DIABETES IN PREGNANCY IN NICARAGUA:

Insights and Lessons from the Pan American Social Marketing Organization’s (PASMO) Gestational Diabetes Project
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The Impact of Diabetes in Pregnancy

Hyperglycemia, or elevated blood sugar, is one of the most common conditions associated with pregnancy. Over 85% cases of hyperglycemia are due to Gestational Diabetes Mellitus (GDM). This is a temporary type of diabetes, which in most cases, disappears after childbirth.

Diabetes in pregnancy (DIP), which includes both women who are diagnosed with diabetes during pregnancy and women who enter gestation with diabetes, is on the rise globally. Each year, 1 in 7 pregnancies is affected by GDM.

DIP CAN LEAD TO SERIOUS IMMEDIATE AND LONG-TERM HEALTH RISKS FOR BOTH THE MOTHER AND CHILD:

**IMMEDIATE**
- Pre-term births, still births and death are more common among babies whose mothers have DIP.
- Up to 45% of babies have macrosomia, which can lead to complications in delivery.
- Mothers are at increased risk for pre-eclampsia, a leading cause of maternal death worldwide.

**LONG-TERM**
- If not properly treated, both mothers with DIP, and their babies, have a higher risk of developing obesity, type 2 diabetes and hypertension.
- Roughly half of mothers with DIP develop type 2 diabetes within 5 years of giving birth.

Integrating DIP testing and management into maternal health interventions can reduce both the short- and long-term impact of diabetes.

**MONITORING BLOOD SUGAR DURING PREGNANCY OFFERS A WINDOW OF OPPORTUNITY TO:**

**01** Identify all women with DIP

**02** Establish diabetes testing and routine monitoring tailored to women's needs and lifestyles

**03** Break the cycle of transmission of non-communicable diseases (NCDs) across generations

The International Federation of Gynecology and Obstetrics (FIGO) recommends universal testing for all women during pregnancy using a one-step procedure.
Gestational Diabetes in Nicaragua

Despite being a largely preventable condition, DIP remains a neglected maternal health issue throughout Central America. In Nicaragua and throughout the region, reliable figures on the prevalence of diabetes in pregnancy are scarce due to lack of routine testing among pregnant women. Yet high rates of chronic disease exist. For example, type 2 diabetes affects over 9% of Nicaraguans, and more than 1 in 4 adults are considered obese.¹¹

With support from the World Diabetes Foundation and Novo Nordisk, the Pan American Social Marketing Organization (PASMO), is working with private sector health providers across multiple hospitals and satellite clinics in Managua, Nicaragua to offer prenatal clients access to testing, diagnosis and management for hyperglycaemia in pregnancy as part of a broader package of maternal health services. Lifestyle modification through tailored diet and exercise plans are key aspects of the program.

**KEY PROGRAM ACHIEVEMENTS**

- **562** providers (nurses, doctors, nutritionists, lab technicians) trained on prevention, diagnosis and management of DIP across 7 hospitals and 11 satellite centers
- **18,132** women tested for DIP and **2,137** diagnosed with the condition¹²
- **88%** of infants delivered in the program were of normal birth weight¹³

Among women diagnosed, **1,053 (49%)** of women elected to participate in nutritional counseling sessions as part of their care

For the first time, nutritionists were integrated into the clinical care team to address dietary and lifestyle management for women diagnosed with DIP

SMS motivational messages sent to program participants to offer motivational messages and appointment reminders

**12%** detection rate for DIP among women tested in the program

"Around here early detection is our daily bread...We understand the risk of not taking action and the value of a preventative approach. We now see patient behavior and compliance with the nutrition plan as a medical issue. We’ve seen the benefits to the patients.”

