A Toolkit for Health Care Practitioners using “Plan Do Study Act (PDSA) Cycles”

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The first network is The Gestational Diabetes Collaborative, Better Data Better Care, a ten state, four tribal entity partnership organized by Joan Ware and Adeline Yerkes of the National Association of Chronic Disease Directors (NACDD) and Michelle Owens-Gary of the Centers for Disease Control and Prevention, Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion. The goal of this Collaborative is to improve gestational diabetes (GDM) surveillance and develop interventions to improve care. Participating states initially included Michigan, North Carolina, Oklahoma, Utah and West Virginia and now extend Arkansas, Florida, Idaho, Missouri, and Ohio plus the tribal entities of Alaska’s SouthCentral Foundation, Chickasaw Nation, Choctaw Nation and Utah Navajo Health System.

The second network involves the partnering of the Association of Maternal Child Health Programs (AMCHP) with the Centers for Disease Control and Prevention, Division of Reproductive Health (DRH), Applied Science Branch/Research and Evaluation Team and the NACDD to support collaborations between Maternal and Child Health (MCH) and Chronic Disease (CD) with three states (Missouri, Ohio, West Virginia) using an adapted Action Learning Collaborative model to address GDM and prevention of type 2 diabetes.
What is Gestational Diabetes and why is it important?

Gestational diabetes puts both the woman and her offspring at higher risk for complications. The American Congress of Obstetricians and Gynecologist (ACOG) define gestational diabetes (GDM) as: “Carbohydrate intolerance leading to hyperglycemia with onset or first recognition during pregnancy.”\(^1\) The American Diabetes Association cites: “While blood glucose levels usually return to normal after delivery for most women, up to one-third of women with GDM will have type 2 diabetes or impaired glucose intolerance at postpartum testing\(^5-10\) and up to 50% will develop diabetes during their lifetime.”\(^11-12\)

In fact, women with a history of GDM have 7.5 times the risk of developing diabetes compared to women without a history.\(^13\) Recent studies also indicate an increase in cardiovascular disease.\(^14-15\)

GDM is increasing in the United States with rates in some populations ranging from 3%-14% and the anticipated growth is up to 18%.\(^2,4\) Prevalence of GDM maybe even higher due to underreporting by birth certificates.\(^17\) GDM has increased greatly in the last 20 years just as the prevalence of type 2 diabetes has risen. This increase in GDM can be linked to obesity and increased maternal age.\(^16\)

Recent studies suggest that the offspring of women experiencing GDM are also at greater risk for developing type 2 diabetes.\(^18\) The research reflects that offspring have a 7.8 times the risk of developing diabetes later in life especially if that offspring is overweight or obese.\(^18\)

What are the Implications for Health Care Practitioners?

Health care practitioners have been good at monitoring for maternal and fetal complications during pregnancy, but not as proficient about making sure all patients have been appropriately diagnosed, counseled for GDM, and tested postpartum for type 2 diabetes. Postpartum testing for type 2 diabetes has not been well integrated into clinical practice, with only an estimated 50% of women who had GDM during pregnancy receiving a postpartum glucose test.\(^19\)

While most leading authorities agree on assessment of the risk for GDM for all pregnant women, the United States (U.S.) Preventive Service Task Force being an exception,\(^20\) they differ on testing procedures, diagnostic criteria, target blood glucose levels during pregnancy, and scheduled postpartum testing and follow-up for diabetes.\(^21-22\) Although this lack of consensus in screening, diagnosing GDM (Resources/Appendix – International/National Guidelines), and postpartum follow-up, can be a barrier, there are system changes in clinic policies and procedures that can greatly improve the quality of care for women with GDM. With the increase in GDM and some deficiencies in care, it is urgent that practitioners assess how they test for GDM and provide care and counseling for women with GDM.
What is the Purpose of This Guide?

During the past two years, staff at the Charleston Area Medical Center (CMAC) Women’s Medicine Center implemented a quality improvement project to enhance the process of care for women with GDM by diagnosing and documenting GDM, educating these women during the prenatal period about GDM and the risk of developing type 2 diabetes and improving postpartum glucose testing. The clinic used the Rapid Cycle Improvement Model, also known as the PDSA Model (Plan, Do, Study, Act). Since not all changes are improvements, this model relies on planning small changes, rapid testing of the changes, adjusting the changes if necessary, more widely testing changes and implementing the changes that are effective.

This guide describes the PDSA Model, demonstrates how West Virginia implemented the Model and how others can replicate this Model for system changes.

An Introduction to the Rapid Cycle Improvement Model (PDSA Model)

The PDSA Cycles Quality Improvement Model is based upon Denning’s model of improvement and developed by the Associates in Process Improvement. The Model tests changes on a small scale before full implementation of a change or improvement in two phases, using a four step process:

- **Plan:** Identify an opportunity and plan for change
- **Do:** Implement the change on a small scale
- **Study:** Use data to analyze the results of the change and determine if it made a difference
- **Act:** If the change was successful, implement it on a wider scale
The improvement model has two phases; setting the process and then implementing the cycles. Quality improvement can be as small as adding a sign or as big as creating a new order set. The bottom line is that you want to improve. With PDSA Cycles of Change Model process you begin with the following questions:

1. What are we trying to accomplish?
2. How will we know that a change is an improvement?
3. What changes can we make that result in improvement?

