

MEDICAL MANAGEMENT

Purpose: To promote a safe pregnancy with a healthy outcome for the mother and baby.

Important considerations: Diabetes mellitus (DM) has a significant effect on pregnancy and fetal health. Good management emphasizing optimal glycemic control before conception through to delivery, will reduce the risk of problems.

ASSESSMENT	EDUCATIONAL APPROACH	RATIONALE & CLINICAL MANAGEMENT GUIDELINES
MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2		
<p>PRECONCEPTION - TYPE 1 OR 2 DM</p> <ul style="list-style-type: none"> ◆ If taking oral anti-hyperglycemic agents (OAs), change to insulin. ◆ If taking extended long-acting insulin, change to intermediate-acting insulin. ◆ Assess: <ul style="list-style-type: none"> • Glycemic control prior to conception - glycated hemoglobin (A1C). 	<ul style="list-style-type: none"> ◆ Explain that OAs cross the placenta to the fetus. ◆ The safety of extended long-acting insulin use in pregnancy must be determined before their use is approved. ◆ Encourage optimal glycemic control for 2 to 3 months prior to conception. ◆ Explain that optimal control reduces the likelihood of pregnancy complications such as fetal anomaly. 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>“Women with pre-existing diabetes should plan their pregnancy, preferably in consultation with an interdisciplinary pregnancy team, to optimize maternal and neonatal outcomes.”¹</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Women with type 2 DM on OAs planning to become pregnant should be started on insulin prior to becoming pregnant.¹ “Use of glyburide or metformin during pregnancy does not appear to be associated with an increase in congenital anomalies independent of glycemic control. However, the evidence is inadequate to warrant recommendation of their use in pregnancy.”¹⁻⁵</p> </div> <p>Women on extended long-acting insulin analogues (such as glargine and detimer) who are planning to become pregnant should be started on intermediate-acting insulin <u>before</u> becoming pregnant.⁵</p> <ul style="list-style-type: none"> ◆ Optimal control reduces the likelihood of pregnancy complications (e.g., fetal anomaly, etc.). Optimal control is defined as A1C ≤ 7% (≤ 6% preferably in pregnancy).¹ Less than 1% above the normal range is desirable.⁶ All women should attempt to attain “normal” blood glucose control.¹

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p>PRECONCEPTION - TYPE 1 OR 2 DM (cont)</p> <ul style="list-style-type: none"> • Preprandial - venous plasma glucose (PG). • Preprandial - capillary blood glucose. • Freedom from significant hypoglycemia and hyperglycemia. • The presence of the following complications: <ul style="list-style-type: none"> - Retinopathy. - Nephropathy. - Neuropathy. - Cardiovascular disease (CVD). 	<ul style="list-style-type: none"> ◆ Reinforce the ideal (acceptable) values. ◆ Values should be within 20% of the PG values. ◆ Explain the benefits of avoiding hypoglycemia and not overtreating. ◆ Explain the implications of any present complications on the pregnancy. 	<ul style="list-style-type: none"> ◆ Fasting PG values should be between 3.4 and 5.3 mmol/L. <div data-bbox="1104 500 1936 574" style="border: 1px solid black; padding: 5px;"> <p>Refer to the DCPNS pamphlet—<i>I Have Diabetes...And I Can Have A Healthy Baby! 2004. See Appendix A.</i></p> </div> <div data-bbox="1104 613 1936 717" style="border: 1px solid black; padding: 5px;"> <p>Note: Not all women will be able to safely achieve these degrees of control; aim for the best control possible, while avoiding frequent or significant hypoglycemia.</p> </div> <ul style="list-style-type: none"> ◆ Hypoglycemia should not be frequent or severe enough to interfere with daily living. Overtreating may lead to rebound hyperglycemia and excessive weight gain. ◆ Established proliferative retinopathy may deteriorate during pregnancy.^{1,7} ◆ Renal disease may become more severe during pregnancy.⁷ Women with significant proteinuria before pregnancy are at risk for hypertension during pregnancy.³ Renal function may worsen after pregnancy.¹ ◆ Due to possible teratogenic effects, ACE and ARB therapy should be discontinued and alternative hypertensive medications (safe in pregnancy) should be introduced.^{1,6,7} ◆ Neuropathy generally remains stable during pregnancy.⁷ ◆ Active coronary artery disease is a relative contraindication for pregnancy.^{1,7}

