health system's readiness for care.
 - 3) Work collaboratively to solve problems and identify a range of solutions in the development of an individual care plan.
 - 4) Track and review exposure to and effectiveness of patient education, and monitor outcomes.
- D. Track provider referrals, women's use of outside referral services, and assist in provider access to reportage of services provided.
- E. Perform a comprehensive assessment of the needs of women at risk:
- Assess the women's readiness to make changes in their diabetes management.

- F. Combine case management with interventions including education, support, home visits, telephone outreach, telemedicine, and patient reminders:
- 1) Monitor individuals or populations at risk using evidence-based features of case management to monitor, evaluate, and improve outcomes.
 - 2) Track interventions and measure their effectiveness at the individual and population levels.
 - 3) Assist in the design of interventions that are more acceptable to women at risk and result in improved outcomes.
 - 4) Use evaluation findings to provide feedback to the individual, health care system providers, and community, to inform each of identified gaps and unmet needs.
- G. Develop and maintain an active registry for women with pregnancies complicated by diabetes and their infants, and conduct clinical outcome and program evaluations:
- 1) Use RPMS, EHR systems or other databases.
 - 2) Use RPMS and/or EHR health maintenance reminders.
 - 3) Establish incidence and prevalence of gestational diabetes using White's classification, and establish the incidence and prevalence of pregnant women with pre-gestational diabetes or pre-diabetes.
 - 4) Consider measuring the following:
 - clinical outcome markers such as A1c, co-morbidities, mode of delivery, and birth weight
 - physical activity levels
 - patient satisfaction
 - health care service utilization
 - outside referrals
 - hospital admissions
 - patient care and program costs
 - calculated rates of obesity, diabetes, maternal weight pre- and post-pregnancy
 - offspring co-morbidities
 - postpartum blood glucose, and
 - breastfeeding initiation and duration.
 - 5) Conduct chart reviews and continuous quality improvement (CQI) with members of the multi-disciplinary care team.

- 6) Document and track medical nutrition therapy (MNT), physical activity counseling, and other lifestyle interventions.
- 7) Assure that prenatal and postpartum pap smears and mammograms are documented in the RPMS Women's Health Package.
- 8) Track co-morbidities using key ICD-9 data from maternal records such as high blood pressure, preeclampsia, and delivery complications.
- 9) Include the history of gestational diabetes and insulin management for all women with diabetes during pregnancy on the health summary/EHR problem list.
- 10) Document and track infant records and outcomes, such as miscarriages and stillbirths, birth weights, anomalies, and gestational ages at birth.
- 11) Follow the offspring of women with pre-gestational and gestational diabetes during the first year of life, and implement a plan to track them for long-term follow-up.
- 12) Utilize tracked data to analyze and evaluate clinical outcomes and program progress; report and publish the outcomes.
- 13) Enhance surveillance through linkages with Tribal epidemiology centers.

H. Establish perinatal fields in diabetes audits:

- 1) Develop a perinatal section in the diabetes audit that includes preconception counseling, family planning, contraception, folic acid supplementation, infant outcomes, alcohol use, pregnancy complications, co-morbidities, breastfeeding, postpartum exam, and assessment of blood glucose. The RPMS Women's Health Package includes diagnosis of diabetes, the most recent A1c level, immunizations, and other important clinical markers, and can populate the diabetes audit for both prenatal and non-pregnant patients.
- 2) Create and maintain a diabetes in pregnancy registry capable of tracking process measures, listing them on the Health Summary, and generating reminders. Consider developing and maintaining registries that include:
 - women of childbearing age at risk for diabetes in pregnancy
 - women with pre-gestational diabetes or pre-diabetes
 - women with gestational diabetes
 - offspring of mothers who have had diabetes during their pregnancy
 - sub-registries of high-risk women
 - women with carbohydrate intolerance in pregnancy
 - women with one abnormal value on an oral glucose tolerance test (OGTT)
 - diagnosis of first trimester gestational diabetes

- 3) Use registries to create templates for tracking clinical and demographic data available in RPMS by using Q-man, VGEN, and PGEN.
- 4) Use a registry to run a gestational component in the diabetes audit.

3. Identify women at risk for pregnancies complicated by diabetes, and provide contraception information, preconception counseling, weight management, and medical management.

Why?

All American Indian and Alaska Native women of childbearing age are at increased risk for developing diabetes during pregnancy. Education about pregnancy, the importance of family planning, and the risks of diabetes is essential to prevent miscarriages and birth defects (IHS Standards of Care for Adults with Type 2 Diabetes, 2009).

Overweight and obesity are major contributing factors to adverse outcome. The risk of gestational diabetes is increased twofold in overweight compared with normal-weight women, and it is increased eightfold in the severely obese (BMI > 40) (American Dietetic Association, 2009). Infants born to obese mothers have a higher prevalence of congenital anomalies than do offspring of normal-weight women, suggesting that maternal adiposity alters development in the sensitive embryonic period (American Dietetic Association (2009).

Given the detrimental influence of maternal overweight and obesity on reproductive and pregnancy outcomes for the mother and child, overweight and obese women of reproductive age should receive counseling on the roles of diet and physical activity in reproductive health prior to pregnancy, during pregnancy, and in the inter-conceptual period, to prevent adverse outcomes (American Dietetic Association, 2009). Counseling about possible complications associated with obesity and how to prevent those problems should be available to all women of reproductive age.

How?

- A. Identify women at risk for developing diabetes during pregnancy, including those who:
 - 1) are over the age of 25
 - 2) have a previous history of gestational diabetes
 - 3) have delivered an infant weighing greater than 4,000 grams at birth
 - 4) have a first-degree family relative with a history of diabetes
 - 5) have a body mass index (BMI) greater than 25 kg/m²
 - 6) have a history of previous stillbirth, habitual abortion, or congenital anomaly
 - 7) have irregular menstruation
 - 8) have *Acanthosis nigricans*, or
 - 9) have polycystic ovary syndrome (PCOS).