With the PDSA cycles of change, the results are known fairly quickly. So you don’t have to wait very long. This is great news in many ways. It allows for positive reinforcement. The staff making the effort to change their current behavior(s) needs to know if making the change indeed results in an improvement. Also if the change does not work, then it can be abandoned quickly and the team or individual does not feel like too much time was wasted. For example, a team wants to change a form, the team tests a mock up version in the clinic one afternoon, and then sees if this will have a positive impact.

**Setting the process** includes identifying the problem from previously gathered observations, data or outcomes. Setting the process includes setting goals, establishing evaluation measures and selecting the team and changes.

- defining objectives - time-specific and measurable
- defining the specific population of patients or other system that will be affected
- defining measures to determine if a specific change actually leads to an improvement or not
- selecting the team to help with implementing the PDSA cycles
- selecting the changes or gaining ideas from change may come from the insights of those who work in the system, or from change concepts or other creative thinking techniques and/or by borrowing from the experience of others who have successfully improved

**Implementing the Cycles** includes implementing the steps of PDSA. Using the PDSA cycle involves testing new change ideas on a small scale. As with any change, ownership is key to implementing the improvement successfully. If you involve a range of colleagues in trying something out on a small scale before it is fully operational, you will reduce the barriers to change.

For example:

- Trying out a new way to make appointments for one consultant or one clinic
- Trying out a new patient information sheet with a selected group of patients before introducing the change to all clinics or patient groups
- Building on the results of these test cycles in a structured way so you can put a new idea in place with greater chances of success

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But how do you tell if in fact this change is an improvement? The Institute for Healthcare Improvement offers some tools that may be beneficial. A PDSA worksheet keeps the team organized while going through each cycle of change. What’s really helpful about this worksheet is that the team can complete this and make assignments to members of the team, list where and when assignments take place. This form also makes the team members think upfront how to measure the change to determine if it is an improvement.
Why test change before implementing it:
Testing involves less time, money and risk.
The process is a learning process where all ideas that could or could not work can be explored; everyone can be involved in developing and exploring the ideas and there is less resistance to the process. Testing on a small scale is less disruptive to staff and clients.

How to utilize the model:
Plan multiple cycles to test ideas. You can adapt these from the current improvement process. Test on a really small scale.

For example, start with one patient or one clinician at one afternoon clinic and increase the numbers as you refine the ideas. Test the proposed change with people who believe in the improvement. Don’t try to convert people into accepting the change at this stage. Only implement the idea when you’re confident you have considered and tested all the possible ways of achieving the change.

Measure the change by studying the data:
Collect data to establish a baseline. Assessing where you are at the beginning or baseline is important in determining whether the results are a change or the change made a difference. Measuring change is dependent on what is changed to improve and there are a couple of ways to go about collecting data:

✓ Collect baseline data so that you can see where you are at before the process change occurs. This can be done before you implement your improvement. You can either collect these data prospectively for a certain time period (and this does not have to be long) or use reports that are already on file, or pull data (retrospectively), such as collecting this information from medical records or a database. Just make sure that when you set up your baseline data “the period of time” is not too far from when you implement your change, such as data from 3 years ago and then you implement the change tomorrow, leaving you with a gap of 3 years in between. While you can collect data for a short period of time, such as a week, be certain that these data are collected under usual circumstances, with the usual patient flow and staff. For example, you collect data on the number of women completing postpartum testing and you compare this with baseline data.

✓ Use a survey. For example, you might want to see if there is an improvement in risk reduction of type 2 diabetes for women with GDM. This would be very hard to test and takes several years to follow patients to see if they changed their behaviors and reduced their risk for type 2 diabetes. You might want to administer a survey to all patients to see what they know about risk reduction when they are first diagnosed with GDM and then another one after they have a few prenatal visits. You can compare the pre and posttest if you keep track of who completed both or if the surveys are anonymous, you can get an idea of the overall change if any. Thus, you would need to then collect data pre and post Quality Improvement (QI) intervention.

✓ Collect pre and post intervention through a retrospective pretest. You may need to choose this method if you need to seize the moment and implement your QI project and do not have time or resources to collect baseline data. For example, you want to conduct a training of medical residents who provide prenatal care to the women in your clinic and there happens to be a training going on in a few days and you are going to do a segment on the postpartum visit for patients with GDM. You develop a learning motto: "Now and Later" in which you...
emphasize that the care provided for women at the postpartum visit, can impact this woman's health for several years, especially for women who do not have a medical home and might not access healthcare again until her next pregnancy. The training emphasis is that you need to make sure she gets the 2 hour GTT test (Now) and then (Later) every 3 years. Develop a plan to ensure that both the "now" and the "later" testing occur, which may include a referral to another clinic for primary care. Since the training occurs in 2 days you don't have time to collect baseline data. The training focus is improving the physician's ability to set up a postpartum testing plan with patients. Thus you choose retrospective pretest. Immediately after this training, you provide a survey to the residents that will ask them both about their abilities to counsel on 2 hour GTT testing 2 weeks prior to today's program and how well they would do the counseling now. You can compare these 2 scores to see if your training was effective. You can then follow up and reinforce your training message after each resident interacts with a patient with GDM.
During the past two years, staff at the Charleston Area Medical Center (CMAC) Women’s Medicine Center implemented a quality improvement project to:

1. Enhance the process of care for women with GDM by diagnosing and documenting GDM.
2. Educate these women during the prenatal period about GDM and risk of type 2 diabetes.
3. Improve postpartum glucose testing.