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p><i>PRECONCEPTION - TYPE 1 OR 2 DM (cont)</i></p> <ul style="list-style-type: none"> • Risk of congenital malformations. <ul style="list-style-type: none"> - Neural tube defects (NTD) • The presence of other risk factors. <ul style="list-style-type: none"> - Medications. - Smoking. - Alcohol. - Previous obstetrical history. - Medical problems, e.g., hypertension, etc. 	<ul style="list-style-type: none"> ◆ Promote optimal blood glucose control before conception and during the first trimester. ◆ Discourage: <ul style="list-style-type: none"> • Taking of medications not approved for pregnancy. • Smoking. • Use of alcohol. ◆ Explain the effects of smoking and alcohol as well as the potential harmful effects of some medications on the fetus. 	<ul style="list-style-type: none"> ◆ Women with pre-existing DM are at increased risk for congenital malformations in their offspring. The most common major anomalies associated with pre-existing DM include the cardiovascular, renal, and musculoskeletal systems, as well as the neural tube. The risk of fetal malformations is related to the degree of hyperglycemia. Blood glucose control preconceptually and in the first trimester reduces the likelihood of congenital malformations.⁸ ◆ In order to reduce the risk of NTD, folic acid supplementation is recommended.^{1,9} <ul style="list-style-type: none"> • Women with type 1 or type 2 DM considering pregnancy, should take 1-4 mg/day of folic acid before conception and during the first trimester of pregnancy.¹ ◆ Ideally, smoking should be discontinued prior to conception. ◆ Alcohol use is not recommended during pregnancy. ◆ Alternative hypertensive medications will be required to replace ACE and ARB therapy.¹

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p>PRECONCEPTION - TYPE 1 OR 2 DM (cont)</p> <ul style="list-style-type: none"> - Psychosocial stresses. • Meal plan/weight. • Exercise/activity as it relates to DM management principles, i.e., meal plan; insulin; hypoglycemia. 	<ul style="list-style-type: none"> ◆ Stress the importance of appropriate meal plan and the benefit of healthy body weight to maintain good control. ◆ Discuss the role of exercise/activity in the preconception period. 	<ul style="list-style-type: none"> ◆ See <i>Psychosocial Considerations</i> section, Appendix A. ◆ Refer to a qualified dietitian with an interest and expertise in the management of pregnancy and DM. ◆ See <i>Nutrition</i> section. ◆ If available, refer to a physiotherapist with an expertise in management of pregnancy and DM. ◆ See <i>Physical Activity</i> section.
<p>GLYCEMIC CONTROL IN EARLY PREGNANCY – TYPE 1 OR 2 DM</p> <p>Meal Plan</p> <p>Exercise/activity</p> <ul style="list-style-type: none"> ◆ Assess: <ul style="list-style-type: none"> • Exercise/activity practices in relation to glycemic control. 	<ul style="list-style-type: none"> ◆ Encourage adherence to dietary advice. ◆ Explain: <ul style="list-style-type: none"> • The benefits of exercise/activity. Encourage the inclusion of regular, appropriate exercise/activity in daily routine. 	<ul style="list-style-type: none"> ◆ Refer to a qualified dietitian with an interest and expertise in the management of pregnancy and DM.^{1,9} ◆ See <i>Nutrition</i> section. ◆ See <i>Physical Activity</i> section.

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p data-bbox="138 345 594 440">GLYCEMIC CONTROL IN EARLY PREGNANCY – TYPE 1 OR 2 DM (cont)</p> <p data-bbox="138 464 432 493">Exercise/activity (cont)</p> <ul data-bbox="191 521 600 613" style="list-style-type: none"> • The presence of any precautions/contraindications to exercise/activity. <p data-bbox="138 639 275 669">Monitoring</p> <ul data-bbox="138 935 594 1247" style="list-style-type: none"> ◆ Assess: <ul data-bbox="191 967 594 1247" style="list-style-type: none"> • Glycemic control and the reliability of self-monitoring of blood glucose (SMBG) results (including laboratory (lab)/ meter comparison). • Testing adequacy in terms of timing and frequency. • A1C • Ketones. <p data-bbox="138 1276 226 1305">Insulin</p> <ul data-bbox="138 1325 594 1386" style="list-style-type: none"> ◆ Reassess the dose and schedule in light of pregnancy changes. 	<ul data-bbox="667 521 1058 643" style="list-style-type: none"> • The reason for exercise/activity modification in the presence of precautions/contraindications. <ul data-bbox="621 672 1050 797" style="list-style-type: none"> ◆ Stress the importance of good control for optimal fetal development, growth, and well being. <ul data-bbox="621 1325 1064 1446" style="list-style-type: none"> ◆ Explain: <ul data-bbox="667 1357 1064 1446" style="list-style-type: none"> • Insulin requirements may decrease slightly in the first trimester 	<ul data-bbox="1098 672 1940 1479" style="list-style-type: none"> ◆ See <i>Blood Glucose Monitoring</i> section. ◆ Regular monitoring of blood glucose gives information that allows for self-adjustment of insulin, activity, and meal plan. This favors optimal fetal development, growth, and well being. ◆ Serves to reduce the risk of developing diabetic ketoacidosis (DKA), hypoglycemia, and hyperglycemia with or without ketones. ◆ See <i>Blood Glucose Monitoring</i> section. ◆ See <i>Ketone Monitoring</i> section. ◆ Optimal glycemic control throughout pregnancy reduces the risks to the fetus and mother. ◆ See <i>Insulin</i> section.

