BD Global Public Policy Position
Diabetes: Prevention, Diagnosis, Treatment and Self-Management

ISSUE: Diabetes is a serious disease impacting nearly 400 million people worldwide. Its enormous patient and public health impact, as well as its economic costs, can be reduced if governments and healthcare systems implement policies to support early and effective diagnosis and treatment of the disease.

Diabetes is a group of diseases characterized by high blood glucose levels that result from defects in the body’s ability to produce and/or use insulin. The disease is among the fastest growing chronic diseases worldwide, reaching almost 1 in 10 adults globally.¹

Diabetes is a progressive disease that if left undiagnosed and untreated can result in serious illness, disability, and death from complications. In addition to the enormous human health costs, diabetes depletes world economies of millions of dollars each year in direct medical costs from the disease, complications, and lost productivity. In fact, approximately, $471 billion (USD) was spent globally in 2012 on treating diabetes and complications.² Because the disease is growing at a high rate, the costs will increase over time if action is not taken now. Fortunately, diabetes can be managed and complications avoided or delayed if it is diagnosed early and treated in a compliant manner. However, this requires that patients and healthcare providers are properly educated, and have access to affordable healthcare, drug therapy and diabetes care supplies.

POSITION: Policymakers should develop public policy frameworks to avoid and reduce the health and economic costs of diabetes through policies and programs that focus on prevention, early detection, adherence to treatment and avoidance and management of complications. The following guiding principles are essential to achieve this:

1. **Education and Awareness**: Education and awareness campaigns should be developed and funded. They should be directed toward patients and healthcare providers and focused on preventing, diagnosing and managing diabetes.

   These campaigns can be established in partnership with key stakeholders, including patient advocacy groups; clinical, public health and diabetes thought leaders; and the life sciences industry, in order to provide robust information that reaches targeted populations. Education and awareness campaigns should include:

   - Promoting healthy lifestyles for the prevention and management of diabetes
   - Early detection and awareness of risk factors and symptoms
   - Promoting compliance and self-care for those diagnosed
   - Safe injection practices for healthcare workers
   - Proper injection techniques for patients to ensure safe and effective administration of insulin or other therapies.
2. **Early Diagnosis:** Programs to drive early diagnosis of diabetes, including screening for high-risk individuals, should be developed and funded to minimize the disabling and costly complications from the disease.

Early diagnosis of diabetes enables patients and their healthcare providers to identify appropriate actions to manage and mitigate complications. This includes lifestyle adjustments and timely initiation of therapy to reduce the clinical and economic costs that arise from inadequate treatment and disease progression.

3. **Insurance coverage:** Diagnosis, monitoring, drug treatment, insulin therapy and patient education/counseling are all essential elements of diabetes care and each should be covered components of healthcare insurance and government-provided care or subsidies.
   - Access to insulin and injection supplies is critical for type 1 diabetics for whom insulin therapy is life-sustaining. Many type 2 diabetes patients also require insulin. Early insulin treatment of type 2 diabetics can improve health outcomes.
   - The absence of any one of the elements noted above compromises care and places patients at risk of complications and health systems at risks of additional long-term costs.
   - Patient self-care enhances quality of life and promotes healthy lifestyles and compliance with treatments. Patient counseling is critical to enabling patient self-care and should be covered and adequately reimbursed. Counseling can be provided by diabetes nurse educators, pharmacists, or other credentialed healthcare workers.

4. **Pharmaceutical Intervention and Monitoring Technology:** Medical devices that deliver insulin and support patient compliance should be viewed as a central and indispensable element of diabetes care programs.
   - Delivery devices are an integral part of diabetes care and are essential for the delivery of injectable drugs. In order for patients to benefit from therapies, access to them must be accompanied by access to effective devices for drug delivery.
   - Coverage and reimbursement for delivery devices should be consistent with the labeling of accompanying therapies.
   - In many countries, diabetes disproportionately impacts communities with socio-economic challenges. This reality creates an imperative that countries establish equitable access to drug therapy and delivery devices to reduce health disparities.
   - Patients should have access to new medical devices that improve patient outcomes, including enhanced accuracy of dose delivery and enhanced patient compliance, as they become available.
5. **Safe Injection Practices**: Awareness and oversight of safe-injection practices when treatments are administered in a healthcare setting.