– Director Monte España
Diabetes in Pregnancy: Its Global Impact

Once considered diseases of the wealthy, the burden of NCDs now lies disproportionately in the developing world, where 80% of cases exist.\textsuperscript{14} This shift in epidemiology is also driven by social determinants that include aging populations, rapid urbanization and globalization.\textsuperscript{15}

In 2015, high blood sugar, or hyperglycemia, affected over 20 million live births worldwide, and 85% of these cases were due to gestational diabetes mellitus — or ‘GDM’.\textsuperscript{16} Yet diabetes in pregnancy remain under recognized and undertreated by medical providers in countries where it is most common. In settings constrained by poverty and limited health infrastructure, health providers and health systems are often ill-equipped to detect and treat chronic diseases over the long-term. In spite of these challenges, there is good news. Lifestyle-based approaches, including tailored diet and exercise programs for pregnant women, are effective prevention measures. In fact, the majority of women diagnosed with DIP can be successfully managed through lifestyle changes.

Health education and promotion is crucial to effectively addressing DIP and other NCDs. Often, women do not have access to information and education on the critical importance of testing for DIP, especially when there are no signs and symptoms of disease present. Underlying social determinants, including low literacy and limited socio-economic and political status, can also hamper women’s ability to inform and protect themselves against serious health risks. Ultimately, society pays the price in the form of higher health costs and lost productivity. Individuals suffer poorer health and lost wages, leading to a cycle of poverty and poor health.\textsuperscript{17}

Cancer, diabetes, and heart diseases are no longer the diseases of the wealthy. Today, they hamper the people and the economies of the poorest populations... this represents a public health emergency in slow motion.

– United Nations Secretary General Ban Ki-Moon

Opportunities to Improve Maternal and Child Health

Pregnancy and routine gestational care offer a window of opportunity for health professionals and expectant mothers to begin a dialogue about the importance of gestational care, the risks associated with DIP and the need for regular check-ups and adhering to healthy behaviors during and after pregnancy.

Following delivery, the post-partum period offers an opportunity to initiate preventive health behaviors for both mothers and babies, who may be at higher risk for common NCDs like obesity, diabetes, hypertension, and other cardiovascular disorders. Research has shown that rates of gestational diabetes can be reduced through diet and lifestyle interventions – signaling the need to identify effective tools and resources to support women in improving their diet and exercise habits before, during and after pregnancy.\textsuperscript{18}

In 2015, the International Federation of Gynecology and Obstetrics (FIGO) published updated guidelines for diagnosing and management of DIP, which underscores the critical role of nutrition in the prevention of DIP and other NCDs.\textsuperscript{19}
The Challenge of Addressing Diabetes in Pregnancy in Nicaragua

Nicaragua’s health care system consists of public services provided by the Ministry of Health (MINSA), semi-private services provided through a combination of government and employer support via the Nicaraguan Social Security Institute (INSS), and private services provided by both for-profit and non-profit entities. The INSS operates through 48 health provider organizations known as Empresas Médicas Previsionales, most of which are located in the capital city of Managua. The hospitals included in the DIP program cover over 200,000 insured Nicaraguans alone.

In 2011, the MINSA established national guidelines for the management of high risk obstetric cases, which included cases of gestational diabetes; however, DIP was not perceived -- by the MINSA, by hospital administrators, by health providers, or by pregnant women -- to be a serious public health concern. Prior to this program, no data existed on the extent of DIP among Nicaraguan women.

At healthcare facilities, providers lacked the necessary tools, resources and awareness to effectively educate their patients about the risks associated with hyperglycemia in pregnancy, and the importance of testing, detection and management of the condition. Even for women who were tested, providers were hesitant to trust a positive diagnosis, since glucose levels can vary significantly during pregnancy. In fact, many providers were hesitant to confirm a diagnosis of DIP in women without obvious symptoms.

Health providers’ roles and activities were poorly coordinated, which lead to inefficiencies in provider care. In particular, hospital nutritionists played a very limited role within the hospitals. Prior to the launch of this program, nutritionists only managed the diets of hospitalized patients or cancer patients. Because nutrition is a relatively new field, it can be difficult to convince providers of the value of nutrition in the care and treatment of pregnant women, especially those with DIP.