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p data-bbox="138 354 594 448">GLYCEMIC CONTROL IN EARLY PREGNANCY – TYPE 1 OR 2 DM (cont)</p> <p data-bbox="138 483 300 509"><i>Insulin (cont)</i></p> <ul data-bbox="138 737 594 799" style="list-style-type: none"> ◆ Document the pre-pregnancy dose of insulin and degree of control. <p data-bbox="138 824 594 886">MATERNAL SURVEILLANCE – TYPE 1 OR 2 DM</p> <p data-bbox="138 912 321 938"><i>First trimester</i></p> <ul data-bbox="138 1019 594 1399" style="list-style-type: none"> ◆ Assess: <ul data-bbox="191 1052 422 1078" style="list-style-type: none"> • Renal function. • The presence and severity of retinopathy. 	<ul data-bbox="667 516 1073 704" style="list-style-type: none"> • The importance of avoiding swings in blood glucose levels. • Minimizing hypoglycemia/hyperglycemia. • The aim of optimal control is to enhance fetal well being. <ul data-bbox="621 1019 1073 1081" style="list-style-type: none"> ◆ Explain the purpose and results of tests. 	<ul data-bbox="1098 737 1808 799" style="list-style-type: none"> ◆ This may provide a guide to insulin requirements in the postpartum period. <div data-bbox="1108 915 1938 987" style="border: 1px solid black; padding: 5px;"> <p>Complications of pregnancy are more likely in the presence of established end organ disease.</p> </div> <ul data-bbox="1098 1019 1948 1458" style="list-style-type: none"> ◆ Blood urea nitrogen (BUN)/creatinine and urinalysis tests are usually adequate unless nephropathy is suspected or known. In this case, determine albumin to creatinine ratio (ACR) in a random urine test or obtain 24h urine collection to assess creatinine clearance and 24-hour urine protein.¹ <ul data-bbox="1146 1175 1948 1302" style="list-style-type: none"> • Urine culture each trimester and when symptomatic. Bacteriuria is common in pregnancy and is more likely to result in pyelonephritis in pregnancy. • Urine test for protein (dipstick) every 2 weeks. ◆ Obtain an ophthalmologic consultation. <ul data-bbox="1146 1367 1948 1458" style="list-style-type: none"> • Retinopathy will require a review each trimester. • Proliferative retinopathy may require treatment and closer ongoing surveillance.

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p data-bbox="138 370 594 435">MATERNAL SURVEILLANCE – TYPE 1 OR 2 DM (cont)</p> <p data-bbox="138 467 394 492">First trimester (cont)</p> <ul style="list-style-type: none"> <li data-bbox="138 532 489 557">◆ Assess other risk factors: <ul style="list-style-type: none"> <li data-bbox="191 630 348 654">• Smoking. <li data-bbox="191 719 348 743">• Alcohol. <li data-bbox="191 784 384 808">• Medication. <li data-bbox="191 881 548 979">• Medical problems such as pregnancy-induced hypertension (PIH). <li data-bbox="191 979 579 1003">• Previous obstetrical history. <li data-bbox="191 1011 405 1036">• Psychosocial. <p data-bbox="138 1076 474 1101">Second and third trimesters</p> <ul style="list-style-type: none"> <li data-bbox="138 1141 422 1198">◆ Assess: <ul style="list-style-type: none"> <li data-bbox="191 1174 422 1198">• Renal function. <li data-bbox="191 1271 405 1295">• Retinopathy. <li data-bbox="191 1336 548 1393">• Previously identified risk factors. 	<ul style="list-style-type: none"> <li data-bbox="615 532 1066 654">◆ Explain the potentially harmful effects and discourage the following: <ul style="list-style-type: none"> <li data-bbox="667 630 825 654">• Smoking. <li data-bbox="667 719 898 743">• Use of alcohol. <li data-bbox="667 784 1024 849">• Taking of medications not approved for pregnancy. <li data-bbox="615 881 1077 979">◆ Explain the value of routine blood pressure testing. Review acceptable values. <li data-bbox="615 1336 1066 1458">◆ Continue to reinforce smoking cessation, avoidance of alcohol, and avoidance of medications not approved for pregnancy. 	<ul style="list-style-type: none"> <li data-bbox="1094 630 1917 686">◆ Support attempts to quit smoking, e.g., refer to smoking cessation program, etc. <li data-bbox="1094 719 1927 784">◆ Support attempts to quit drinking. Refer to appropriate program, if applicable. <li data-bbox="1094 881 1633 906">◆ Measure blood pressure every two weeks. <li data-bbox="1094 1011 1703 1036">◆ <i>See Psychosocial Considerations, Appendix A.</i> <li data-bbox="1094 1174 1875 1230">◆ Arrange for a urine protein test (dipstick) every 2 weeks up to 36 weeks, then weekly. <li data-bbox="1094 1271 1654 1295">◆ Review as per guidelines in first trimester.