In settings in which healthcare workers administer insulin, (including institutional, school, and home care settings), education and oversight on safe injection practices should be implemented to prevent possible transmission of blood borne pathogens to healthcare workers. This includes:

- Training on proper injection techniques and the risks of transmission of blood borne pathogens to healthcare workers and patients due to unsafe injection practices.
- Needlestick injury prevention, including requirements to use safety-engineered devices.
- Re-use prevention, including both syringes and pen needles.

6. **Innovation Incentivized by Payment Systems and Research Programs**: Advances in diabetes care should be fostered through research that is funded by public and private sources and incentivized by payment systems that reward innovations that bring better patient outcomes and long-term cost savings to health systems.

7. **Evidence-based Policy Evolution**: Policies and programs should be updated as new technologies and information become available.
Background

Prevalence and Incidence

Though traditionally viewed as a disease that primarily affects countries like the United States (US) and those in the European Union (EU), diabetes mellitus (diabetes) is now recognized as a global disease. Current estimates of total diabetes prevalence vary but are generally well over 300 million people. For instance, one study cited by the World Health Organization (WHO) estimates there are 347 million people living with diabetes in the world today, while the International Diabetes Federation (IDF) estimates there are 371 million people living with diabetes globally.\(^3\,^4\,^5\) With so many individuals living with diabetes and deaths from diabetes estimated at 4.8 million in 2012,\(^6\) diabetes is a global epidemic that requires more consistent and greater focus and resources across the globe.

The number of people estimated to have diabetes has grown exponentially in recent years as prevalence rates have increased. For example, estimates placed the worldwide diabetes population at 30 million in 1985, rising to 135 million in 1995 and 177 million in 2000.\(^7\) Furthermore, the diabetes epidemic is only expected to continue growing. By 2030, the IDF estimates almost 552 million people will have diabetes, a growth of over 180 million people.

The geographic distribution of diabetes continues to evolve. IDF estimates that 48 percent of individuals with diabetes in 2030 (approximately 90 million individuals) will live in China and India alone.\(^8\) The ten countries with the largest diabetes populations today are listed in Table 1, and global diabetes rates are shown in Figure 1.

<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated Diabetes Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>92,300,000</td>
</tr>
<tr>
<td>India</td>
<td>63,000,000</td>
</tr>
<tr>
<td>United States</td>
<td>24,100,000</td>
</tr>
<tr>
<td>Brazil</td>
<td>13,400,000</td>
</tr>
<tr>
<td>Russia</td>
<td>12,700,000</td>
</tr>
<tr>
<td>Mexico</td>
<td>10,600,000</td>
</tr>
<tr>
<td>Indonesia</td>
<td>7,600,000</td>
</tr>
<tr>
<td>Egypt</td>
<td>7,500,000</td>
</tr>
<tr>
<td>Japan</td>
<td>7,100,000</td>
</tr>
<tr>
<td>Pakistan</td>
<td>6,600,000</td>
</tr>
</tbody>
</table>
Figure 1: Approximately 371 Million People Worldwide Are Living with Diabetes

NORTH AMERICA AND CARIBBEAN
- More healthcare dollars were spent on diabetes in this region than any other
- 1 in 10 adults in this region has diabetes
- 10.5% PREVALENCE
- 29.2% UNDIAGNOSED (38 M)

MIDDLE EAST AND NORTH AFRICA
- 1 in 9 adults in this region has diabetes
- More than half of people with diabetes in this region don’t know they have it
- 10.9% PREVALENCE
- 52.9% UNDIAGNOSED (34 M)

EUROPE
- 1 out of every 3 dollars spent on diabetes healthcare was spent in this region
- 21.2 million people in this region have diabetes and don’t know it
- 6.7% PREVALENCE
- 38.6% UNDIAGNOSED (55 M)

AFRICA
- Over the next 20 years, the number of people with diabetes in the region will almost double
- This region has the highest mortality rate due to diabetes
- 4.3% PREVALENCE
- 81.2% UNDIAGNOSED (15 M)

SOUTH AND CENTRAL AMERICA
- Only 5% of all healthcare dollars for diabetes were spent in this region
- 1 in 11 adults in this region has diabetes
- 9.2% PREVALENCE
- 45.5% UNDIAGNOSED (of 26 M)

SOUTH-EAST ASIA
- 1 in 5 of all undiagnosed cases of diabetes is are in this region
- 1 in 4 deaths due to diabetes occur in this region
- 8.7% PREVALENCE
- 51.1% UNDIAGNOSED (70 M)