B. Provide contraception information and preconception counseling to women at risk. Set goals and focus content of preconception education to reduce the risk of adverse outcomes for both the mother and the offspring. Cover the following topics:

- 1) family planning methods and preparing for conception
- 2) healthy lifestyle choices, including:
 - making healthy food choices
 - increasing physical activity
 - maintaining a healthy weight
 - value of folic acid supplements, and
 - avoiding tobacco, alcohol, recreational drugs, and caffeine.
- 3) relationship between diabetes and pregnancy
- 4) resources (e.g., brochures and videos) for women at risk, for example:
 - The National Institute of Child Health and Development offers a free brochure titled *Am I at Risk for Gestational Diabetes?* as well as other educational brochures.
<http://www.nichd.nih.gov/publications/pubs/upload/GestationalDiabetesBrochure.pdf>.
 - The American Diabetes Association (ADA) provides numerous resource materials <http://www.diabetes.org/gestational-diabetes.jsp>.
 - The National Diabetes Education Program's (NDEP's) publication titled *It's Never Too Early to Prevent Diabetes. A Lifetime of Small Steps for a Healthy Family* can help American Indian and Alaska Native women with a history of gestational diabetes take steps to prevent or delay type 2 diabetes, as well as help their children lower their risk for the disease. The following educational materials can be ordered from the NDEP website at <http://www.ndep.nih.gov/> or by calling 1-800-438-5383:
 - ◆ *It's Never Too Early to Prevent Diabetes. A Lifetime of Small Steps for a Healthy Family* – A tip sheet for women who have had gestational diabetes
 - ◆ *Lower Your Risk for Type 2 Diabetes* -- A tip sheet for children who are at risk for type 2 diabetes, and

- ◆ *Your GAME PLAN to Prevent Type 2 Diabetes* – A booklet for adults to help women and their families make healthy food choices and be more physically active to prevent or delay type 2 diabetes.
 - March of Dimes. A booklet for planning for a healthy pregnancy called *The Coming of the Blessing - A Pathway to a Healthy Pregnancy*. 2009. Call 1-800-367-6630.
- C. Provide nutrition counseling to women at risk that is consistent with American Diabetes Association and American Dietetic Association recommendations. Counseling should be provided by a registered dietitian, when possible. Counseling content should include:
- 1) preconception nutrition management (ADA, 2003)
 - 2) strategies to reach and maintain a healthy weight, and
 - 3) individualized medical nutrition therapy (MNT) based on the woman’s weight and height, including:
 - successful weight loss practices (see IHS publication *Indian Health Diabetes Best Practice Adult Weight Management and Diabetes*)
 - healthful eating—both in the types of food and quantities (portion sizes)
 - folic acid supplement use, and
 - moderate to vigorous physical activity on most days of the week .

4. Screen high-risk women who do not have diabetes for gestational diabetes (GDM) at the onset of pregnancy.

Why?

All American Indian and Alaska Native women are at increased risk for developing diabetes during pregnancy. All American Indian and Alaska Native women determined to be at high risk should be screened at the first prenatal visit (IHS/ACOG Task Force on Diabetes in Pregnancy in American Indians and Alaska Natives, 1993).

There is evidence that one abnormal value (OAV) on the oral glucose tolerance test (also referred to as CHO Intolerance of pregnancy or IGT of pregnancy), when not treated, is associated with adverse maternal and fetal outcomes. (Sweet Success Update, 2009; DiCanni, *Diabetes Care*, 2007; Jovanovich, *Diabetes Care*, 1999). Some settings manage OAV as an abnormal glucose tolerance, complementing the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) findings that adverse outcomes increase as glucose levels increase, even at levels previously felt to be normal (HAPO, 2008). In 2009, it is expected that the translation of HAPO research findings into clinical recommendations by the authors is expected to change the diagnostic test process and values (Hippo, *JEJ*, 2008).

How?

A. Screen women for diabetes using a one-step blood glucose test (50-gram, one-hour oral glucose tolerance test [OGTT]) as outlined in the IHS *Standards of Care for Adults with Type 2 Diabetes*:

- 1) http://www.ihs.gov/MedicalPrograms/Diabetes/HomeDocs/Tools/ClinicalGuidelines/Diabetes_Standards_Care_508Rev2.pdf
- 2) http://care.diabetesjournals.org/cgi/content/full/26/suppl_1/s103

B. Use the following screening procedures:

- 1) The most commonly used screening test is the glucose challenge test (GCT), a challenge 50-gram glucose tolerance beverage, followed in one hour by drawing a blood sample. Fasting preparation is not required, but it may be recommended that the woman not consume food or drink (other than water) in the hour before the test.
- 2) In most settings, an abnormal GCT screening result is followed by a fasting oral glucose tolerance test (OGTT) with 100 grams of glucose tolerance beverage, followed by drawing a blood sample every hour for three hours. If possible, the three-hour OGTT should be performed within one week of an abnormal GCT.
- 3) If the initial screening does not indicate abnormal glucose tolerance, re-screen at 24–28 weeks of gestation.
- 4) Refer to appropriate health care providers with little delay, when there is a positive diagnosis of gestational diabetes.

5. Identify, assess health status, and refer women with pre-gestational diabetes who become pregnant.

Why?

Pregnancy in women with pre-gestational diabetes is associated with an increase in risk to both the fetus and the mother. Management of diabetes in pregnancy offers a unique opportunity to positively affect the health of both (IHS *Standards of Care for Adults with Type 2 Diabetes*, 2009).

How?

A. Create and maintain a registry of women of childbearing age with type 1 or type 2 diabetes (see Clinical Recommendation #2).

- B. Assess the health status of women of childbearing age with diabetes:
- 1) Obtain medical and obstetrical history before planning for pregnancy.
 - 2) Conduct a comprehensive physical exam.
 - 3) Review the patient's current management plan and develop and implement a comprehensive treatment plan.
 - 4) Conduct an individual education evaluation session with a diabetes educator and registered dietitian.
- C. Refer patients to appropriate health care providers and resources based on assessment of health status (e.g., see American Diabetes Association information at <http://www.diabetes.org/gestational-diabetes.jsp>).

See Appendix B for a detailed description of identification, health status assessment, and referral.

6. Provide perinatal care for pregnant women with pre-gestational diabetes.

Why?

Critical evidence reveals that identifying and treating gestational diabetes can substantially reduce the risk of adverse perinatal outcomes. (Crowther et al., NEJM June 16, 2005). Adverse outcomes increase as glucose levels increase, even at levels previously felt to be normal (HAPO, 2008).

How?