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p data-bbox="138 363 594 423"><i>MATERNAL SURVEILLANCE – TYPE 1 OR 2 DM (cont)</i></p> <p data-bbox="138 459 552 488"><i>Second and third trimesters (cont)</i></p> <ul data-bbox="191 524 594 808" style="list-style-type: none"> • Medical problems such as PIH and pre-existing medical problems. • Uterine growth after 20 weeks. • Insulin requirements. <p data-bbox="138 878 594 938"><i>FETAL SURVEILLANCE – TYPE 1 OR 2 DM</i></p> <p data-bbox="138 974 321 1003"><i>First trimester</i></p> <ul data-bbox="138 1039 594 1128" style="list-style-type: none"> ◆ Assess: <ul data-bbox="191 1068 562 1128" style="list-style-type: none"> • Viability of the pregnancy and rule out anencephaly. 	<ul data-bbox="615 621 1045 1154" style="list-style-type: none"> ◆ Explain what factors indicate optimal growth. If necessary, review factors that influence growth. ◆ Reassure that increased insulin requirements are expected. ◆ Explain the purpose of ultrasounds and other tests as indicated. Introduce testing for NTD. 	<ul data-bbox="1094 524 1938 1349" style="list-style-type: none"> ◆ Measure blood pressure every 2 weeks up to 36 weeks, then weekly. ◆ Measure uterine growth clinically every 2 to 4 weeks. Conduct other surveillance as obstetrically indicated. ◆ Insulin requirements usually increase during the 2nd and 3rd trimesters and may decrease late in the 3rd trimester (36 to 38 weeks). Increased fetal surveillance is required in the latter event. ◆ An ultrasound for viability may be done at 8 weeks. ◆ Arrange for an ultrasound at 11 to 14 weeks to evaluate fetal anatomy. ◆ If available, assess nuchal translucency (screening test for chromosomal/ structural abnormalities). ◆ Time may be needed by the patient to decide if she wishes to proceed with alpha-fetoprotein testing.

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p data-bbox="138 363 594 423"><i>FETAL SURVEILLANCE - TYPE 1 OR 2 DM (cont)</i></p> <p data-bbox="138 459 344 483"><i>Second trimester</i></p> <ul data-bbox="138 524 422 675" style="list-style-type: none"> ◆ Assess: <ul style="list-style-type: none"> • Fetal anatomy. • Cardiac status. <p data-bbox="138 808 331 833"><i>Third trimester</i></p> <ul data-bbox="138 873 594 1382" style="list-style-type: none"> ◆ Assess: <ul style="list-style-type: none"> • Fetal growth. • Estimated fetal weight. ◆ Monitor fetal well being: <ul style="list-style-type: none"> • Daily fetal movement counts. 	<ul data-bbox="615 524 1024 1446" style="list-style-type: none"> ◆ Explain the purpose of the necessary tests and the indications of the findings. ◆ Explain effects of DM on the following: <ul style="list-style-type: none"> • Fetal growth. • Placental functions. ◆ Reinforce: <ul style="list-style-type: none"> • Optimal control of blood glucose to help normalize these effects. • Fetal testing provides reassurance. ◆ Teach: <ul style="list-style-type: none"> • Proper assessment of fetal movements over a 4-hour period each day. 	<ul data-bbox="1094 524 1927 1414" style="list-style-type: none"> ◆ Arrange for the following: <ul style="list-style-type: none"> • A serum alpha-fetoprotein test ideally at 16 weeks gestation (available 15 to 20 weeks), if desired. • An ultrasound at 18 to 20 weeks.⁶ • A fetal echocardiogram at 20 to 22 weeks. ◆ Insulin requirements usually increase during the 2nd and 3rd trimesters and may decrease late in the 3rd trimester. Increased fetal surveillance is required in the latter event. ◆ Arrange for an ultrasound for fetal growth assessment at 28 and 32 weeks if symphysis fundal height differs from estimated gestational age by more than 2 centimeters. ◆ Consider an ultrasound for estimated fetal weight and fetal growth at 36 to 38 weeks gestation. ◆ Start daily fetal movement counts at 28 weeks. Ten or more movements per 4-hour period is the recognized guideline.