WESTERN PACIFIC
- 1 in 3 adults with diabetes lives in this region
- 6 of the top 10 countries for diabetes prevalence are Pacific Islands
- 8.0% PREVALENCE
- 57.9% UNDIAGNOSED (132 M)
**Disease Burden**

The IDF estimates $471 billion was spent globally in 2012 on treating diabetes and complications.\(^{11}\) The US comprises the largest percentage of that spending, with estimates of spending on direct costs totaling $176 billion in 2012.\(^{12}\) The largest components of medical expenditures include hospital inpatient care (43% of medical costs), prescription medications to treat the complications of diabetes (18%), anti-diabetic agents and diabetic supplies (12%), physician offices visits (9%), and nursing/residential facility stays (8%).\(^{13}\)

Moreover, the direct costs of treating diabetes do not reflect the full economic burden the disease places on patients and society. In addition to the direct medical costs of treatment, significant indirect costs impose limitations on patients and society. When assessing the true burden of the disease, it is necessary to account for costs associated with travelling to care centers, lost wages from disability, family costs incurred to support a patient with diabetes, and even productivity costs. For instance, a recent analysis of the economic costs of diabetes in the United States found that indirect costs from diabetes totaled $68.6 billion in 2012. Indirect costs included increased absenteeism ($5 billion), reduced productivity while at work ($20.8 billion) for the employed population, reduced productivity for those not in the labor force ($2.7 billion), inability to work as a result of disease-related disability ($21.6 billion), and lost productive capacity due to early mortality ($18.5 billion).\(^{14}\)

Patients with diabetes in developed markets including North America, the EU, and Japan pay out-of-pocket for some of these costs, but rely on government or commercial payers to pay for many of the costs. However, patients in other countries carry the burden for a significant share of the costs related to diabetes treatment.\(^{15}\) This disparity may help explain the large gap in life expectancy between individuals living with diabetes in countries with higher investment in diabetes care and individuals living in countries with lower investment in the treatment of diabetes (Figure 2).\(^{16}\)

The worldwide effect of this disparity is significant, as four out of five people with diabetes live in countries where spending on diabetes care is toward the lower end of the spectrum.\(^{17}\)
Diabetes – Overview

Diabetes is a group of diseases characterized by high blood glucose levels that result from defects in the body’s ability to produce and/or use insulin. Diabetes is a chronic and progressive disease that, if left undiagnosed and improperly treated, can result in serious illness, disability, and death from complications. Long-term complications associated with diabetes include: heart disease, vascular disease and poor circulation, blindness, kidney failure, poor healing, stroke, diabetic ulcers, and other neurological diseases.  

While the term diabetes is broadly used, distinct forms exist:

**Type 1 Diabetes**, formerly called “juvenile diabetes,” is an autoimmune disorder that occurs when a person’s immune system destroys beta cells in the pancreas and thus its ability to produce insulin. As a result, people with type 1 diabetes have an insulin deficiency and do not produce enough insulin to process glucose. Type 1 diabetes often presents in children and young adults, though it can develop at any age. Individuals with type 1 diabetes present to healthcare providers – sometimes in an emergency situation – with acute symptoms at diagnosis. This form of diabetes is less common – accounting for an estimated 5-10 percent of the diabetes population and requires lifelong insulin treatment.

**Type 2 Diabetes** also occurs when the body is unable to process glucose appropriately. Individuals with type 2 diabetes suffer from relative insulin deficiency and are often able to produce insulin at a level considerably higher than patients with type 1 diabetes. Unlike those with type 1 diabetes, however, individuals with type 2 diabetes also suffer from insulin resistance, or the inability to process glucose appropriately. For unknown reasons, people with insulin resistance are able to produce insulin, but their bodies are unable to use that insulin to process glucose efficiently. Type 2 diabetes is associated with several other health factors, including obesity and physical inactivity, and was formerly considered to present only among adults. Today, that perception has changed, as more young adults and even children are diagnosed with type 2 diabetes. However, unlike individuals with type 1 diabetes, many individuals with type 2 diabetes do not present with noticeable or sudden symptoms and are diagnosed while being treated for other illnesses or for complications that are not uniquely linked to diabetes. Type 2 diabetes is far more common than type 1 diabetes, accounting for an estimated 90-95 percent of all people with diabetes.