- A. Review medical and obstetrical history and conduct a physical exam (see Clinical Recommendation #5).
- B. Review medical conditions and change or adjust medications.
- C. Review the patient's current management plan and develop and implement a comprehensive treatment plan.
- D. Provide medical nutrition therapy (MNT).
- E. Promote physical activity.

See Appendix B for detailed description of how to provide perinatal care for women with pre-gestational diabetes.

7. Provide perinatal care for women with gestational diabetes Class A-1 (managed with diet, exercise) or with one abnormal value on OGTT.

Why?

Diabetes treatment has been associated with a reduction in poor maternal and infant outcomes (ACOG, 2001; Mello et al., 2000). Class A-1 includes women with diet-controlled gestational diabetes that is diagnosed during pregnancy.

How?

- A. Obtain a medical and obstetrical history.
- B. Provide an individual patient education evaluation session with a diabetes educator and a registered dietitian.
- C. Conduct a physical exam, including blood pressure measurement, testing for orthostatic changes, and an oral health exam for periodontal disease and other dental health issues.
- D. Develop and implement a diabetes management plan.

See Appendix B for detailed description of how to provide perinatal care for women with gestational diabetes Class A-1 or with one abnormal value on OGTT.

8. Provide perinatal care for women with gestational diabetes Class A-2 (managed with diet, exercise, and medication).

Why?

Diabetes treatment has been associated with a reduction in poor maternal and infant outcomes (Crowther et al., 2005; ACOG, 2001; Mello et al., 2000). Class A-2 includes women with unsuccessful control of blood glucose levels after two weeks of nutrition counseling.

How?

- A. Review medical and obstetrical history, and conduct a physical exam.
- B. Conduct an individual patient education evaluation session with a diabetes educator and a registered dietitian.
- C. Conduct a physical exam, including blood pressure measurement, testing for orthostatic changes, and an oral health exam for periodontal disease and other dental health issues.

- D. Conduct baseline and follow-up tests and exams.
- E. Develop and implement a diabetes management plan.
- F. Provide multi-disciplinary education, counseling, and self-management support.

See Appendix B for detailed description of how to provide perinatal care for women with gestational diabetes Class A-2.

9. Provide postpartum counseling and assessment for all women with pregnancies complicated by diabetes.

Why?

A retrospective study of Navajo women demonstrated the rapid development of type 2 diabetes in this population and the importance of postpartum screening of women with gestational diabetes for assessment and prevention of diabetes and pre-diabetes. (Steinhart, 1997; Nicholson, Johns Hopkins, 2008)

How?

A. Provide postpartum follow-up for GDM and OAV women:

The ACOG recognizes the value of both the fasting plasma glucose and the OGTT in identifying women with abnormal glucose tolerance after a GDM pregnancy (ACOG, 2001). Using the 75-gram glucose tolerance beverage after drawing a fasting blood sample followed by drawing another blood sample can identify impaired glucose, impaired glucose tolerance (both pre-diabetic conditions that respond to lifestyle change) and type 2 diabetes. This value often is accompanied by an A1c.

- 1) Schedule a medical six-weeks postpartum morning appointment.
- 2) Instruct the woman to present, fasting, for a two-hour OGTT.
- 3) Schedule a subsequent morning appointment with the educator/case manager to review:
 - results of the OGTT and A1c
 - pre-pregnancy, last pregnancy, and current postpartum weights
 - contraceptive choice
 - infant feeding status
 - postpartum nutrition
 - physical activity
 - postpartum educational material, and
 - postpartum plan for weight loss and diabetes prevention.

- B. Refer for MNT and physical activity program, if appropriate.
- C. Offer follow-up counseling with an educator, a dietitian, or a primary provider.
- D. If the woman had pre-gestational diabetes or has been identified as type 2 diabetes postpartum, refer the patient to her primary provider, diabetes clinic, or diabetes program in order to:
 - 1) Review foregoing postpartum services and follow-up on any glycemic medication management the woman is taking.
 - 2) Set non-pregnancy goals for self-monitored blood glucose.
- E. Suggest repeat of OGTT at the cessation of breastfeeding, and with pap and pelvic follow-up appointments.
- F. Inform women of local, Tribal and national efforts to prevent diabetes. For example:
 - 1) The National Diabetes Education Program's (NDEP) *Small Steps. Big Rewards. Prevent Type 2 Diabetes* campaign offers materials that can help women with a history of gestational diabetes take steps to prevent or delay type 2 diabetes and help their children lower their risk for the disease. The following educational materials can be ordered from the NDEP website at <http://www.ndep.nih.gov/> or by calling 1-800-438-5383:
 - 2) *"It's Never Too Early to Prevent Diabetes. A Lifetime of Small Steps for a Healthy Family"*: A tip sheet for women who have had gestational diabetes.
 - 3) *"Lower Your Risk for Type 2 Diabetes"*: A tip sheet for children at risk for type 2 diabetes.
 - 4) *"Your GAME PLAN to Prevent Type 2 Diabetes"*: A booklet for adults to help women and their families make healthy food choices and be more physically active to prevent or delay type 2 diabetes.

Community Recommendations

1. Collaborate and develop partnerships with agencies and community programs that share common diabetes prevention and self-care goals.

Why?

An important element in implementing high quality diabetes and pregnancy care is developing partnerships with and incorporating community resources into program planning and delivery. Community recognition and increased understanding of health risks, early intervention, and benefits of prevention can play an important role in improving the health of women prior to and during at-risk pregnancies.

The following best practice recommendations were adapted from the Chronic Care Model, developed by the MacColl Institute for Healthcare Innovation at the Group Health Cooperative. For more information on the Chronic Care Model visit their website at <http://www.improvingchroniccare.org/>.

How?

- A. Contact local agencies, coalitions, community, Tribal, state and national diabetes programs, women's health programs, nonprofit foundations, federal agencies, and third-party payer organizations to explore potential collaborations.
- B. Acquire knowledge of health behaviors, practices, and beliefs in the community about diabetes in pregnancy.
- C. Conduct an inventory of community nutrition and physical activity resources and programs.
- D. Define methods for contracting for health and specialty care referrals.
- E. Train field health personnel in gestational diabetes mellitus (GDM) assessment and education.
- F. Coordinate between gestational diabetes services and local programs.
- G. Develop and implement community diabetes and pregnancy education in-services training.
- H. Form partnerships with local schools and health education programs.
- I. Obtain evidence of community and/or Tribal support through proclamations and other documentation.