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p>FETAL SURVEILLANCE - TYPE 1 OR 2 DM (cont)</p> <p><i>Third trimester (cont)</i></p> <ul style="list-style-type: none"> • Non-stress tests and/or biophysical profiles (planning scores). ◆ Assess timing of delivery. <ul style="list-style-type: none"> • Obstetrical risk. • Glycemic control. 	<ul style="list-style-type: none"> • When to report changes in the number and quality of movements. ◆ Explain: <ul style="list-style-type: none"> • The purpose of non-stress tests and biophysical profiles. • The indication for early delivery. • If glycemic control is good and there are no other risk factors, optimal timing for delivery is between 38 and 40 weeks. • If control is sub-optimal, or in the presence of other complications, early delivery may be indicated. 	<ul style="list-style-type: none"> ◆ Perceived reduced activity requires further fetal assessment. ◆ Start non-stress tests and/or biophysical profiles at 28 to 32 weeks and continue weekly until delivery. ◆ If delivery is being considered before 38 weeks, amniocentesis may be helpful to assess fetal lung maturity.¹⁰ ◆ It is recommended that the pregnancy be carried to or near term if there are no medical or obstetrical complications, but should not exceed 40 weeks gestation.
<p>INTRAPARTUM – TYPE 1 OR 2 DM</p> <p><i>Induction</i></p> <ul style="list-style-type: none"> ◆ Assess for the presence of contraindications. <p><i>Insulin</i></p> <ul style="list-style-type: none"> ◆ Assess insulin requirements and if insulin infusion will be necessary. 	<ul style="list-style-type: none"> ◆ Explain why labour induction is recommended and the role of oxytocin if necessary. ◆ Explain the possible need for insulin infusion. 	<ul style="list-style-type: none"> ◆ Start oxytocin as per hospital protocol. ◆ Normoglycemia during labour ensures optimum conditions for the infant.

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MANAGEMENT OF WOMEN WITH KNOWN DIABETES MELLITUS - TYPE 1 OR TYPE 2 (cont)		
<p><i>IMMEDIATE POSTPARTUM – TYPE 1 OR 2 DM (cont)</i></p> <p>Insulin (cont)</p> <p>Monitoring</p> <ul style="list-style-type: none"> ◆ Assess blood glucose control. <p>Meal Plan</p> <p>Exercise/Activity</p>	<ul style="list-style-type: none"> • Insulin adjustments. • The role of the dextrose in water solution. <p>◆ Explain the need for and frequency of capillary and/or PG testing.</p>	<ul style="list-style-type: none"> ◆ Following delivery, stop insulin infusion and immediately give subcutaneous short-acting or (rapid-acting insulin if accompanying a meal); resume the multiple dose subcutaneous insulin schedule starting with 1/2 to 2/3 the pre-pregnancy dose of insulin. Continue 10% dextrose in water at 50 cc per hour until food is tolerated. ◆ Monitor capillary blood glucose every 2 hours until eating; then four times a day before meals and bedtime (hs) snack as well as 0300 hours. ◆ <i>See Blood Glucose Monitoring section.</i> ◆ <i>See Nutrition section.</i> ◆ <i>See Physical Activity section.</i>
<p><i>LONG-TERM SURVEILLANCE - TYPE 1 OR 2 DM</i></p> <ul style="list-style-type: none"> ◆ Assess: <ul style="list-style-type: none"> • Understanding of relationship between health care practices and the development of long-term complications. 	<ul style="list-style-type: none"> ◆ Explain aggressive management of blood pressure, blood glucose, and lipids has been shown to reduce long-term complications associated with DM. Routine follow-up should be scheduled.¹ 	<ul style="list-style-type: none"> ◆ Individualize the frequency of lab and SMBG as per recommended practice for the non-pregnant woman with type 1 or type 2 DM.