**Gestational Diabetes** is developed by some women late in pregnancy. Although gestational diabetes usually ends after pregnancy, women who develop it are 40-60 percent more likely to develop type 2 diabetes within 5-10 years. As a benchmark, approximately 3-8 percent of pregnant women in the United States develop gestational diabetes.

**Diagnosis**

Typical symptoms of diabetes include excessive thirst, fatigue, frequent illness or infections, poor circulation (including tingling or numbness in the feet or hands), wounds that do not heal, blurred vision, and unintentional weight loss. Laboratory-analyzed blood tests are used to diagnose diabetes. Though glucose monitoring devices such as blood glucose meters may be an indicator of high glucose levels, they are not accurate enough to substantiate a diabetes diagnosis. One common test used to diagnose diabetes is the fasting plasma glucose test. Normal fasting blood glucose -- or blood sugar -- is between 70 and 100 milligrams per deciliter or mg/dL (4 to 6 mmol/L) for people who do not have diabetes.
The standard diagnosis of diabetes is made when two separate blood tests indicate a fasting blood glucose level is greater than or equal to 126 mg/dL. Other tests that can be used to confirm diabetes are the A1C test and the oral glucose test. The A1C test measures the average blood glucose control for the prior two – three months and is determined by measuring the percentage of glycated hemoglobin (HbA1c) in the blood. This test is often performed routinely post-diagnosis as part of ongoing monitoring of diabetes.

Because of the challenges in diagnosing type 2 diabetes, a central concern in treating diabetes is the number of people who continue to live undiagnosed and thus do not receive proper monitoring and treatment. Of 371 million individuals estimated to be currently living with diabetes, it is believed that approximately half remain undiagnosed. The substantial numbers of people living with undiagnosed diabetes poses a significant challenge to public health and medical professionals and is particularly troublesome since much of the global spending on diabetes already “results from unmanaged diabetes and the high costs involved in treating complications – spending that could have been prevented.”

Looking forward, it is imperative that more individuals living with diabetes are diagnosed so that their disease can be properly managed and treated with appropriate actions to mitigate complications. This includes lifestyle adjustments and timely initiation of therapies that can reduce the health and economic costs of complications that arise from inadequate treatment and disease progression. To drive early diagnosis, it will be necessary to implement screening programs for high-risk individuals. In addition, it is essential to promote education and awareness of diabetes for patients and healthcare providers to encourage the prevention and appropriate diagnosis and treatment of diabetes.

### Treatment

Central to the management of diabetes is controlling glucose levels through a combination of medication and self-management activities. Glucose control requires a great deal of effort and coordination on the part of the patient. To control glucose levels, individuals with diabetes may need to coordinate diet, exercise, blood glucose monitoring, and oral and injectable medications. For many diabetes patients, monitoring and managing glucose levels can be time consuming and complicated. Therefore, patient education programs can play a critical role in helping patients with diabetes manage their disease. Such programs should encourage diabetes awareness, disease management tools and techniques, and partnerships between physicians and patients to achieve optimal treatment and outcomes.

In addition, treatment varies substantially across the spectrum of diabetes patients. While all people with type 1 diabetes must take insulin, some patients with type 2 diabetes may be able to manage their condition for some time through nutrition, diet, and exercise. Over time, most patients with type 2 diabetes will need to take oral medications, and many patients with type 2 diabetes will also need to take insulin. Active and accurate monitoring of blood glucose levels is essential to diabetes treatment.

The central medical components of diabetes treatment are described in greater detail below.

#### Oral Treatments and Non-Insulin Injectables

Oral medications and several non-insulin injectable therapies for diabetes are indicated for use by people with type 2 diabetes. These treatments function by encouraging the body to work more efficiently to manage glucose.
levels, either by enhancing or discouraging existing bodily functions. There are several different types of diabetes medications and each performs its job through a different mechanism. Some medications encourage insulin production. Some increase the body’s sensitivity to insulin. Some even aid the digestive process by targeting specific enzymes in the digestive tract. In most cases, treatment with a single anti-diabetes agent will have diminishing efficacy for individual patients after several years, or even several months. At that point, patients may be able to continue treatment with a combination of oral medications and/or non-insulin injectables. Eventually, many type 2 diabetes patients will need to shift to insulin use to effectively manage blood glucose levels.  