- J. Seek opportunities to participate with community members and interested staff members to work together on local breastfeeding support issues and to educate the community about breastfeeding's role in diabetes prevention.
- K. Provide education on diabetes, obesity prevention, breastfeeding, and diabetes and pregnancy at local health fairs and schools.

2. Develop and implement a community referral system.

Why?

Many women and their families participate in the Women, Infants, and Children program (WIC) and other community services. Coordinating health care and community services can avoid duplication, provide consistent information, and promote appropriate use of community services and health care services by women.

How?

- A. Designate a person/group responsible for ascertaining what services are available in the community.
- B. Develop a mechanism for referral to community organizations such as Healthy Start, WIC, Temporary Aid to Needy Families (TANF), and Head Start, as well as Tribal health education, diabetes, social services, housing, and food assistance programs.
- C. Refer women to WIC at their first prenatal visit and again at the diagnosis of gestational diabetes, anemia, etc.

Organization Recommendations

1. Establish organizational policies that support and provide for improved maternal and child health services.

Why?

Improving the health and well-being of women, infants, children, and families is included in the Healthy People 2010 objectives because it is an important indicator of a community's and a nation's health status and is a predictor of the health of future generations.

How?

- A. Design and implement a customer-focused system to decrease barriers to timely care.

- B. Ensure access to comprehensive, multi-disciplinary education and prenatal services, including a diabetes and pregnancy team that may include a nurse educator, diabetes in pregnancy case manager, a medical nutrition therapy counselor, providers with up-to-date specialty knowledge, and public health nursing.
- C. Include in organizational structure the relationship of the diabetes and pregnancy team/program to other programs with position descriptions, defined performance standards, supervision plans, and performance contracts.
- D. Provide or support the acquisition of resources necessary to support the designated diabetes and pregnancy team/program, including space, budget, equipment, supplies, position descriptions, and an orientation plan.
- E. Promote the adoption of detailed, evidence-based diabetes and pregnancy care guidelines (see References).
- F. Include prevention and treatment of diabetes and pregnancy in the organization's annual goals and objectives.
- G. Include specific diabetes and pregnancy outcome measures in the organization's annual performance-based objectives.
- H. Include breastfeeding education and support in the organization's annual goals and objectives.
- I. Support the development of policies, mechanisms, and resources for screening and referral for out-of-facility services when they are required.
- J. Adopt protocols and standards of care for the management and referral of pregnant women with diabetes and women of childbearing age with diabetes.

2. Institute system and programmatic changes.

Why?

Health care organizations that are ready to implement case management can help providers and educators: (1) target patients more effectively; (2) design interventions that are more acceptable to patients; and (3) design interventions that help improve blood glucose control monitoring by physicians. Changes in health care organizations also have been associated with increased delivery of appropriate diabetes care. (Norris et al., 2002).

How?

- A. Recognize the need for and promote changes in the health care system that will promote improved patient care and satisfaction.

- B. Recognize and support the role of medical records in providing continuity of care for women with pregnancies complicated by diabetes, by obtaining records on previous pregnancies and pregnancy-related services provided in other health care settings.
- C. Support case management strategies to complement existing services.
- D. Provide evidence of organizational support through policies and procedures, structures, and accountability processes.
- E. Establish Medicaid or other state insurance eligibility as a high priority for the prenatal patient.
- F. Provide the diabetes and pregnancy team with time and funding to participate in regional and national perinatal collaborative activities focused on diabetes in pregnancy.
- G. Promote innovative opportunities to initiate prenatal care, including screening for gestational diabetes (GDM).
- H. Provide facility access to antenatal surveillance (e.g., ultrasound, serum markers, fetal echo, etc.) or implement specific policies supporting access to outside referrals for such services.
- I. Provide access to specialty services (e.g., podiatry, oral health, optometry, perinatology, genetics counseling, etc.).
- J. Support development of processes for referral to community organizations such as Healthy Start, Women, Infants, and Children (WIC), and Head Start programs.

Evaluating a Diabetes and Pregnancy Program

Evaluation is important because it helps you see what is working and what is not working in your diabetes and pregnancy program, and whether adjustments or changes are needed to improve it. Evaluation also provides information you can use to share your successes with patients, providers, Tribal leaders, administrators, the community, funders, and other stakeholders.

Actions can be taken to design and implement ongoing evaluation. Consider including the following when developing your program and planning for evaluation:

- Work with epidemiology programs to accurately determine the incidence and prevalence of gestational diabetes (GDM), pre-gestational diabetes, morbidity, and mortality associated with diabetes in pregnancy, and the effect on offspring.

- Implement and maintain current Diabetes in Pregnancy and Infants of Mothers with Diabetes registries.
- Develop documentation tools that promote quantitative collection of patient care data: screening and diagnostic testing, preconception preparation, patient standard of care indicators, and maternal and fetal outcomes.
- Ensure that program evaluations take place at each site.
- Ensure that all available tools collect baseline data and that the patient data resources (RPMS/EHR, Diabetes Audit, computer databases such as ACCESS, cost data spreadsheets, and EXCEL) are being used to prepare evaluation reports.
- Plan and conduct regular program/clinical outcome evaluations, develop performance improvement plans to assess changes from baseline over time, and prepare fiscal analysis.
- Assess the competencies of clinicians who are providing services.
- Assess staffing patterns and workloads.
- Assess available resources, needs, and areas for improvement.
- Share evaluation results with all stakeholders including health care workers, administration, Tribal health boards, and the community to promote support and increase awareness of challenges and successes.

Sustaining a Diabetes and Pregnancy Program

One of the major organizational challenges is sustaining a diabetes program for more than a few years, in order to reach clinical care goals and achieve quantitative changes in both clinical outcomes and program evaluation results. Important key considerations need to be made to build sustainability into program planning:

- Support is needed from all stakeholders, including health care workers, administration, Tribal health boards, and the community. Stakeholders must recognize and promote goals for the improvement of care. Stakeholders need to be aware of the role of the multi-disciplinary team and the responsibilities of each collaborative team member.
- Policies need to be established to promote staff retention, integrate care, and maintain collaboration with women's health care providers, internal medicine personnel, diabetes educators, and professionals from other disciplines. Provide updates on diabetes and pregnancy program activities to all stakeholders on a regular basis.