ASSESSMENT	EDUCATIONAL APPROACH	RATIONALE & CLINICAL MANAGEMENT GUIDELINES
MANAGEMENT OF WOMEN WITH GESTATIONAL DIABETES MELLITUS IN A PREVIOUS PREGNANCY		
<p data-bbox="138 370 594 435">PRECONCEPTION</p> <ul data-bbox="138 573 594 638" style="list-style-type: none"> ◆ Screen all women with a previous history of GDM. <p data-bbox="138 833 594 898">EARLY SCREENING</p> <ul data-bbox="138 930 594 1060" style="list-style-type: none"> ◆ Determine the presence of GDM by screening as early as feasible in pregnancy with a 50 g oral glucose challenge. 	<ul data-bbox="615 573 1073 638" style="list-style-type: none"> ◆ Explain the need to detect DM prior to pregnancy. <ul data-bbox="615 930 1073 1239" style="list-style-type: none"> ◆ Review the implications of GDM on the fetus and long-term on the woman. ◆ If the test is normal, explain when repeat testing will be performed. ◆ If the test is abnormal, explain further testing to be done. 	<div data-bbox="1104 370 1940 540" style="border: 1px solid black; padding: 5px;"> <p>Women with GDM in a previous pregnancy are at an increased risk for developing GDM in subsequent pregnancies and/or type 2 DM. Preconception counseling and early screening for the presence of DM, impaired glucose tolerance (IGT), and/or impaired fasting glucose (IFG) is recommended.</p> </div> <ul data-bbox="1104 573 1950 1206" style="list-style-type: none"> ◆ A fasting and/or casual PG test should be done. These women should be encouraged to adopt a healthy lifestyle while planning pregnancy (healthy eating/physical activity, smoking cessation, etc.). A daily supplement of 0.4 mg/day of folic acid is recommended preconceptually and in the first trimester to reduce the incidence of NTD.⁹ ◆ <i>See Screening section.</i> ◆ GDM recurs in 30 to 50% of subsequent pregnancies. For women with previous GDM, recommend adherence to the meal plan in a subsequent pregnancy whether or not a new diagnosis is made. ◆ Repeat the 50 g oral glucose challenge at 24 to 28 weeks or at any time there are symptoms or signs of hyperglycemia, and if necessary, at 34 weeks. ◆ <i>See Screening section.</i>

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MANAGEMENT OF WOMEN WITH GESTATIONAL DIABETES MELLITUS		
<p data-bbox="138 345 594 407"><i>GLYCEMIC CONTROL IN EARLY PREGNANCY - GDM</i></p> <ul data-bbox="191 574 516 636" style="list-style-type: none"> • Assess the adequacy of glycemic control. <p data-bbox="138 927 594 989"><i>MATERNAL SURVEILLANCE - GDM</i></p> <p data-bbox="138 1013 464 1040"><i>Second and third trimester</i></p> <p data-bbox="138 1203 594 1230"><i>FETAL SURVEILLANCE – GDM</i></p> <p data-bbox="138 1260 464 1287"><i>Second and third trimester</i></p>	<ul data-bbox="621 570 1066 1502" style="list-style-type: none"> ◆ Explain the following, if control is inadequate: <ul data-bbox="667 634 1066 756" style="list-style-type: none"> • The benefits of insulin therapy. • The implications of elevated blood glucose. ◆ Explain the parameters that will be monitored regularly and the purpose for monitoring them. ◆ Explain the purpose of the following: <ul data-bbox="667 1357 1066 1502" style="list-style-type: none"> • Fetal surveillance. • Ultrasound for fetal growth. 	<div data-bbox="1108 350 1934 548" style="border: 1px solid black; padding: 5px;"> <p>Optimal glycemic control may be achieved through adherence to treatment that includes healthy eating, active lifestyle, and routine monitoring of blood glucose and ketones. Individualized dietary advice, blood glucose monitoring, and insulin therapy (as needed) have been shown to reduce serious perinatal morbidity and may improve the woman’s health-related quality of life.¹¹</p> </div> <ul data-bbox="1098 634 1942 1502" style="list-style-type: none"> ◆ Insulin should be considered if diet and activity management fails to normalize blood glucose. Capillary values should be within 20% of the PG values.¹ Consider insulin if the PG is:¹ <ul data-bbox="1144 727 1528 886" style="list-style-type: none"> • Fasting ≥ 5.3 mmol/L <li style="text-align: center;">or • 1-hour pc ≥ 7.8 mmol/L <li style="text-align: center;">or • 2-hour pc ≥ 6.7 mmol/L ◆ See <i>Insulin section</i>. ◆ For insulin-requiring GDM, follow maternal and fetal surveillance guidelines as for women with type 1 or 2 DM. (<i>See pages 6 to 10 in this section.</i>) ◆ For diet controlled GDM, as per standard prenatal care. ◆ For insulin-requiring GDM, follow fetal surveillance guidelines as for women with type 1 or 2 DM. (<i>See pages 8 to 10 in this section.</i>) ◆ If diet controlled, start weekly biophysical testing after 40 weeks. ◆ Consider an ultrasound for estimated fetal weight at 38 weeks.

