

Preface

Diabetes currently affects ~30 million adults in the United States and 463 million people worldwide. With the rare exception of neonatal diabetes, people with type 2 diabetes, which explains 90–95% of the diabetes burden, were born with normal glucose regulation and maintained that state for several years or decades before experiencing progressive deterioration in glucose regulation. The transition from normal glucose regulation to type 2 diabetes is punctuated by a variable interlude in an intermediate stage characterized by impaired fasting glucose and/or impaired glucose tolerance.

Prediabetes, the conventional term for the intermediate stage, is diagnosed by documenting impaired fasting glucose (fasting plasma glucose 100–125 mg/dL [5.5–6.9 mmol/L]) or impaired glucose tolerance (2-h postload plasma glucose 140–199 mg/dL [7.8–11.0 mmol/L] during oral glucose tolerance test) or an HbA_{1c} level of 5.7–6.4% (39–46 mmol/mol). Using those diagnostic criteria, nearly 90 million U.S. adults and more than 374 million people worldwide have prediabetes. Marked increases in the prevalence of diabetes and prediabetes over the next decade have been predicted. Diabetes exacts a huge economic and human toll as the leading cause of blindness, kidney disease, amputation, heart disease, and stroke.

Excellent glycemic control decreases the risks of diabetes complications; however, ~50% of people with diabetes worldwide achieve suboptimal glycemic control. Thus, along with improving glucose control in people with diabetes, the dominant strategy for stemming the epidemic is primary prevention. Based on the natural history of type 2 diabetes, intervention at the stage of prediabetes can interrupt development of full-blown disease. Therefore, focusing on prediabetes, is compelling. However, a deeper understanding of the pathobiology of prediabetes is critical to the discovery and delivery of programs for preventing diabetes. Numerous predictive risk factors have been identified for the initial escape from normal glucose regulation toward prediabetes and the subsequent transition to diabetes.

Focusing on prediabetes, this book first discusses the demographic, anthropometric, biobehavioral, and biochemical factors that drive the transition from normoglycemia to prediabetes. Emerging knowledge from genomics, transcriptomics, microRNAs, metabolomics, and microbiomics is incorporated into an expansive treatise on the pathobiology of prediabetes. People with persistent prediabetes are at increased risks for multiple vascular complications; the frequency of prediabetic microvascular and macrovascular complications and the mechanisms for their occurrence are discussed in detail.

Next, the focus shifts to evidence-based management of prediabetes and prevention of type 2 diabetes. Prediabetes either progresses to type 2 diabetes or remains persistent, seldom remitting spontaneously. Lifestyle modification and certain medications prevent progression from prediabetes to type 2 diabetes and may even induce remission of prediabetes in some people. Remission of prediabetes is desirable, because it is associated with long-term protection from future diabetes and its complications.

Finally, this book discusses how the strategies successfully used for diabetes prevention in landmark randomized, controlled clinical trials can be translated in communities around the world. Emphasis is given to practical adaptations that would enable the establishment of cost-effective community diabetes prevention initiatives.

The ideas discussed here are germane to developed and developing countries; low-, middle-, and high-income regions; and high- or low-literacy segments of the populace. Interventions using lifestyle modification are prioritized over medications, but novel approaches (including cyclical medication strategy, designer nutraceuticals, and metabolic surgery) are also discussed. Current lifestyle intervention protocols have been more effective at preventing progression from prediabetes to type 2 diabetes than they have been at restoring normal glucose regulation. This book makes the case that restoration of normal glucose regulation carries numerous benefits and should be the primary goal of intervention in people with prediabetes.