At the community level, DIP was not recognized as a serious condition. Few women understood or recognized the need for universal testing for this condition.

NICARAGUA AND MANAGUA BY THE NUMBERS

<table>
<thead>
<tr>
<th>National population (2014):</th>
<th>6 MILLION</th>
</tr>
</thead>
<tbody>
<tr>
<td>National poverty rate:</td>
<td>29%</td>
</tr>
<tr>
<td>Percentage of population living in urban areas:</td>
<td>58%²⁰</td>
</tr>
<tr>
<td>National adult obesity rate:</td>
<td>22%²¹</td>
</tr>
<tr>
<td>Type 2 diabetes rate among adults:</td>
<td>7.7%²²</td>
</tr>
<tr>
<td>GDM rate:</td>
<td>UNKNOWN</td>
</tr>
<tr>
<td></td>
<td>(12% rate detected in PASMO project)</td>
</tr>
<tr>
<td>Maternal mortality rate:</td>
<td>154/100,000²³</td>
</tr>
<tr>
<td>Infant mortality rate:</td>
<td>19/1,000²⁴</td>
</tr>
<tr>
<td>Population of the Managua Metro Area (2012):</td>
<td>2.4 MILLION²⁵</td>
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</tbody>
</table>
Transforming DIP Care in Nicaragua’s Health System

PASMO/Nicaragua, a network member of Population Services International, was founded in 1998, with a focus on sexual and reproductive health programming in Latin America and the Caribbean. In 2010, PASMO launched Red Segura (meaning “safe network” in Spanish), a network of medical clinics that offers affordable sexual and reproductive health services that adhere to strict quality standards based on voluntary and informed choice.

PASMO identifies each franchise member, selecting only those providers who adhere to strict quality standards and who have a strong social commitment to improving the sexual and reproductive health of poor and vulnerable women in their communities. As a member of the franchise, providers receive training, medical equipment, promotional items, educational materials, and access to a range of low cost family planning products that can be purchased from PASMO. In Nicaragua, PASMO supports 56 social franchise clinics, including 88 health care providers.

In 2011, PASMO approached the World Diabetes Foundation with a project to address the growing problem of diabetes and gestational diabetes in Nicaragua. The project aimed to reduce child mortality and improve the health of mothers by training healthcare professionals and building capacity at selected clinics in the Red Segura network. The program was initially conceived by the PASMO staff, a team of expert clinicians and public health advisors who realized that DIP wasn’t on the national public health radar, and believed that DIP could easily be integrated within the existing work with the private sector through the Red Segura social franchise. Partners in the project included Novo Nordisk A/S, which provided technical assistance, logistic support and co-funding. The World Diabetes Foundation funded the project.

Leveraging the positive relationships that PASMO/Nicaragua had built with hospitals and providers through Red Segura, PASMO invited three hospitals from the INSS system to launch program activities in 2013. The program has since expanded to include seven hospitals and eleven satellite centers.

**SOCIAL FRANCHISING**

In many low- and middle-income countries, a majority of people seek health care from the private sector, though provision of consistent, high quality services are challenging. Fragmentation, poor economies of scale, inadequate financing, political opposition, and weak regulatory and quality control systems often pose serious challenges for quality private sector service delivery.

Social franchising addresses a number of these challenges by organizing small, independent health care businesses into quality-assured networks. The goal of social franchising is to improve access, quality, equity, and cost effectiveness of the health care system in developing countries.

**GOAL**
To reduce child mortality and improve the health of mothers affected by DIP

**OBJECTIVES**
- Improve screening and diagnosis of DIP among pregnant women
- Improve knowledge of risks and management of DIP among health care providers
- Improve management of DIP among women diagnosed with the condition

**PROGRAM INDICATORS**
- DIP rates detected among program participants
- Percent of providers who report changes in knowledge, attitudes or practices related to DIP
- Postpartum outcomes (baby’s weight, number of postpartum consultations attended)
Building Effective Partnerships

Building partnerships with local stakeholders has been part of the program mission to ensure buy-in, support, and sustainability. Leveraging the strong relationships built with INSS hospitals, PASMO/Nicaragua invited Red Segura hospitals to participate in the program.