- Training ensures that the diabetes and pregnancy team has access to continued education opportunities, stays up-to-date on current practices, and ensures that other clinical staff members have updates related to their practices.
- Standardization of clinical programs demonstrates successful implementation of best practices and provides a guideline for other sites. Ensure that clinical and education programs for patients are designed to be accessible and culturally appropriate. Provide well-defined outcome measures for evaluating the diabetes and pregnancy program.
- Building the capacity to be financially self-supporting is essential for maintaining and sustaining these programs for the future. Examples include: working with Contract Health Services and Benefits Coordinators to assure verified eligibility for alternative resources; seeking program resources through grants and other funding sources; maximizing billing capabilities for prenatal care and other services (e.g., MNT, pharmacist patient education, durable medical equipment for self-monitoring blood glucose monitors and supplies); establishing a fiscal workgroup to acquire and review data for referred care (e.g., fetal and maternal medicine), cost of gestational diabetes care (including care in a neonatal intensive care unit), and delivery complications.

Tools and Resources

Indian Health Service Websites

Beautiful Beginnings. The IHS Division of Diabetes Treatment and Prevention's Beautiful Beginnings: Pregnancy and Diabetes (BB) Supplemental Teaching Sessions provide information specific to pregnancy and type 2 diabetes, including pre-gestational diabetes and gestational diabetes mellitus (GDM). These Supplemental Teaching Sessions are intended for use in conjunction with the IHS Balancing Your Life and Diabetes (BYLD) curriculum.

<http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=toolsCurricula>

IHS Division of Diabetes Treatment and Prevention [Internet]. [Updated 2009 April 27; cited 2009 June] Creating Strong Diabetes Programs: Plan a Trip to Success [38 pages with one page sample in appendix]. A workbook (with on-line training course) on effective program planning and evaluation.

<http://www.ihs.gov/MedicalPrograms/Diabetes/HomeDocs/Training/WebBased/Basics/Creating/Workbook.pdf>

IHS Division of Diabetes Treatment and Prevention [Internet]. [Updated 2009 July]; cited 2009 June] Creating Strong Diabetes Programs: Plan a Trip to Success. An on-line training course on effective program planning and evaluation. Division of Diabetes Treatment and Prevention [Internet].

<http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=trainingBasicsCreating>

IHS Maternal and Child Health Website. Excellent source for perinatal, breastfeeding and child health notes, abstracts, hot topics, features, upcoming trainings, and articles. Subscribe online: <http://www.ihs.gov/MedicalPrograms/MCH/sitemap.cfm>

CCC Corner, National Council of Chief Clinical Consultants. Focus on health of American Indian and Alaskan Native Women and Children. (Future and back issues on diabetes and pregnancy.) <http://www.ihs.gov/MedicalPrograms/MCH/M/ob.cfm>

Perinatology Corner Online. Clinical information on management of diabetes and pregnancy. Access through MCH Website. CEU/CME Modules on Diabetes in Pregnancy—Screening and Diagnosis and Diabetes in Pregnancy—Management and Postpartum. <http://www.ihs.gov/MedicalPrograms/MCH/sitemap.cfm>

Diabetes in Pregnancy Guidelines. ANMC Women’s Health Service, Diabetes Mellitus in Pregnancy Screening and Management Guidelines. Neil Murphy, 10/25/04. http://www.ihs.gov/MedicalPrograms/MCH/M/documents/DMPreg102504_002.doc

IHS Diabetes Audit Information. Source of support for conducting and using the Diabetes Audit. <http://www.dmaudit.com/>

IHS Area Diabetes Consultants website. The Navajo Area Diabetes Consultant has experience in how an SDPI program can support diabetes in pregnancy programs. <http://www.ihs.gov/MedicalPrograms/Diabetes/index.cfm?module=peopleADC>

Other Web-Based Resources

California Diabetes and Pregnancy Program (CDAPP). CDAPP developed “Sweet Success,” a clinical model of care based on the use of trained multi-disciplinary teams composed of physicians, nurses, dietitians, social workers, and other health care professionals to provide comprehensive services to the target population. The CDAPP Guidelines for Care outline how to provide comprehensive health services and promote improved pregnancy outcomes for high-risk pregnant women with pre-existing diabetes and women who develop diabetes while pregnant. <http://www.cdph.ca.gov/programs/CDAPP/>

California Diabetes and Pregnancy Program Resource Center. Produces and distributes high quality, easy-to-read educational materials. <http://www.regionalperinatalsystem.org/programs/mrc>

Cochrane Library, systematic reviews of the effects of health care interventions. <http://www.cochrane.org/>

National Diabetes Education Program (NDEP). Offers materials on gestational diabetes, diabetes management, and diabetes prevention, including information specifically for American Indians and Alaska Natives. <http://www.ndep.nih.gov/>

Small Steps. Big Rewards. Prevent Type 2 Diabetes. “It’s Never Too Early to Prevent Diabetes” is a NDEP campaign for women with a history of GDM. The “Power to Prevent Diabetes” materials for American Indians and Alaska Natives contain seven powerful tips to prevent diabetes. <http://www.ndep.nih.gov/>

SSEP (Sweet Success Express). This nonprofit program serves facilities outside the State of California. SSEP was developed, with encouragement from CDAPP, to increase awareness of the Sweet Success model of care nationwide. SSEP offers services and activities that support improved pregnancy outcomes for diabetes in pregnancy, including educational materials, conferences, and membership programs. <http://www.sweetsuccessexpress.com/>

Women’s Health Information Center. This Office of Women’s Health, U.S. Department of Health and Human Services website has resources and information on breastfeeding, diabetes in pregnancy, and obesity. <http://womenshealth.gov/>

UpToDate is an evidence-based, peer-reviewed information resource. <http://www.uptodateonline.com>

Examples of Current Best Practice Programs

Alaska Native Medical Center

Neil Murphy, MD
4320 Diplomacy Drive, PCC-WH
Anchorage, AK 99508
(907) 729-3154
nmurphy@scf.cc

The Alaska Native Medical Center has developed diabetes in pregnancy management guidelines that can be accessed at:

http://www.ihs.gov/MedicalPrograms/MCH/M/documents/DMPreg102504_002.doc

Navajo Area Sweet Associate Group

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Winslow Indian Health Care Center

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Navajo Area has a well-established diabetes in pregnancy program. Nine facilities (Chinle, Crownpoint, Fort Defiance, Gallup, Kayenta/Inscription House, Shiprock, Tuba, SE Utah, and Winslow) make up the Sweet Success Associate Group. Women with pregnancies complicated by pre-gestational diabetes, gestational diabetes, and carbohydrate intolerance in pregnancy are cared for in these multi-disciplinary programs.