The clinic used the PDSA Model (Plan, Do, Study, Act). By utilizing this model for one year, the CAMC staff was able to document their improvements.

- Documented prenatal GDM testing increased from 55% to 73%.
- Documented GDM diagnosis on medical charts increased to 100%.
- Documented GDM risk education increased to 95%, a 30% improvement over baseline.
- Attendance at postpartum visits increased from 50% to 89%.
- Documented medical orders for postpartum glucose testing increased 4-fold.

This toolkit demonstrates how West Virginia implemented the Model and how others can replicate this Model for system changes.

**West Virginia Toolkit**

**An Illustration of a Successful PSDA Model Intervention to Improve the System of Care for Women with Gestational Diabetes**

**Step 1. Plan - Understanding where you are**

As healthcare practitioners, you have decided to improve the care for women with gestational diabetes (GDM). But, how do you do it? Where do you start? A few years ago, Charleston Area Medical Center OB-GYN clinic made this decision, and has been able to improve care for Women with GDM and are still working at it. First, figure out your specific goals(s) or the “systems goals” that relate to an overall outcome. What needs to improve in your clinic, health care delivery system or a relationship with the larger global population of women with GDM?

**The West Virginia Quality Improvement Initiative**

- Establish a systematic process for the identification and documentation of GDM
- Educate women with GDM about risk reduction of Type 2 Diabetes
- Improve postpartum testing

- Consistent care for women with GDM
- Reduce incidence of new onset Type 2 Diabetes
• Second, it may seem basic, but assessing the current system in your clinic with respect to policies and procedures of care for women with GDM is important.

Establishing a baseline of your current system provides you important data in making the overall system change. Here are a couple of questions that went through the minds of the West Virginia Team as we began the quality improvement (QI) initiative for obstetric patients in an outpatient clinic:

- Are all staff following the same nationally recognized GDM guidelines?
- Does all staff know which GDM guidelines to follow?
- If so, which guidelines?
  - American Congress of Obstetrics and Gynecology (ACOG)
  - American Diabetes Association (ADA)
  - World Health Organization (WHO)
  - US Preventive Health Task Force Guidelines
- Are we educating our patients with GDM about the risk of developing type 2 diabetes?
- Do most of our patients’ follow through with a post-partum glucose screen lab?

How much data do we need to collect to figure out where we are?

Rather than a lengthy and comprehensive assessment, the West Virginia Team took on rapid cycle process improvement, often known as the Plan, Do, Study, Act (PDSA) cycles of change. It begins with a planned change (Plan) usually something small. Next execute the change (Do). It may mean trying it out on one or two patients or for a short period of time. Then assess if this was in fact an improvement (Study). Finally, act on these results (Act). As we all know too well, change does not always equate to improvement. So sometimes you realize what you are doing is not working and may need to be modified further or you may need to start all over again.
Third, the West Virginia Initiative formed an interdisciplinary team.

The West Virginia Interdisciplinary Team

Some suggested sample members to consider and include:

- Physician(s)
- Nursing manager
- Public Health Expert(s)
- Diabetes educator(s)
- Facilitators
- Residents in OBGYN
- Researchers/Evaluators

A diverse team served well because it gave the team a collection of talents and approaches to focus on the issues of the QI initiative. We had clinicians that were on the ground testing for GDM, educating women about GDM, and we also had some that did not work in the clinic who could ask some “out of the box” questions about work flow and clinic practice.
• Fourth, the team began collecting baseline data on client characteristics.

Rather than try to collect data on how we were doing, we started with some hunches and anecdotal information, what the practitioners thought were the issues. However, if you have data already available it is advisable to review this. For example, you might want to assess the following baseline information:

**Screening for GDM**
1. Percentage of patients screened for GDM.
2. Percentage of patients who complete GDM testing. (typically a 2 step process)
3. Are there issues of compliance in completing the GDM testing?
   a. Patient compliance-(patients do not complete testing)
   b. System compliance (physicians do not order test or follow-up with patients missing labs))

**Identification of Women with GDM**
1. Percentage of medical records where the ICD-9 code adequately identifies the patient has GDM.
2. Percentage of patients’ medical records with a plan of care.
3. Percentage of patients whose medical record indicates that patient education was completed.
4. Percentage of patients whose medical record indicates that patient received monitoring laboratory values for GDM.
5. What comprises your GDM education, content is culturally specific and timely, group or individual classes?

**Post-partum testing**
1. Percentage of patients who completed a postpartum visit.
2. Percentage of patients who completed postpartum testing for type 2 diabetes.
3. Percentage of patients informed of the risk for developing type 2 diabetes.
4. Are there issues of compliance in postpartum testing?
5. Is there documentation of discussion with patients as to community resources to aid in preventing type 2 diabetes?