Collaboration agreements were established with each hospital, delineating the expectations and responsibilities for both PASMO and participating partners, for both their work in reproductive health and DIP.

**ROLES AND RESPONSIBILITIES OF PASMO**

- Provide training in the diagnosis and medical management of DIP to providers
- Ensure appropriate equipment and supplies for testing (glucometers, glucose packs, blood pressure monitors, scales)
- Design and implement a system to test and follow women diagnosed with DIP
- Design and implement a management of information systems (MIS) to support the systematic collection of data related for DIP
- Support increased demand for DIP services through social marketing
- Evaluate the quality of services among collaborating partners

**PRIOR TO PROJECT LAUNCH**

Gestational diabetes is not recognized or understood as a serious health problem in Nicaragua.

- PASMO/PSI partners with the World Diabetes Foundation and Novo Nordisk for improved to address DIP in Nicaragua.
- Bautista, Carlos Roberto Heumbe, & Monte España hospitals selected to implement the DIP program.
- Early detection training for selected hospitals and laboratories.
ROLES AND RESPONSIBILITIES OF PARTNERING HOSPITALS

• Provide a physical space and the time of at least one licensed nutritionist to be trained in the management of DIP
• Ensure that services meet quality standards established by the Ministry of Health (MINSA) and the Red Segura franchise
• Notify PASMO of any adverse events or complications
• Report regularly on program indicators, achievements, challenges
• Maintain confidentiality and accuracy of client records

SUMEDICO hospital added to the network.

SERMESA

• Added two additional Sermesa Company hospitals to the network, which include Hospital Cruz Azul and Hospital Central.
• A total of 18,132 women tested for DIP in participating hospitals and clinics.

73% of women diagnosed with DIP in 2015 were enrolled into the program for lifestyle management and monitoring.

2014
2015
2016
2016 +

Integrate additional hospitals into the network.
Expand the program outside Managua.
Continued advocacy for expansion of DIP services across the health system.
The PASMO Model: A Holistic, Client-Centered Approach to Care

PASMO’s model of care is based on the Adoption Stairway, in which providers move along a continuum from interest to knowledge, trial, adoption, and advocacy as a way to engage in learning, trial and adoption. This model was also applied to the DIP program.²⁷

As part of the program’s evaluation, providers’ attitudes, and behaviors and knowledge related to DIP were measured first in August 2013 as a baseline and again in April 2016. Comparison of all measures between baseline and endline improved across all categories. General provider knowledge of DIP improved by 19% across all providers, with highest gains among nutritionists, nurses and lab technicians. Importantly, demonstrated knowledge and practice on DIP management increased among all levels of providers. In the endline survey, providers also reported more positive attitudes about their ability to manage the condition.

The diagnosis of DIP can be scary, and many women have expressed that they were afraid to learn about their condition. The PASMO model places the woman in an empowered position to recognize the signs and symptoms of DIP and to speak with her provider. PASMO has engaged pregnant women via multiple communication channels to improve their ability to stay informed and motivated about their health:

- Motivational text messages were developed by the team of PASMO nutritionists and are tailored to the woman’s gestational week and nutritional information. Messages are sent out every 4-14 days and include post-natal messages, including reminders about post-partum nutritional consultations.

  “Your sugars look good, continue eating healthy, drinking enough water, and exercising.”

  “Don’t forget your next appointment, it’s not losing your whole morning, it’s gaining the health of you and your child.”

  “In order to keep gestational diabetes under control, slowly but surely reduce your intake of sugar, sweets, and sodas.”

- Banners and brochures in waiting rooms with key message around the warning signs for DIP and tips on bringing up the issue with the provider.