ASSESSMENT	EDUCATIONAL APPROACH	RATIONALE & CLINICAL MANAGEMENT GUIDELINES
MANAGEMENT OF WOMEN WITH GESTATIONAL DIABETES MELLITUS (cont)		
<p data-bbox="138 354 594 418">FETAL SURVEILLANCE – GDM (cont)</p> <p data-bbox="138 441 541 474"><i>Second and third trimester (cont)</i></p> <p data-bbox="138 571 594 636">INTRAPARTUM – GDM</p> <p data-bbox="138 659 256 691"><i>Delivery</i></p> <ul data-bbox="138 724 487 789" style="list-style-type: none"> ◆ Assess the need for early delivery. <p data-bbox="138 1032 583 1065">IMMEDIATE POSTPARTUM - GDM</p> <p data-bbox="138 1097 277 1130"><i>Monitoring</i></p> <p data-bbox="138 1292 268 1325"><i>Meal Plan</i></p> <p data-bbox="138 1390 361 1422"><i>Exercise/Activity</i></p>	<ul data-bbox="615 480 1062 1487" style="list-style-type: none"> ◆ Teach proper assessment of fetal movements (<i>see page 9 in this section</i>). ◆ If necessary, explain when induction will be considered. ◆ Explain the need for PG testing. ◆ Encourage continuation of a healthy meal plan. ◆ Encourage return to regular exercise/activity. 	<ul data-bbox="1094 480 1938 1455" style="list-style-type: none"> ◆ If obese, do serial ultrasounds for growth evaluation during the 3rd trimester if clinically indicated. ◆ Early delivery may be necessary in the presence of hypertension or other maternal complications or with suspected fetal compromise. ◆ Consider delivery by 42 weeks (sooner in the presence of risk factors). Be prepared for possible shoulder dystocia. <div data-bbox="1104 906 1938 980" style="border: 1px solid black; padding: 5px;"> <p>For insulin treated GDM, Intravenous (IV) insulin is usually not required during labour and delivery or postpartum.</p> </div> <ul data-bbox="1094 1136 1854 1455" style="list-style-type: none"> ◆ A fasting or casual PG should be done on those with insulin requiring GDM prior to discharge to rule out ongoing glucose intolerance. (<i>See Screening section.</i>) ◆ <i>See Blood Glucose Monitoring section.</i> ◆ <i>See Nutrition section.</i> ◆ <i>See Physical Activity section.</i>

ASSESSMENT	EDUCATIONAL APPROACH	RATIONALE & CLINICAL MANAGEMENT GUIDELINES
MANAGEMENT OF WOMEN WITH GESTATIONAL DIABETES MELLITUS (cont)		
<p><i>LONG-TERM SURVEILLANCE – GDM (includes 6 to 8 weeks postpartum)</i></p> <ul style="list-style-type: none"> ◆ Screen for ongoing DM. 	<ul style="list-style-type: none"> ◆ Explain: <ul style="list-style-type: none"> • The need for testing at the first postnatal visit and routinely thereafter. • The value of preconception care and counselling. 	<ul style="list-style-type: none"> ◆ See Screening section. ◆ See Blood Glucose Monitoring section. ◆ The recurrence rate for GDM in a subsequent pregnancy ranges from 30 to 50%.^{12,13} It is highest among ethnic groups with high prevalence rates for DM (First Nations, African, Hispanic, and Asian descent). It also increases with age and postpartum weight gain. ◆ Thirty to 50% of women with GDM go on to develop DM within 10 years.⁷ This is dependent on gestational age at diagnosis, degree of glycemia at diagnosis, obesity, and further pregnancy.¹⁴ Approximately 15% of women who have GDM will remain glucose intolerant or demonstrate overt diabetes mellitus postpartum.³ Those who were diagnosed early, obese, and required insulin are more likely to demonstrate persistent glucose intolerance.⁷
MANAGEMENT OF WOMEN WITH IMPAIRED GLUCOSE TOLERANCE (IGT) OF PREGNANCY		
<p><i>PRECONCEPTION – HISTORY OF IGT OF PREGNANCY</i></p> <p><i>Screening</i></p>	<ul style="list-style-type: none"> ◆ Review benefit of the following: <ul style="list-style-type: none"> • Weight management. • Active lifestyle. ◆ Review benefit of early diagnosis. 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>In women with a previous history of IGT of pregnancy, preconception counseling and early screening for DM/GDM should be encouraged.</p> </div> <ul style="list-style-type: none"> ◆ Weight reduction may be recommended in those that are overweight. ◆ Screen for DM in the preconception period. Plan to screen for GDM/IGT of pregnancy as early in pregnancy as feasible with 50 g glucose challenge.