Once you have a chance to see where you are, you are ready to start thinking about process improvement.
As we built our program, here are a few things we learned:

- **Start with something small** (the low hanging fruit). It may be that you decide to put stickers on the charts identifying patients with GDM. It may be that you develop a letter for all women who have GDM that goes over the risk(s) they now have for developing type 2 diabetes and the importance of returning for postpartum type 2 diabetes testing. It may be that you make sure residents and attending physicians are ordering postpartum labs by making this process automated.

- **Just do it!** It is OK if it does not work. It really is. You will not be able to assess your program if you spend days, weeks, or months planning its execution. With the rapid cycle process improvement method, you will see if it is an improvement fairly quickly. If it works you keep it, and if it doesn’t you move onto try something else. Because you are going to see if it is working after a few patients or a very short period of time, if it does not work, then you haven’t wasted too much time.

- **Make sure you have a plan.** You need to assign some tasks to members of the team. Who is in charge of launching the change? Who is in charge of collecting some data (pre/post change data to see if it brought about an improvement)? You will need evidence that it works.

- **Changes to the system or buy-in from specific staff members may be a challenge.** Having a physician leader or evidence that this improvement process works, may bring others on board possibly at the systems level (think administrator or other top level members of management) to bring credence to you proposed change.

- **Patience is key.** As one knows too well, it may take longer than you anticipate. For example a simple idea of changing a form to list the GDM blood testing and check off boxes, may take months to get approved because of an internal system requirement. Thus, you might want to pilot it on a small scale so that you work out all the kinks before setting it in stone.

- **Remember what this is all about.** It’s about the patients. That being said, make sure these changes are in fact patient-centered. Put yourself in the shoes of the patient and try to better understand why there may be issues of compliance. For example, does getting lab work involve going outside the clinic to a lab? Is this convenient for your patients? You may want to consider inviting patients to join the team. This will help make sure the effort is patient centered.
We have mentioned a few examples of improvement in this section. How about some more? When our "change" team came together we looked at 3-4 different areas to improve care. You can choose one area or focus on the areas where you need improvement or tackle all of them. As each clinic is different, some of these examples may or may not work or are not a target area for improvement for your clinic. Here are a few examples if you need some help to get started:

**Screening for GDM**
- Bring phlebotomists to the clinic rather than sending patients to an outside laboratory
- Run a weekly report of those tested and those who have an elevated blood glucose test to make sure all have been contacted to get second test
- Put someone in charge of reviewing labs to make sure they are complete
- Develop and implement script for practitioners to use to advise patients of the importance of getting prenatal lab work, specifically explaining the glucose challenge test and why it is important for patients to know whether or not they may have GDM
- Call patients who do not complete GDM testing and discuss the importance of getting lab work completed
- Better understand why patients may not be getting lab work completed
  - Is there a financial component?
  - Do they have an ethical issue with prenatal blood work?
  - This may involve asking each patient why they did or did not complete the lab work.
  - Ask patients if there is anything that would help so that the lab work is completed?
  - What can team members or the system do to improve the system?
  - Keep track of these ideas and look for patterns or areas the clinic can change to make it more patient centered
  - Standardize documentation of GDM testing. Is it going to be in the narrative, or the ACOG prenatal form, or both?

- Identification of Women with GDM
- Make it easier for Practitioners with a checklist or encounter form to include GDM in "Diagnostic List."
- Making the item visible and easy to document is often easier and gains compliance by clinicians
- Add a visual to the chart that lets Practitioners know the patient has GDM, without needing to dig through the chart to look for it. This may be a “GDM” sticker on the chart or after the lab section.

**Patient Education**
- Educational material make-over. Change educational materials so that they are more user friendly and provide the latest information. Make sure the materials are pertinent to the population you serve (health literacy concern).
Many of the educational materials can be way over the heads of people coming for care. Watch for signs of lower health literacy levels such as a patient stating, "I forgot my glasses at home" or "I don't understand what you are asking for." Other telltale signs might be when the patient takes a very long time to fill out a form or skips over certain questions.

- Develop a message and make sure each patient with GDM receives it. It may be in the form of a conversation between the patients and physician, or a paragraph for them to read or be read to them that they sign off acknowledging that they read it. A sample letter is included in Appendix B.
- Add "Diabetes Education" to the encounter form.
- Make sure education is not just on GDM but how to prevent developing type 2 diabetes (lifestyle changes, diet, exercise, proper weight gain during pregnancy, breastfeeding).
- Ensure that educational materials are available in all exam/counseling rooms.

**Post-partum testing for and education about type 2 diabetes**

- Incentivize post-partum lab test completion. For example; provide a free baby photo, department store or grocery store gift card. [See Appendix C for a sample letter]
- Add postpartum testing to encounter form, for practitioner to check off
- Change discharge orders to automatically document follow-up visits
- Educate practitioners with a session, "What to do during a post-partum visit," emphasizing the importance of identifying women who had GDM during their pregnancy, ordering postpartum lab work to test for elevated glucose levels, and providing risk reduction strategies (breast feeding, lifestyle changes through diet and exercise ) to prevent type 2 diabetes
- Refer patients without a medical home to a clinic or provider and let them know the patient had GDM
- Check to make sure the patient completes the visit at the end of one year postpartum.