Phoenix Indian Medical Center Diabetes Center of Excellence (PIMC)

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Director, Diabetes Center of Excellence
4212 North 16th Street
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(602) 263-1587

Charlton Wilson, MD
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Suzanne Lipke, APRN, BC-ADM, CDE
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The Diabetes and Pregnancy Program at PIMC has many years of experience in case management. It is also a large program that has been peer evaluated and published. PIMC predominantly uses midwives, but they are complemented by OB-GYN doctors. Diabetes screening and treatment are routine care as well as options such as underwater tubs for the birthing process.

Four Directions Clinic

Terry Friend, CNM
Pine Ridge Hospital
East Highway 18
Pine Ridge, SD 57770
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terry.friend@abr.ihs.gov

This program, located in community clinics in Pine Ridge, South Dakota, serves pregnant women with pre-existing diabetes or gestational diabetes.

Additional Contacts

Contacting other people involved in diabetes and pregnancy is important because they can help you get started. Peers at other health care organizations can share their expertise, materials, ideas, and challenges. They can also tell you what has worked for them and what has not worked. This can help to avoid reinventing the wheel. Following are ideas for connecting with others:

- Ask your Area Diabetes Consultant for the names of people who may be able to help you.
<http://www.ihs.gov/MedicalPrograms/diabetes/index.cfm?module=peopleADCDirectory>
- Contact the IHS Division of Diabetes Treatment and Prevention for ideas. Staff members may be able to point you in the right direction.
- Ask the IHS Integrated Diabetes Education Recognition Program and your Area IHS Diabetes Consultant for suggested contacts. They have names and contact information for people who work with IHS-accredited diabetes education programs (see Web-based Resources).
- *Health for Native Life* magazine articles may give you ideas for activities to try and people to contact. This magazine profiles many diabetes programs throughout Indian Country.
- Contact web-based resources and current Best Practice Programs for critical resources such as algorithms, fact sheets, patient education materials, and handouts.

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Appendix A

Improving Diabetes and Pregnancy in the Indian Health System

There are three fundamental questions to ask as you plan and implement your best practice. These questions and possible examples are:

1. What are you trying to do?

- Reduce the burden of complications of diabetes in pregnancy for both mothers and their unborn children during pregnancy, at delivery, and throughout their lifespan.

2. How will you know if what you do makes things better?

- Collect and display data on an ongoing basis. Analyze the data and use it to plan next steps.
- Improved data results suggest that things are getting better. For example:
 - Over one year, an increase of at least 50% more women with diabetes in pregnancy were identified and have been evaluated by a multi-disciplinary team.

3. What can you do to make things better?

- Obtain leadership support to initiate and improve effective diabetes and pregnancy services.
- Establish a multi-disciplinary team to manage women with diabetes in pregnancy whose members will identify gaps in providing services and apply realistic solutions.
- Work together in a multi-disciplinary team to increase the number of education and medical management interactions occurring for women with diabetes in pregnancy, including postpartum interactions.

Appendix B: Detailed Information for Implementing Clinical Recommendations 5. through 8.

Clinical Recommendation 5. – Identify, assess health status, and refer women with pre-gestational diabetes who become pregnant.

- A. Create and maintain a registry of women of childbearing age with type 1 or type 2 diabetes (see Clinical Recommendation #2).

- B. Assess the health status of women of childbearing age with diabetes:
 - 1) Obtain medical and obstetrical history before planning for pregnancy, including information on:
 - family history of diabetes
 - history of gestational diabetes mellitus (GDM)
 - diabetes duration
 - obesity
 - age
 - acute complications

 - chronic complications, including:
 - ◆ retinopathy
 - ◆ nephropathy
 - ◆ high blood pressure
 - ◆ atherosclerotic vascular disease, and autonomic or peripheral neuropathy,

 - diabetes management, including medication regimens, self-monitoring of blood glucose, medical nutrition therapy, and physical activity

 - concomitant medical conditions and medications
 - menstrual and pregnancy history
 - previous stillbirth or baby with birth defects
 - breastfeeding history
 - contraceptive use
 - pregnancy-induced high blood pressure (hypertension)
 - large baby in a previous pregnancy, and
 - support system, including family and work environment.

- 2) Conduct a comprehensive physical exam, including:
 - blood pressure exam, including testing for orthostatic changes
 - diagnostic tests and exams, including:
 - ◆ A1c test
 - ◆ baseline laboratory test including complete blood count, serum creatinine, and 24-hour urine (protein and creatinine clearance). (Although obtaining protein and creatinine clearance from a 24-hour urine test can be inaccurate, the test provides baseline data.)
 - cardiovascular exam for evidence of cardiac or peripheral vascular disease. If found, women should have screening tests for coronary artery disease before attempting pregnancy to ensure they can tolerate the increased cardiac demands.
 - oral health exam for periodontal disease and other dental health issues
 - dilated retinal exam by an ophthalmologist or other eye specialist knowledgeable about diabetic eye disease, and
 - neurological exam, including examination for signs of autonomic neuropathy.
- 3) Review the patient's current management plan and develop and implement a comprehensive treatment plan that includes:
 - medical nutrition therapy (MNT)
 - physical activity consultation with exercise physiologist or physical therapist
 - education and counseling on home blood glucose monitoring (including fasting and two-hour postprandial)
 - schedule for monitoring fasting and one-hour postprandial blood glucose (Jovanovic, Diabetes Care 1999)
 - documentation of blood glucose and food choices in workbook
 - review of self-monitoring blood glucose (SMBG) technique with return demonstration
 - setting goals for self-monitored blood glucose

- insulin therapy (some settings will consider oral glycemic medication if current diabetes control is good)
 - monitoring A1c levels at one- to two-month intervals until stable
 - aggressive monitoring and control of hypertension during preconception period
 - dental referral
 - prenatal visits every week until blood glucose is well-controlled, then every four weeks until 32 weeks; then every two weeks until 36 weeks; then weekly
 - fetal echo at 18-24 weeks
 - ultrasound monitoring during early first trimester; low-risk patients at 18-20 weeks; 29-33 weeks; and every six weeks thereafter
 - monitoring fetal movement at 32 weeks
 - non-stress tests: type 1 and type 2 diabetes, early diabetes diagnosis, or poor control
 - low risk: weekly, starting at 32 weeks
 - high risk: twice a week, starting at 36 weeks, and
 - if patient has vasculopathy, hypertension, uncontrolled diabetes, or ketoacidosis, twice a week as early as 28 weeks.
- 4) Conduct an individual education evaluation session with a diabetes educator and a registered dietitian.
- C. Refer patients to appropriate health care providers and resources based on assessment of health status (e.g., see American Diabetes Association information at <http://www.diabetes.org/gestational-diabetes.jsp>).