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The Adoption Stairway for Behavior Change

<table>
<thead>
<tr>
<th>AWARENESS</th>
<th>INTEREST</th>
<th>TRIAL</th>
<th>ADOPTION</th>
<th>ADVOCACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I KNOW ABOUT IT.”</td>
<td>“I’M INTERESTED IN LEARNING MORE.”</td>
<td>“I’VE TRIED IT MYSELF.”</td>
<td>“I USE IT REGULARLY. I PREFER IT.”</td>
<td>“I WANT TO TELL OTHERS ABOUT IT!”</td>
</tr>
</tbody>
</table>

Awareness of the product, service or behavior.
Curiosity about its potential benefits.
Belief in the benefits and ability to use.
Trust that it is worthwhile.
Enthusiasm.
• **Personalized notebooks** to track women's progress of key behaviors and habits. Notebooks include a list of healthy, low-cost foods available in the local market, examples of exercises, and tracking of meals and sugar levels to be reviewed with the nutritionist. The notebooks track habits based on a 'traffic light system' whereby women are monitored based on their dietary habits:

- **‘RED’** means there are no restrictions made on food and sugar intake;
- **‘YELLOW’** indicates that women are eating recommended amounts of fruits and vegetables, but not limiting sugar;
- **‘GREEN’** symbolizes optimal amounts of fruits and vegetables, restricted sugar, and adequate water intake.
THE PATIENT EXPERIENCE

During her first pre-natal visit, Sara sees a banner in the waiting room about high blood sugar in pregnancy and listens to a nutritionist in the waiting area who encourages her to get more information from her health provider.

On her next visit, Sara receives a fasting blood glucose test (FBGT). If positive, she will receive the oral glucose tolerance test (OGTT) to confirm her diagnosis. If negative, she will receive the oral glucose tolerance test between 24-28 weeks gestation to confirm she is still negative. If Sarah has one or more risk factors for DIP, she’ll receive another OGTT between 32-34 weeks gestation.

If Sara is diagnosed with DIP, she’ll receive information on how to manage her condition. Sara’s providers will all work together to streamline her care. She’ll be referred to a nutritionist, who will establish a schedule for nutritional counseling and a management plan for DIP based on her current nutritional habits and availability of local foods. Sara will be invited to meet with the nutritionist regularly to discuss her progress and get advice on any specific challenges.

Sara will receive a notebook where she can track her progress and check for tips on healthy eating and exercise. She also receives regular appointment reminders and weekly motivational messages.

Sara gives birth to a healthy baby. Her provider makes a note in her chart that part of her post-partum care should include at least two nutritional consultations. She attends her follow-up visits with the nutritionist to make sure both she and her baby stay healthy. Sara’s entire family has begun to eat healthy and exercise thanks to support from the program team.

“...The little notebook has all of the foods and correct portions I need for my illness. If it weren’t for the notebook and the nutritionist, I don’t know where I’d be...”

– Program Participant, Hospital Monte España
Key Achievements

- A behavioral-focused model to address DIP that has expanded from 3 INSS hospitals to 7 hospitals and 11 satellite clinics
- First estimate of DIP prevalence in Nicaragua (12%) established
- Among 270 infants born during the program, 88% are of normal weight for their gestational age

PROVIDERS

- A total of 562 providers trained on prevention, diagnosis and management of DIP across 7 hospitals and 11 satellite clinics
- Providers have adopted a culture of integrated care for women with high blood sugar and DIP, which emphasizes lifestyle-based management
- For the first time, nutritionists have been integrated into the clinical care team to support management of DIP among this population

CLIENTS

- Program participants who are empowered to take control of their health for the improvement of their health as well as the health of their families
- Women with DIP sensitized on importance of diabetes control through lifestyle modification and routine monitoring using nutritionists, SMS, and program tools
- 18,132 women tested for DIP (12% detection rate)
- Additional six months of follow-up for women postpartum, supported by the participating hospitals

PROGRAM CHALLENGES

Challenges reaching women for DIP testing and management: In Nicaragua, many pregnant women only visit the hospital for the delivery of their baby. Others engage in care very late in the pregnancy, making it difficult to establish appropriate care for these women. Still others do not return for their post-partum visits following delivery.