ASSESSMENT	EDUCATIONAL APPROACH	RATIONALE & CLINICAL MANAGEMENT GUIDELINES	
MANAGEMENT OF WOMEN WITH IMPAIRED GLUCOSE TOLERANCE OF PREGNANCY (cont)			
PRECONCEPTION – HISTORY OF IGT OF PREGNANCY (cont)	<ul style="list-style-type: none"> ◆ Explain the parameters that will be monitored regularly and the purpose for monitoring them. 	<p>See specific guidelines related to meal plan, physical activity, blood glucose monitoring, and ketone monitoring. See the appropriate sections in the manual.</p>	
DURING PREGNANCY – IGT OF PREGNANCY		<p>Meal Plan</p>	<ul style="list-style-type: none"> ◆ Management of IGT is guided by the same principles as for GDM. Weight management and spacing meals with attention to overall nutrition is recommended.¹ The benefits of a meal plan are especially seen in women with a BMI ≥ 29.¹⁵
		<p>Physical Activity</p>	<ul style="list-style-type: none"> ◆ Active lifestyle should be encouraged.
<p>Monitoring</p> <ul style="list-style-type: none"> ◆ Lab ◆ SMBG ◆ Ketones 		<ul style="list-style-type: none"> ◆ Monitoring may be justified¹ and frequency will be determined by the health care team, taking into consideration individual risk and patient motivation. If not self-monitoring, retest in 4 weeks for progression of glucose intolerance.¹⁶ Some women with IGTP have been shown to require insulin.¹⁷ 	
Maternal/Fetal Surveillance	<ul style="list-style-type: none"> ◆ As per standard prenatal care. 	<ul style="list-style-type: none"> ◆ Manage the same as the non-diabetic population. 	
INTRAPARTUM – IGT OF PREGNANCY			

<i>ASSESSMENT</i>	<i>EDUCATIONAL APPROACH</i>	<i>RATIONALE & CLINICAL MANAGEMENT GUIDELINES</i>
MANAGEMENT OF WOMEN WITH IMPAIRED GLUCOSE TOLERANCE OF PREGNANCY (cont)		
<p>IMMEDIATE POSTPARTUM – IGT OF PREGNANCY</p> <p>LONG-TERM SURVEILLANCE – IGT OF PREGNANCY</p>	<ul style="list-style-type: none"> ◆ Review symptoms of DM. 	<ul style="list-style-type: none"> ◆ Women with IGT of pregnancy should be encouraged to seek preconception counseling for future pregnancies. ◆ The progression to DM or to persistent IGT is greatest in women with increased fasting plasma glucose levels during pregnancy and the need for insulin therapy particularly before 24 weeks gestation.⁷ ◆ Encourage annual testing for progression to DM, promoting healthy eating, active living (physical activity), weight management, and vascular risk factor modifications.
PROBABLE INDICATIONS FOR REFERRAL TO AN OBSTETRICIAN		
<ul style="list-style-type: none"> ◆ Determine need for specialist involvement. 	<ul style="list-style-type: none"> ◆ Explain the role of the obstetrician and the impact this referral may have on visits to the family physician. 	<ul style="list-style-type: none"> ◆ Indications for referral: <ul style="list-style-type: none"> • All women with type 1 DM and type 2 DM. • Women with insulin-requiring GDM. • Women with GDM with known high-risk pregnancy risk factors, e.g. hypertension, morbid obesity, previous poor obstetric history. ◆ Consider referral to an endocrinologist/internist in all cases.

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ADDITIONAL READING

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