Clinical Recommendation 6. – Provide perinatal care for pregnant women with pre-gestational diabetes.

How?

- A. Review medical and obstetrical history and conduct a physical exam for pregnant women with pre-gestational diabetes (see Clinical Recommendation #5).
- B. Review medical conditions and change or adjust medications (see Clinical Recommendation #5).
- C. Review the patient's current management plan and develop and implement a comprehensive treatment plan that includes:
 - 1) medical nutrition therapy (MNT)
 - 2) physical activity counseling
 - 3) education and counseling on home blood glucose monitoring
 - 4) schedule for monitoring fasting and one-hour postprandial (Jovanovic, Diabetes Care 1999)
 - 5) documentation of blood glucose and food choices in workbook
 - 6) review of self-monitoring blood glucose technique with return demonstration
 - 7) setting pregnancy goals for self-monitored blood glucose
 - 8) prenatal visits every week until blood glucose is well controlled, then every four weeks until 32 weeks; then every two weeks until 36 weeks; then weekly
 - 9) physical activity consult with exercise physiologist or physical therapist
 - 10) dental referral
 - 11) insulin therapy (some settings will consider oral glycemc medication if current diabetes control is good)
 - 12) monitoring A1c levels at one- to two-month intervals until stable
 - 13) fetal echo at 18–24 weeks
 - 14) ultrasound monitoring during early first trimester; low-risk patients at 18–20 weeks, 29–33 weeks, and every six weeks thereafter

15) monitor fetal movement at 32 weeks, and

16) non-stress tests: type 1 and type 2 diabetes, early diabetes diagnosis, or poor control:

- low risk: weekly starting at 32 weeks (if on medication without vasculopathy)
- high risk: twice a week starting at 36 weeks
- if patient has vasculopathy, hypertension, uncontrolled diabetes, or ketoacidosis, twice a week as early as 28 weeks.

D. Provide medical nutrition therapy (MNT):

1) Provide perinatal nutrition management (ADA, 2003).

2) Counseling content should include:

- nutrition counseling consistent with American Diabetes Association recommendations by a registered dietitian, when possible
- weight management counseling
- medical nutrition therapy (MNT) based on maternal weight and height. MNT should include adequate calories and nutrients to meet the needs of pregnancy and should be consistent with the maternal blood glucose goals that have been established
- use of non-caloric sweeteners in moderation
- encouraging women to drink water and consume protein, calcium, and fruits and vegetables, especially those high in folic acid, and
- encouraging women to avoid alcohol, tobacco, recreational drugs, and caffeine.

E. Promote physical activity:

1) Encourage women to participate in moderate intensity, regular physical activity such as walking most days of the week. (Moderate physical exercise has been shown to lower maternal blood glucose concentrations in women with gestational diabetes.) Although the impact of exercise on neonatal complications awaits rigorous clinical trials, the beneficial glucose-lowering effects warrant a recommendation that women be encouraged to start or continue a program of moderate exercise (ADA, 2003).

- 2) Obtain a medical release when referring patients for exercise programs.
- 3) Provide education on safe exercise and blood glucose considerations.

Clinical Recommendation 7. – Provide perinatal care for women with gestational diabetes Class A-1 (managed with diet, exercise) or with one abnormal value on OGTT.

Why?

Diabetes treatment has been associated with a reduction in poor maternal and infant outcomes (ACOG, 2001; Mello et al., 2000).

How?

Class A-1 includes women with diet-controlled gestational diabetes that is diagnosed during pregnancy.

- A. Obtain medical and obstetrical history.
- B. Provide an individual patient education evaluation session with a diabetes educator and a registered dietitian.
- C. Conduct a physical exam, including blood pressure measurement, testing for orthostatic changes, and an oral health exam for periodontal disease and other dental health issues.
- D. Develop and implement a diabetes management plan that includes:
 - 1) medical nutrition therapy (see Clinical Recommendation #6)
 - 2) physical activity counseling (see Clinical Recommendation #6)
 - 3) education and counseling on home blood glucose (BG) monitoring:
 - Establish schedule for fasting and one-hour postprandial blood glucose monitoring (Jovanovic, Diabetes Care 1999).
 - The ideal frequency of blood glucose monitoring has not been established in patients requiring insulin therapy. A common practice is to check blood glucose levels four times daily. The first morning blood glucose level can rule out fasting high blood glucose and additional one- or two-hour postprandial values can ensure adequate control (ADA, 2003; Turok et al., 2003).
 - Document blood glucose and food choices in workbook.

- Review self-monitoring blood glucose technique with return demonstration.
- Set goals for self-monitored blood glucose.
- 4) prenatal visits scheduled every week until blood glucose is well controlled, then every four weeks until 32 weeks, every two weeks until 36 weeks, and then weekly
- 5) physical activity consultation with exercise physiologist or physical therapist
- 6) dental referral
- 7) monitor fetal movement at 32 weeks, and
- 8) ultrasound monitoring during early first trimester; low-risk patients at 18–20 weeks and 29–33 weeks.

Clinical Recommendation 8. – Provide perinatal care for women with gestational diabetes Class A-2 (managed with diet, exercise, and medication).

Why?

Diabetes treatment has been associated with a reduction in poor maternal and infant outcomes (Crowther et al., 2005; ACOG, 2001; Mello et al., 2000).

How?

Class A-2 includes women with unsuccessful control of blood glucose levels after two weeks of nutrition counseling and whose diabetes should be managed with diet, exercise, and medication.