Now that you decided what you want to do to improve care for women with GDM and you executed your change, what now? Let’s move onto how you are going to make sure this is not just change, but an actual improvement.
In Step 1 you began measuring by establishing baselines: baseline of your system and then patient characteristics. Now you are ready to measure for change – comparing the baseline to what happening during your pilot testing phase.

Here are a few more pointers in measuring change:

✓ Measure immediately, with each patient or process,
✓ If the change is an improvement, then you can implement this change on a larger scale
✓ If the change is not an improvement, then you begin the process again by planning a different strategy to bring about improvement
✓ If you find the change worked in some aspects but not others, then you have an opportunity to modify it, rework the change and test again
✓ Keep measuring for a specified time period so that you can see if an initial improvement trend wasn't by chance or caused by people knowing their work is being measured.
✓ Once you implement the change on a larger scale, you need to keep measuring the large scale change to see how sustainable it is.
✓ With PDSA the cycles are continuous, meaning after you have made one successful improvement, again think how to make another improvement
✓ If resources are an issue (your staff is already overstretched), then seek help from the outside (QI staff from the hospital, research staff, department of health staff, university/college/medical school students, volunteers).
Step 4. Do - Implement the Change and Promote Adherence to the Process

Now that your team has found a way to improve the process of care for women with GDM, how to maintain the process change is the next challenge. This is one of the biggest challenges of any initiative and the team has to really work on this. This can be especially challenging when your organization may have staff turnover or is downsized. If working on the QI project feels like a burden or extra work, then efforts may not continue. However, if staff can see the improvement and it makes their job better or easier, then they will help sustain it.

For example, you want women with GDM to obtain their 2-hour glucose test postpartum for type 2 diabetes. This has been hit or miss in the past as the staff is aware that the majority of their patients do not return for their postpartum visit in this particular clinic. What if as part of your QI projects, you were able to empower the patients with GDM to return for their postpartum visit? Possibly you could incentivize, or work harder at reminding the women, or provide childcare for them to make these visits. Or maybe you could work with the pediatric clinic so that the baby's wellness checkup and postpartum visits are at the same time. Whatever the initiative, clinic staff now see how this one QI project that was focused on patients with GDM, could be applied to all clinic patients to increase overall postpartum visit rate. Thus the chance of sustainability is higher.

Here are a few things that the West Virginia Team learned along the way of trying to make our QI project sustainable:

- **Need a champion of the cause.** The most effective champion is usually someone in leadership or someone that can energize and empower staff. Initiating a QI project often involves all of the staff and some may be resistant to change or even forget the new process. If leadership has a positive attitude toward change and sets the agenda for the clinic, then staff is apt to be more willing to participate.

- **A QI team needs to be multidisciplinary.** This brings a wider set of skills, diverse area of expertise and creative strategies.

- **You are special.** While it is great to get ideas from other institutions and see what others are trying, each institution, clinic, patient population is unique and your clinic staff are the experts on your clinic population. So the ideas for the QI project need to come from understanding the specific issues that face your patient population and the system in which you work.

- **The improvement runneth over.** QI projects may have an intended purpose to improve one small process, but these are connected to major areas that your organization may be trying to make improvements such as patient satisfaction, efficiency, work-flow, etc. Remember the main goal is improving quality of care in general.

- **Create a culture of Improvement.** While it is part of human nature to want to better ourselves, why is it that sometimes we are stubborn to change? Change is the unknown. It makes you do something different. It makes you see something differently. If you work on rewarding staff that improve the process of care for
women with GDM, it will seem less daunting, difficult and uncomfortable for everyone else. You have to work on creating this culture of improvement. It does not just happen on its own. You have to work at changing the work culture so that there is a drive to improve. This means making sure you have the resources, making sure staff are trained, freeing up staff time to work on the QI project and trying to figure out what may be holding back some from participating. Overall, you have to make sure your organization values improvement and have been adequately trained or have the skillset to do it and are rewarded.

- **Remember your process of improvement does not end.** This is an ongoing process. The West Virginia team developed a checklist to help others complete and repeat the process. (See Appendix D – WV Checklist)
Publications on GDM and Prevention of Type 2 Diabetes:


Resource Organizations with Educational Materials on GDM for practitioners and patients:

• American Diabetes Association.
  http://www.diabetes.org/diabetes-basics/gestational/?loc=DropDownDB-gestational

• National Institutes of Health.
  http://ndep.nih.gov/publications/index.aspx?Keyword=Gestational +Diabetes&Go.x=10&Go.y=4

• Centers for Disease Control and Prevention.
  http://www.cdc.gov/Features/DiabetesPregnancy/

• State Diabetes Prevention and Control Programs

• State Maternal and Child Health Programs
Quality Improvement Resources:

- The Improvement Guide: A Practical Approach to Enhancing Organizational Performance (2nd Edition) Langley GL, Nolan KM, Nolan TW, Norman CL, Provost LP, San Francisco, California, USA: Jossey-Bass Publishers; 2009 [http://www.ihi.org](http://www.ihi.org) (you will need to register and search for PDSA and you will have access to the worksheet and other tools)

- Doctor's Digest. "Quality Improvement and Your Practice" Jan/Feb 2011. [www.doctorsdigest.net](http://www.doctorsdigest.net)

  Search for "PDSA" or "process improvement." Can search database at [http://www.innovations.ahrq.gov](http://www.innovations.ahrq.gov) for examples of real QI projects


National Collaborative Partners:

- National Gestational Diabetes Network of the Women’s Health Council, National Association of Chronic Disease Directors (NACDD).