Women Tested, Diagnosed, and Managed for DIP (August 2013 - November 2016)

- Women screened using FBG
- Women diagnosed with DIP using OGTT
- Women diagnosed with DIP completing at least two nutritional counseling sessions
due to work or family obligations. Continually stressing the importance of pre-natal and antenatal care remains a priority, as new mothers develop new routines and habits regarding infant care.

Translating program success to the national level: National rates of DIP have yet to be established for Nicaragua due to the lack of widespread testing; however, this program shows that testing and management can be accomplished with modest investments and support. PASMO and its partners will continue to advocate for more widespread testing across the country and across the region.

Changing the way health providers view DIP: The process required to create integrated care teams and change the culture of treatment within hospitals can be slow and challenging. During their medical training, clinicians are trained to manage DIP as a medical condition, e.g., with insulin. They do not always appreciate the critical role that nutrition and exercise can play in reducing risk of diabetes in pregnancy. This program demonstrates that a well-coordinated, complementary team of clinical providers can offer a woman the skills, the knowledge and the care she needs to maintain a healthy, active lifestyle in pregnancy.

“...All the educational materials are brilliant, easy! Every time I need to refresh my knowledge or need reference about GDM, I refer back to the materials given to us.”

— Director, Sumedico Hospital

“We have been able to use what has been taught to us by PASMO and we are now implementing it in other disciplines. We are creating more supportive and collaborative environments to provide quality service to our patients.”

— Dr. Lary, Carlos Roberto Huembes
The Value of Investing in Diabetes in Pregnancy

NCDs are the largest cause of disease and death in LMICs, yet continue to receive the least funding. Identifying cost-effective NCD investments is a priority for donors, country governments, and non-state actors alike.\(^\text{29}\)

Evidence suggests that investing in identifying and managing DIP during and after pregnancy pays for itself in lower healthcare costs overall. This conclusion is supported across diverse settings, even as DIP rates vary.\(^\text{30}\)

Within the current program, participating hospitals have observed a reduced cost due to fewer hospitalizations, fewer high-risk obstetric cases, and less need for medical management with insulin, which can be resource intensive.

As evidence of their support, hospital administrators at all program hospitals have agreed to cover the costs of following up women until 6 months following delivery. Encouraging women to maintain healthy diet and exercise behaviors encourages long-term habits.

The integrated approach that has been employed in the PASMO program in which OBGYNs, nurses, nutritionists and lab techs form a team of complementary caregivers, is now being used in other health areas to improve care and build in efficiencies across clinical teams.

“\[
\text{The cost is less than the benefit, for both the patient and the hospital. Management of pregnancies affected by GDM/DIP is very expensive, but it can be prevented with early detection.}
\]

– Director, Sumedico Hospital
Sustainability and Transfer of Responsibilities from PASMO to Partners

Since the program began, participating hospitals have been working to increasingly take ownership for their DIP programs, as they continue to invest in its success beyond the project:

- Hospital Carlos Roberto Huembes has established its own patient tracking system to call patients with DIP who miss their appointments.
- Hospitals Monte Espana and Sumedico have each hired their own nutritionists dedicated full-time to DIP management, even though the nutritionists are not covered by insurance. The hospitals donate the nutritional counseling sessions to pregnant women because management of high-risk obstetric cases is good for their patients and good for their bottom line.
- Hospital Monte Espana now trains all new clinical staff on their integrated approach to DIP detection and management.
- All participating hospitals now actively monitor testing, diagnosis, and management of DIP. They are enthusiastic to lead presentations on their achievements during hospitals’ annual review meetings.