- A. Review medical and obstetrical history and conduct physical exam.
 - 1) Conduct an individual patient education evaluation session with a diabetes educator and a registered dietitian.
 - 2) Conduct a physical exam, including blood pressure measurement, testing for orthostatic changes, and an oral health exam for periodontal disease and other dental health issues.

3) Conduct tests and exams, including:

- baseline laboratory test including complete blood count, serum creatinine, and 24-hour urine (protein and creatinine clearance). (Although obtaining protein and creatinine clearance from a 24-hour urine test can be inaccurate, the test provides baseline data.)

4) Develop and implement a diabetes management plan that includes:

- medical nutrition therapy (see Clinical Recommendation #6)
- physical activity counseling (see Clinical Recommendation #6)
- education and counseling on home blood glucose monitoring:
 - ◆ Establish schedule for fasting and one-hour postprandial blood glucose monitoring (Jovanovic, Diabetes Care 1999).
 - ◆ The ideal frequency of blood glucose monitoring has not been established in patients requiring insulin therapy. A common practice is to check blood glucose levels four times daily. A first morning blood glucose level can rule out fasting high blood glucose, and additional one- or two-hour postprandial values can ensure adequate control (ADA, 2003; Turok et al., 2003).
 - ◆ Document blood glucose and food choices in workbook
 - ◆ Review self-monitoring blood glucose technique with return demonstration
 - ◆ Set goals for self-monitored blood glucose
 - ◆ Monitor A1c levels at one- to two-month intervals until stable
 - ◆ Prenatal visits every week until blood glucose well controlled, then four weeks until 32 weeks; then every two weeks until 36 weeks; then weekly.
- physical activity consult with exercise physiologist or physical therapist
- dental referral
- select therapy. Consider insulin or oral glycemic therapy
- ultrasound monitoring during early first trimester; low-risk patients at 18–20 weeks and every six weeks thereafter
- monitor fetal movement at 32 weeks

- non-stress tests:
 - ◆ low risk (i.e., good control, normal blood pressure, no stillbirth history, or no vasculopathy): weekly, starting at 34 weeks.
 - ◆ high risk (i.e., poor control, high blood pressure, still birth history, or vasculopathy): twice a week, starting at 32 weeks.

B. Provide multi-disciplinary education, counseling, and self-management support.

- 1) Offer basic prenatal care or referrals to specialty care for women with gestational diabetes.
- 2) Provide a culturally appropriate and comprehensive diabetes and pregnancy program.
- 3) Offer care in family-friendly environments.
- 4) Inform women about evidence-based guidelines for care.
- 5) Provide women with emergency medical contact information.
- 6) Provide case management services to assist women in negotiating the care system.
- 7) Offer Medicaid or other third-party payer enrollment assistance services.
- 8) Offer assistance in arranging transportation, timely scheduling of clinic, lab services, and out of facility appointments.
- 9) Link women to Healthy Start, WIC, and other community programs.
- 10) Identify fitness resources and community activity programs that fit women's needs.
- 11) Refer women to best practice educators/dietitians for nutrition and diabetes self-care counseling and support.
- 12) Assess women's health behaviors, knowledge, and self-care practices and individualize medical and self-care education and counseling.
- 13) Help women with blood glucose monitor accuracy skills.
- 14) Provide glucose monitor supplies and monitor value printouts, using them as educational and discussion opportunities.

- 15) Provide culturally appropriate education within the framework of an IHS-certified (or equivalent) curriculum (i.e., Beautiful Beginnings in the Tools and Resources section, above).
- 16) Provide counseling and education on nutrition, exercise, monitoring, medications, and importance of prenatal care.
- 17) Coach the women to identify alternative self-management strategies.
- 18) Assess women for psychosocial stressors and refer for social services and behavioral health support.
- 19) Encourage women to use exercise and diet logs.
- 20) Provide family and breastfeeding support groups and programs.
- 21) Address women's and families' concerns through traditional medicine, talking circles, prenatal classes open to family members, and breastfeeding support programs.
- 22) Provide case management advocacy for women.

Appendix C: Diabetes and Pregnancy Facts and Statistics

- One third of all Americans have pre-diabetes (impaired fasting glucose or impaired glucose tolerance), including three million teenagers. Pre-diabetes is associated with metabolic syndrome and polycystic ovarian syndrome (PCOS). Prevalence of type 2 diabetes is two to four times higher in American Indian women.
- 45% of American Indian women are overweight or obese, increasing their risk for diabetes during pregnancy.
- Increasingly higher preconception A1c levels are associated with an increased risk of adverse pregnancy outcomes, spontaneous abortion, stillbirth, neonatal death, and congenital anomaly, with an almost linear association from an A1c slightly below 7%. (Diabetes Care, 2006).
- Approximately 7% of all pregnancies are complicated by gestational diabetes (GDM). The prevalence of gestational diabetes is as high as 15% in some groups (ADA, 2004). American Indian and Alaska Native women had approximately 40,000 births in 2005 (Martin, 2005). Conservative estimates indicate that approximately 2,800 of these births will be affected by gestational diabetes (based on a 7% incidence of gestational diabetes).
- The incidence of diabetes in pregnancy in Navajo Area has increased from 7.2% in 2003 to 13.4% in 2008. (Navajo Area Sweet Success Associate Group, Data 2008).
- Hyperglycemia during pregnancy is associated with increased mortality and morbidity, including but not limited to: spontaneous abortion, fetal anomaly, fetal demise, macrosomia, birth injury, cesarean section, worsening retinal and renal damage, and cardiovascular disease for the mother. (Silverman, DM Care 1998; Mello, 2000; ACOG, 2001; HAPO Study Cooperative Research Group, N Engl J Med 2008.)
- Diabetes confers long-term risk in the infant of the diabetic pregnancy for elevated body mass index (BMI) and early onset of type 2 diabetes or impaired glucose tolerance, as well as the risk associated with complications of these conditions (Pettit, 1998; Pettit, 1997, Hillier, Pettit D. Diabetes Care, 2007).
- Exposure to diabetes in the intrauterine environment accounts for approximately 40% of type 2 diabetes in children between the ages of five and nineteen; more than 70% of people with prenatal exposure to type 2 diabetes develop it by the time they reach early adulthood (between the ages of 25 and 34 years). (Dabelea, 2000).