- Maternal and Child Health (MCH) & Chronic Diseases (D) Collaboration Project
  Association of Maternal Child Health Programs (AMCHP)

- Centers for Disease Control and Prevention, Division of Reproductive Health (DRH), Applied Science Branch/Research and Evaluation Team
PDSA Worksheet for Testing Change

**Aim:** (overall goal you wish to achieve)

*Every goal will require multiple smaller tests of change*

<table>
<thead>
<tr>
<th>Describe your first (or next) test of change:</th>
<th>Person responsible</th>
<th>When to be done</th>
<th>Where to be done</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Plan**

<table>
<thead>
<tr>
<th>List the tasks needed to set up this test of change</th>
<th>Person responsible</th>
<th>When to be done</th>
<th>Where to be done</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predict what will happen when the test is carried out</th>
<th>Measures to determine if prediction succeeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Do**

Describe what actually happened when you ran the test

**Study**

Describe the measured results and how they compared to the predictions

**Act**

Describe what modifications to the plan will be made for the next cycle from what you learned

*Institute for Healthcare Improvement*
An Example of Health Education Piece with an Incentive

Post-partum Visit Incentive Program for Patients with Gestational Diabetes,
Women's Medicine Center, CAMC Woman and Children’s Hospital

By signing this form, you agree to participate in a program that encourages women with gestational diabetes to attend a postpartum care visit (4-6 weeks after giving birth).

You are eligible to receive (2 5 X 7 photos of your baby) if you:
• have gestational diabetes,
• show for your postpartum visit,
• get your blood glucose tested afterwards,
• provide us with a mailing address below

A blood glucose test is especially important for you because your health care provider need to know more about you blood sugar level now that you have given birth. Sometimes after giving birth, blood sugar levels will return to normal (meaning that these women most likely had gestational diabetes which put them at risk for developing diabetes later in life). Other times, the blood sugar levels do not return to normal, and these women have diabetes which will need to be carefully managed by the patient along with their team of providers and health care professionals.

Once you complete your lab work, we will mail you your gift card. Please provide the best address and phone number below to reach you after you deliver. If this information changes, please update this information at your next visit in the Women’s Medicine Center or call one of the staff members on this project at 304-388-9922.

Mailing address:
__________________________________________
__________________________________________
__________________________________________

Phone number:
_______________________

By signing this form, you acknowledge that you have read the above information and agree to participate.

_______________________
Printed Name

_______________________
Signature

__________
Date
POST PARTUM TESTING COMPLETION LETTER

(Adapted from City of New York Department of Health and Mental Hygiene)

[Date]

Dear Ms. :

Thank you for completing the Post-partum Visit Incentive Program for Patients with Gestational Diabetes at CAMC Women and Children’s Hospital, Women’s Medicine Center.

Since you have completed your lab work postpartum, we are enclosing a Wal-Mart gift card in the amount of $10.00 as a thank you. We had hoped to mail you 2 5 X 7 photos of your baby, but the photography company was not able to take this photo.

Your doctor may have already told you that since you had diabetes during pregnancy, your chances are very high (2 in 3) that you will get it again if you become pregnant again. Also, your chances are high of getting type 2 diabetes later in life. That is why it was important that you had your glucose blood test at your postpartum visit. If you blood sugar levels were too high, your provider referred you to see a doctor to help you manage your diabetes. If your tests were normal, it will be important to let your doctor know you had gestational diabetes and get your sugar levels tested from time to time.

Diabetes is a serious disease that can affect the heart, eyes, kidneys, nerves, and feet. Here are a few things you can do to help prevent diabetes:

- Get more physical activity: At least 30 minutes a day on most days of moderate to vigorous physical activity (such as a brisk walk) can help prevent diabetes. Walk as much as you can. Even if you don’t lose weight, if you get regular physical activity, you will be much healthier.
- Make healthy food choices: Eat plenty of fruits, vegetables, and whole grains. Avoid sugary foods and drinks, including non-diet soda. Eat smaller portions.
- If you are breast-feeding, keep it up: Breast-feeding will help you return to your pre-pregnancy weight, and breast-fed infants have lower rates of childhood obesity.
- Lose weight: If you are overweight, losing even a few pounds can help you avoid diabetes.
- Set healthy examples for your child: Offer healthy, food choices and opportunities for being physically active. Discourage eating in front of the TV, and limit TV, video and computer games that keep your child from moving.
- Have a regular doctor for you and your new baby: Tell your doctor about your diabetes during pregnancy. Plan a visit to your doctor right before you think about having another baby. If you don’t have a doctor, we can help refer you to one by calling PhysicianMatch at 304-345-9051.