**Insulin**

Insulin is required to sustain the lives of millions of type 1 diabetes patients worldwide, as well as many patients with type 2 diabetes. There are four different categories of insulin available for the treatment of diabetes today. Each type varies based on how quickly it works, when it peaks, and how long it remains in the body.

<table>
<thead>
<tr>
<th>Type of Insulin</th>
<th>Time to Bloodstream</th>
<th>Time to Peak</th>
<th>Total Time Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid-acting</td>
<td>5 minutes after injection</td>
<td>1 hour</td>
<td>2-4 hours</td>
</tr>
<tr>
<td>Regular or Short-acting</td>
<td>30 minutes after injection</td>
<td>2-3 hours</td>
<td>3-6 hours</td>
</tr>
<tr>
<td>Intermediate-acting</td>
<td>2-4 hours after injection</td>
<td>4-12 hours</td>
<td>12-18 hours</td>
</tr>
<tr>
<td>Long-acting</td>
<td>6-10 hours after injection</td>
<td>N/A</td>
<td>20-24 hours</td>
</tr>
</tbody>
</table>

Individuals with type 1 diabetes will likely use long or intermediate-acting insulin and rapid or short-acting insulin throughout the day. The long or intermediate-acting insulin is used to establish a “basal” level of insulin in the body during the course of the day. This basal level is meant to allow patients to set a steady base glucose level during the day. The rapid or short-acting insulin is used to convert carbohydrates consumed during meals into energy and to prevent spikes in glucose in the bloodstream that would otherwise occur. In order to manage glucose levels around meals and as levels fluctuate naturally, diabetes patients may have to use rapid or short-acting insulin several times during the day. Patients with type 2 diabetes may require only a long-acting insulin injected once a day to maintain better blood glucose control in combination with other medications, while others may progress to full insulin dependence requiring mealtime insulin as well.

**Insulin Delivery Systems – Syringes, Pens, and Pumps**

Insulin must be delivered subcutaneously, due to the hurdle of the body digesting insulin before it enters the bloodstream. The large majority of insulin-taking individuals with diabetes use syringes to inject themselves with insulin. Many patients may also use an insulin pen needle for injections. In recent years, pen needles have overtaken syringes as the most common type of insulin delivery device in many developed countries. In Western Europe, for instance, insulin pens are more commonly used for insulin administration than syringes. Inhaled insulin products have also been developed, but were removed from the market due to limited uptake and other issues.

Individuals with diabetes use syringes or pens to inject insulin subcutaneously. Though syringes are the most common method of insulin delivery, pen needles are often considered less painful and more convenient, which can promote patient adherence to insulin therapy. It is common for patients with diabetes to occasionally
reuse syringes as a way to reduce costs, minimize your syringe purchases and storage, and reduce waste. However, syringe reuse raises issues like sterility and is not appropriate in all situations according to the American Diabetes Association. Such guidelines may influence differing syringe reuse practices across countries. For instance, it can be common for diabetes patients in China to reuse syringes up to 20 times, a considerable amount more than the average three times of reuse in the US. Anecdotal evidence also suggests that greater reuse leads to increased pain on injection, which may adversely influence adherence with insulin.

An alternative method of insulin delivery is the continuous subcutaneous insulin infusion pump (insulin pump). Insulin pumps replace the need for patients to inject themselves with insulin periodically throughout the day. Such pumps weigh approximately three ounces and can be worn on a belt or carried in a pocket. The pump holds a plastic insulin cartridge and delivers the insulin to the body through an infusion site. The infusion site is connected to the pump via a cannula – a needle or small soft tube – that is inserted into tissue beneath the skin. In addition to these durable pumps, “patch” pumps also are available for patients who choose insulin pump therapy. Unlike traditional pumps, which deliver insulin to a patient by pushing insulin through tubing and the cannula into the patient’s subcutaneous tissue, patch pumps do not have tubing. Instead, the insulin reservoir, cannula or needle, and motor to deliver insulin are all contained in a small, disposable unit that is worn on the body. The disposable unit is controlled remotely by a device which is operated by the patient. Both types of insulin pumps use only rapid or short-acting insulin and provide a steady or “basal” amount of insulin continuously throughout the day. Patients also use the pump to provide “bolus” doses of insulin at meals or to administer correction doses of insulin to address any hyperglycemia that occurs throughout the day.