Next Steps for PASMO

The PASMO team of professionals have already met with stakeholders throughout Nicaragua to advocate for national expansion of this program. In a next phase, when funding allows, the next steps will include:

- Implementation of a communication campaign to increase the number of women attending their first prenatal care visit in their first trimester so that DIP can be detected and monitored early, leading to improved health outcomes.
- Engaging with employers to help them understand the value of the program and the cost-benefit of employees being able to attend nutritional consultations both during pregnancy and after birth.
- Involving pediatricians in the DIP program, as they have greater contact with mothers post-partum and can continue to provide nutritional advice to both mothers and children.
- Continued advocacy efforts to expand this program in Nicaragua’s public sector and among neighboring countries in the region.
Key Recommendations for New Programs

The PASMO DIP program offers a number of successful elements that can serve to inform new or expanding programs in Nicaragua, the Caribbean region and beyond.

- **Engage early and often with program partners.** The PASMO project is built on a foundation of strong partnerships and the need for local champions. Partners are critical for sustainability and success.

- **Identify local experts and engage them as champions.** Early on, PASMO’s program identified obstetrician/gynecologist trainers, as well as an expert endocrinologist, who offered legitimacy and expertise as the program launched.

- **Establish program benchmarks and monitor regularly to determine program strengths and weaknesses.** The use of specialized stickers on patient charts allows providers to more easily identify and track women in the program.

- **Establish a baseline and endline knowledge, attitudes, and beliefs survey** to measure changes in provider knowledge, skills and behaviors over time.

- **Commit to building provider capacity** for high quality care.

- **Work continuously with hospital administrators to foster a culture of integrated care and training** together with integrated teams of providers with complementary skills and expertise, including gynecology, internal medicine, nursing, pharmacy, statistics, and laboratory providers.

- **Train providers on the differences between nutritional and medical management of DIP,** and clarify indications for when each are most appropriate.

- **Offer tools that empower pregnant women** to monitor their own habits. Pregnancy is a unique moment in which women are highly motivated to improve their health and their baby’s health. Diaries, nutrition booklets, and consistent text messages are tools that can foster healthier lifestyle choices.

- **Develop communications materials** for providers to facilitate the conversation with pregnant women, including an algorithm for determining risk factors and testing needs, brochures, and an illustrated flipchart with key messages to address with patients.

- **Establish routine analysis of DIP case studies** in each hospital to build upon lessons learned from care and management of each case.

“**Management of gestational diabetes serves as an example for other areas of medicine, the need for integrated teams, not only for the care of our pregnant patients, but for all.**

— Dr. Levy, Director, Carlos Robert Huembes
Acknowledgments

PASMO/Nicaragua wishes to thank the World Diabetes Foundation and Novo Nordisk for their generous financial support and technical contributions made towards this program.

The World Diabetes Foundation aims to alleviate human suffering related to diabetes and its complications among those least able to withstand the burden of the disease.

As a leader in diabetes care, Novo Nordisk works to prevent, treat and ultimately cure diabetes. In 2009, we launched the Changing Diabetes® in Pregnancy programme to create awareness of the linkages between diabetes and pregnancy. www.novonordisk.com/cdip

PASMO wishes to acknowledge the tireless efforts made on behalf of local collaborating organizations in support of this work:
Hospital Bautista, Dr. Juan Carlos Solis, Director
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SERMESA - Hospital Central Managua, Dr. Freddy Solis, Director
SERMESA - Policlinica Norte Cruz Azul, Dr. Maria Pon, Director


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REFERENCES

2. Ibid.
9. Ibid.
12. Women were initially tested using fasting blood glucose. The initial screening test was performed either within the PASMO clinic or within the INSS hospital. Confirmatory oral glucose tolerance testing was conducted at the PASMO clinic.
13. A total of 270 infants were delivered during the program; of these, 238 (98%) weighed between 2501-3999 grams at delivery.
21. Ibid.
26. These data will be available by June 2016.
27. The Adoption Stairway is based upon Prochaska, DiClemente and Norcross’ Transtheoretical Model (or Stages of Change) Model, which conceptualizes the process of intentional change towards a new behavior.
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