Thank you again for participating in our Post-Partum Visit Incentive Program for Patients with Gestational Diabetes. The American Diabetes Association is a good resource for information on diabetes (1-888-DIABETES [1-888-342-2383]; www.diabetes.org).

Sincerely,

[Director’s Name]
West Virginia QI CHECKLIST

☐ Organize multidisciplinary QI team (this may include dieticians, nurses, physicians, researchers, patients, etc.)

☐ Establish QI goal(s) (make sure they are measureable)

☐ Gather baseline data (related to QI goals)

☐ Plan changes (start with something simple and easy; determine who will promote the change and who will evaluate it)

☐ Do it! (Engage in the change)

☐ Study the change. Evaluate if it is indeed an improvement

☐ Act on the results you have found. If it works, test it on a larger scale and incorporate into your practice. If it does not work, little time was wasted and you can work on a new approach

☐ Repeat the last 4 steps until your goal(s) has/have been met

☐ Promote adherence to improvement (think about creating a culture of improvement)

☐ If needed, ask for help. Network with others who have gone through this process or are familiar with PDSA (see resources)
1. Gestational diabetes. ACOG Committee Opinion Number 435, June 2009


17. Owens-Gary MD, Ware J. Interventions to Increase Access to Care and Quality of Care for Women with Gestational Diabetes. *Diabetes Spectrum*: 25 (1)2012-26-28


Screening Protocols for Gestational Diabetes – International/National Guidelines


Individuals at high risk for gestational diabetes include:
- older women
- obese women
- women with previous history of glucose intolerance
- any pregnant woman who has elevated fasting, or casual, blood glucose levels
- women with a history of gestational diabetes mellitus
- women with a history of large-for-gestational-age babies
- women from certain high risk ethnic groups
- strong family history of diabetes mellitus

It may be appropriate to screen pregnant women belonging to high-risk population groups during the first trimester of pregnancy in order to detect previously undiagnosed diabetes mellitus. Women at high risk who screen negatively and average risk women should be tested between 24 and 28 weeks of gestation.

Screening Procedure

- A standard OGTT should be performed after overnight fasting (8–14 hours) by giving 75 g anhydrous glucose in 250–300 mL water.
- Plasma glucose is measured fasting and then after 2 hours.
- Pregnant women who meet WHO criteria for diabetes mellitus or IGT are classified as having gestational diabetes.
- After the pregnancy ends, the woman should be reclassified as having either diabetes mellitus, IGT or normal glucose tolerance based on the results of a 75 g OGTT, 6 weeks or more after delivery.
- It should be emphasized that such women, regardless of the 6-week post-pregnancy result, are at increased risk of subsequently developing diabetes.
- Alternatively, the 100 g OGTT may be substituted for the 75 g OGTT in screening for gestational diabetes mellitus.

Diagnostic Criteria

75 g OGTT - two or more positive values
- fasting ≥95 mg/dL (5.3 mmol/L)
- 1 hour ≥180 mg/dL (10 mmol/L)
- 2 hours ≥155 mg/dL (8.6 mmol/L)

100 g OGTT - two or more positive values
- fasting ≥95 mg/dL (5.3 mmol/L)
- 1 hour ≥180 mg/dL (10 mmol/L)
- 2 hours ≥155 mg/dL (8.6 mmol/L)
- 3 hours ≥140 mg/dL (7.8 mmol/L)

50 g GCT with blood glucose value after 1 hour
- ≥130 mg/dL (7.2 mmol/L), then confirm with 75 g or 100 g OGTT
International Diabetes Federation Recommendations - Gestational Diabetes (2009)

Testing for GDM – a two-stage or one-stage procedure?

A definitive diagnosis of GDM is currently made on the result of an OGTT. Currently, a two-stage diagnostic procedure is conducted in some parts of the world. A two-stage procedure involves a non-fasting glucose challenge test (GCT) followed by a formal OGTT for women who have a positive result. The GCT will inevitably miss some women with GDM. In addition, there has been little systematic examination of:

(a) how many women who are positive on a GCT fail to return for the definitive OGTT;

(b) whether a two-stage procedure delays the diagnosis and treatment of GDM, and what the effect of such a possible delay might be.

A one-stage definitive procedure is preferred, but a two stage procedure will continue to suit many healthcare arrangements. Potential adoption of a lower glucose load (75 g) and a shorter duration of the testing procedure may lead to reconsideration about the need for a two stage procedure.
American College of Obstetrics and Gynecology Guidelines (2011)

1. All pregnant women should be screened for GDM, whether by patient history, clinical risk factors, or a 50-g, 1-hour loading test to determine blood glucose levels.

2. The diagnosis of GDM can be made based on the result of the 100-g, 3-hour oral glucose tolerance test, for which there is evidence that treatment improves outcome. Either the plasma or serum glucose level established by Carpenter and Coustan or the plasma level designated by the National Diabetes Data Group is appropriate to use (see Table 1). A positive diagnosis requires that two or more thresholds be met or exceeded.