Regardless of the method used to deliver insulin - via an insulin pump or injections – insulin therapy requires frequent blood glucose monitoring and in some cases, patients also couple their insulin delivery regimen with a CGM to aid in blood glucose management.

**Blood Glucose Monitoring**

Blood glucose monitoring is considered to be the main tool patients have to monitor their diabetes control. Frequency of blood glucose monitoring is highly customized to the patient and may occur as infrequently as a few times a week for certain patients with type 2 diabetes, or as frequently as 6 or more times a day for patients with type 1 diabetes on intensive insulin management regimens. Furthermore, targets for blood glucose levels will vary from person to person based on several factors, including duration of diabetes, age, comorbid conditions, known complications, hypoglycemia unawareness, and other individual patient considerations. For individuals with type 2 diabetes, blood glucose monitoring may be a way to retrospectively monitor patterns in treatment and disease progression with their health care provider. For individuals with type 1 diabetes and insulin dependent type 2 diabetes, blood glucose monitoring is central to managing the daily use of insulin.

For most individuals with diabetes, monitoring blood glucose is achieved through blood glucose meters which analyze small blood samples obtained via a finger-stick. Such devices are small, computerized machines that analyze a small capillary blood sample to determine total glucose levels. Typically, the blood sample is taken by piercing the end of a finger with a small needle or lancet. Based on the results of each reading, insulin-dependent patients can increase or decrease their dosage of insulin. Type 2 patients who are not on insulin may simply record their readings and review them later with their health care provider to inform any changes to their treatment protocols.
A relatively new alternative to blood glucose meters is the continuous glucose monitor (CGM). These devices represent an important step in the effort to help individuals with diabetes achieve target glucose levels and avoid severe glucose fluctuations. CGM devices read glucose levels at regular intervals – as frequently as every five minutes - through a small sensor placed under the skin and can alert patients when glucose levels become dangerously high or low. As a result, CGM devices provide a real-time snapshot of a patient’s glucose levels and trend information on whether glucose levels are moving upwards or downwards and how fast. CGM devices also provide longer-term trend data, which can help patients and providers modify treatment over time. CGM devices are an important step toward the concept of an “artificial pancreas,” which imagines a diabetes monitoring and treatment system that would automatically alter insulin dosages based on real-time glucose data to closely mimic the functions of a real pancreas and limit the negative impacts of hyper- and hypoglycemia.

Self-management and Progression
Optimal diabetes treatment necessarily involves strong patient self-management. Active participation from the patient and coordination with the healthcare delivery team is required. Healthy eating, exercise, and consistent monitoring of blood glucose levels are all areas that people living with diabetes must embrace to achieve optimal glycemic control. Variations in patient self-management can create significant health disparities among patients with diabetes.

The most important measure of an individual’s ability to manage their diabetes is known as glycemic control. Glycemic control is measured primarily by an individual’s HbA1c level. Clinical guidelines for management of HbA1c vary worldwide. For example, the US and EU generally target an HbA1c range of 6.5 – 7.0 percent, though other countries, such as Brazil, are evaluating appropriate recommendations for their citizens. However, despite recognition of the growing diabetes population and the importance of appropriate treatment for these patients, it is also well recognized that many patients with diabetes are not achieving desired levels of glycemic control and outcomes. In fact, only slightly more than half (56.8 percent) of the diabetes population in a recent US study achieved a target HbA1c less than 7.0 percent, further reflecting the need for enhanced diabetes care.

Additional studies have demonstrated that optimal treatment and management can improve glycemic control and reduce long-term complications in patients with type 1 and type 2 diabetes. Better treatment and management of diabetes have both been demonstrated to improve patient outcomes and reduce costs. For example, for every point higher in HbA1c, type 1 patients are 40 percent more likely, and type 2 patients are 25 percent more likely, to suffer long-term complications. It is critical, therefore, that healthcare professionals engage with patients with diabetes to provide appropriate and timely training, monitoring, and follow-up to enable proper treatment and optimal outcomes, including avoidance of costly and debilitating complications.

In conclusion, diabetes is a serious and growing problem worldwide and must be addressed through comprehensive policies that include building education and awareness, driving early diagnosis, improving access to medical treatments, and enhancing coverage and reimbursement by payers including governments.


6. Ibid, 524-525.


22. Ibid, 1620.


26. NIDDK, “Diabetes Overview.”


33. Ibid, 524-525.


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