3. Diagnosis of GDM based on the one-step screening and diagnosis test outlined in the International Association of Diabetes in Pregnancy Study Group guidelines is not recommended at this time because there is no evidence that diagnosis using these criteria leads to clinically significant improvements in maternal or newborn outcomes and it would lead to a significant increase in health care costs.

Table 1. Diagnostic Criteria for the 100-g, 3-Hour Tolerance Test for Gestational Diabetes Mellitus*

<table>
<thead>
<tr>
<th>Status</th>
<th>Plasma or Serum Glucose Level</th>
<th>Plasma Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carpenter and Coustan Conversion</td>
<td>National Diabetes Data Group Conversion</td>
</tr>
<tr>
<td></td>
<td>(mg/dL)</td>
<td>(mmol/L)</td>
</tr>
<tr>
<td>Fasting</td>
<td>95</td>
<td>5.3</td>
</tr>
<tr>
<td>1 hour</td>
<td>180</td>
<td>10.0</td>
</tr>
<tr>
<td>2 hours</td>
<td>155</td>
<td>8.6</td>
</tr>
<tr>
<td>3 hours</td>
<td>140</td>
<td>7.8</td>
</tr>
</tbody>
</table>

*A positive diagnosis requires that two or more thresholds be met or exceeded.

American Diabetes Association Recommendations and Guidelines (2011)

These recommendations are based on the results of the HAPO Study (The Hyperglycemia and Adverse Pregnancy Outcomes) have led to careful reconsideration of the diagnostic criteria for GDM. After deliberations in 2008–2009, the International Association of Diabetes and Pregnancy Study Groups (IADPSG), an international consensus group with representatives from multiple obstetrical and diabetes organizations, including ADA, developed revised recommendations for diagnosing GDM.

Recommendations

- Screen for undiagnosed type 2 diabetes at the first prenatal visit in those with risk factors, using standard diagnostic criteria.
- In all pregnant women not known to have diabetes, screen with a 50-g, 1-hour loading test at 24–26 weeks and women exceeding the 130 mg/dl threshold should be screened with the 75-g 2-h OGGT
- In pregnant women not known to have diabetes, screen for GDM at 24–28 weeks of gestation, using a 75-g 2-h OGGT and the diagnostic cut points
- Screen women with GDM for persistent diabetes 6–12 weeks postpartum.
- Women with a history of GDM should have lifelong screening for the development of diabetes or pre-diabetes at least every 3 years.

Screening for and diagnosis of GDM

Women at high risk for gestational diabetes include:
- 25 years of age and older
- obese
- previous history of glucose intolerance
- any pregnant woman who has elevated fasting, or casual, blood glucose levels
- history of gestational diabetes mellitus
- history of large-for-gestational-age babies – larger than 9 pounds
- high risk ethnic groups
- strong family history of diabetes mellitus

- Perform a 75-g OGGT, with plasma glucose measurement fasting and at 1 and 2 h, at 24–28 weeks of gestation in women not previously diagnosed with overt diabetes.
- The OGGT should be performed in the morning after an overnight fast of at least 8 h.
- The diagnosis of GDM is made when any of the following plasma glucose values are exceeded:
  - Fasting >92 mg/dl (5.1 mmol/l)
  - 1 h >180 mg/dl (10.0 mmol/l)
  - 2 h >153 mg/dl (8.5 mmol/l)

American Diabetes Association Standards of Medical Care in Diabetes—2011, Diabetes Care, volume 34, Supplement 1, January 2011
Summary of Recommendations The U.S. Preventive Services Task Force (2010-2011)

Screening for Gestational Diabetes Mellitus

The U.S. Preventive Services Task Force (USPSTF) concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for gestational diabetes mellitus (GDM), either before or after 24 weeks gestation.

Statement

Clinical Considerations - This recommendation concerns pregnant women who have not previously been diagnosed with diabetes. Until there is better evidence, clinicians should discuss screening for GDM with their patients and make case-by-case decisions. Discussions should include information about the uncertainty of benefits and harms as well as the frequency of positive screening test results.

- Women who are obese, older than 25 years of age, have a family history of diabetes, have a history of previous GDM, or are of certain ethnic groups (Hispanic, American Indian, Asian, or African-American) are at increased risk of developing GDM.

- In the United States, the most common screening test is an initial 50-gram 1-hour glucose challenge test (GCT). If the result of the GCT is abnormal, variably defined as either greater than 130 mg/dL or 140 mg/dL, the patient undergoes a 100-gram 3-hour oral glucose tolerance test (OGTT). Two or more abnormal values on the OGTT are considered a diagnosis of GDM.

- Most screening is conducted between 24 and 28 weeks gestation. There is little evidence about the value of earlier screening.

- Treatment usually includes recommendations for physical activity and dietary modification. In addition, treatment sometimes includes medication (either insulin or oral hypoglycemic agents), support from diabetes educators and nutritionists, and increased surveillance in prenatal care. The extent to which these interventions improve health outcomes is uncertain.

- Nearly all pregnant women should be encouraged to achieve moderate weight gain based on their pre-pregnancy body mass index (BMI) and to participate in physical activity.
