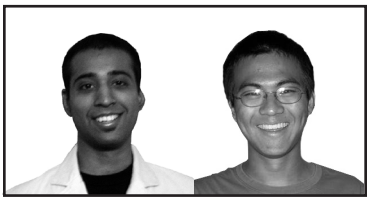
# The Diabetic Pandemic:
## Globalization, Industrialization, and Type 2 Diabetes



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*Diabetes is an illness that is increasing in incidence worldwide. This paper gives an introduction to the disease, and describes its etiology and epidemiology. Most importantly, it analyzes the possibility of a correlation between a socioeconomic predictor (GDP PPP per capita) and diabetes prevalence in the world.*

In the past few decades, the socio-economic conditions of nations around the world have trended towards parity, and there has been a growth of global interdependencies. This continuing trend poses various risks to individual nations ranging from political unrest, loss of cultural expression and the increased incidence of certain diseases.

In this article, we examine Type 2 Diabetes, one of this decade's greatest pandemics (World Diabetes Foundation, 2006). Specifically, we aim to look at the role of socioeconomic predictors of this disease in developing and developed nations.

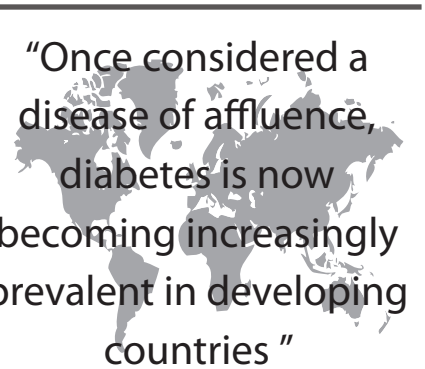
## Type 2 Diabetes

***What is it?***

Type 2 Diabetes is an illness involving the pancreas producing inadequate levels of insulin, or the body's insufficient response to the insulin that it produces (World Health Organization, 2008). Long term complications may include blindness, heart disease, kidney problems, nerve damage, and erectile dysfunction (Canadian Diabetes Association, 2008). In 2006, the United Nations officially recognized diabetes as a global health threat (Canadian Diabetes Association, 2008).

***Etiology***

Research is being conducted to better understand the biochemical pathways involved in the development of Type 2 Diabetes. Some studies have shown that insulin-receptor substrates (IRS proteins), specifically IRS-2, may be linked with Type 2 Diabetes (Withers et al., 1998). Moreover, some researchers have been using novel experimental techniques with magnetic resonance spectroscopy (MRS) in order to provide insight into molecular defects present in diabetic subjects. Based on this research, it is observed that insulin resistance observed in diabetics is mainly attributed to reduced activity of insulin-stimulated glucose transport via the GLUT4 protein (Petersen & Shulman, 2006).




Although the exact cause of Type 2 Diabetes is still unknown, healthcare professionals agree that it is the result of both genetic factors and lifestyle. Physical inactivity and obesity are often cited as the main causes, indicating that this disease may be preventable to some extent (Bennett, 1998).

## Global Epidimiology

***Overview***

While considered a disease of affluence, diabetes is now becoming increasingly prevalent in developing countries (Siegel & Narayan, 2008). Diabetes affects 5.9% of the world's adult population, and accounts for approximately 5% of all global deaths, showing that it truly is a disease of global proportions (Figure 1). The number of deaths is expected to increase by more than 50% in the next 10 years.

Several interesting trends arise as public health professionals

and epidemiologists attempt to analyze morbidity data. For example, 80% of people with diabetes worldwide live in low and middle income countries. While the rate of obesity among these countries is lower than high income countries, it is expected that low and middle income countries will experience the greatest increase in prevalence. This indicates that there could possibly be a causal relationship between a country's socioeconomic status and the prevalence of diabetes. Furthermore, the age distribution of sufferers differs greatly: most people with diabetes in low and middle income countries are middle-aged (45-64), unlike high income countries, where most diabetic patients are elderly

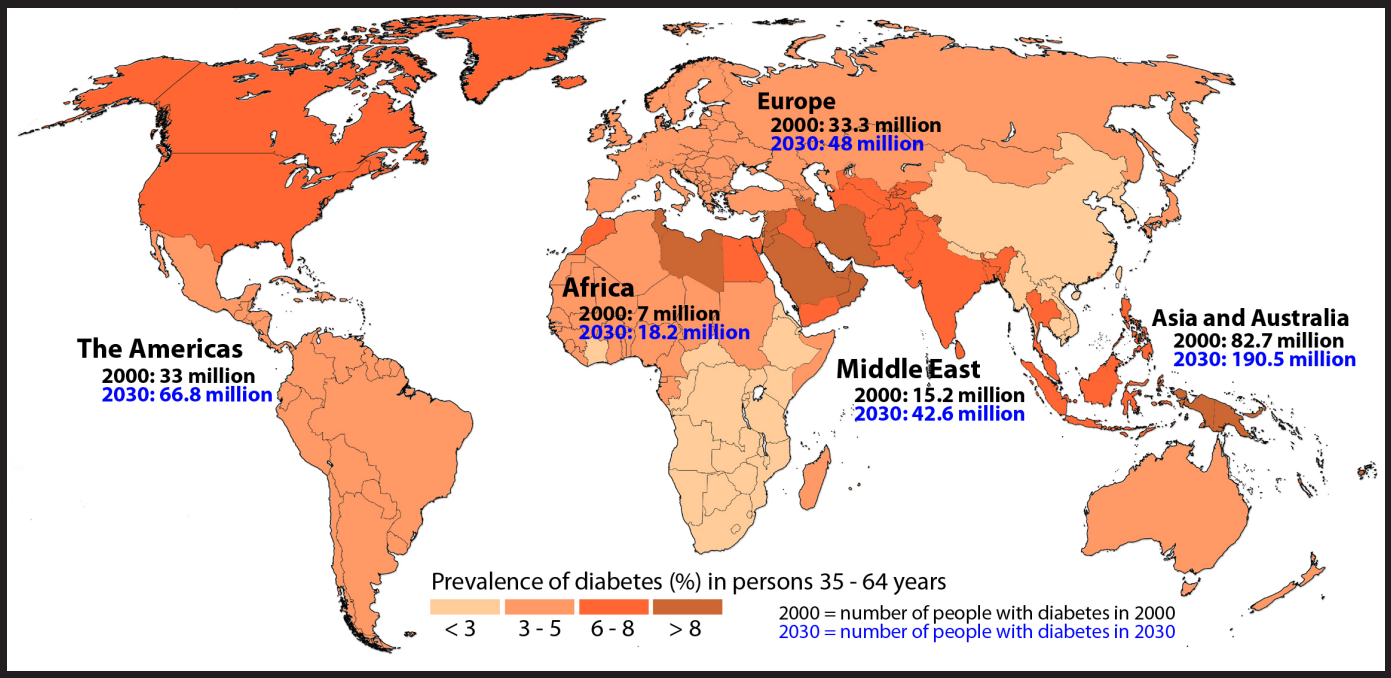



**Figure 1** World map showing diabetes prevalence as percent of population (colour scale), and absolute morbidity for the years 2000 and 2030 (projected). There are geographical, and socioeconomic trends. (King et al., 1998).

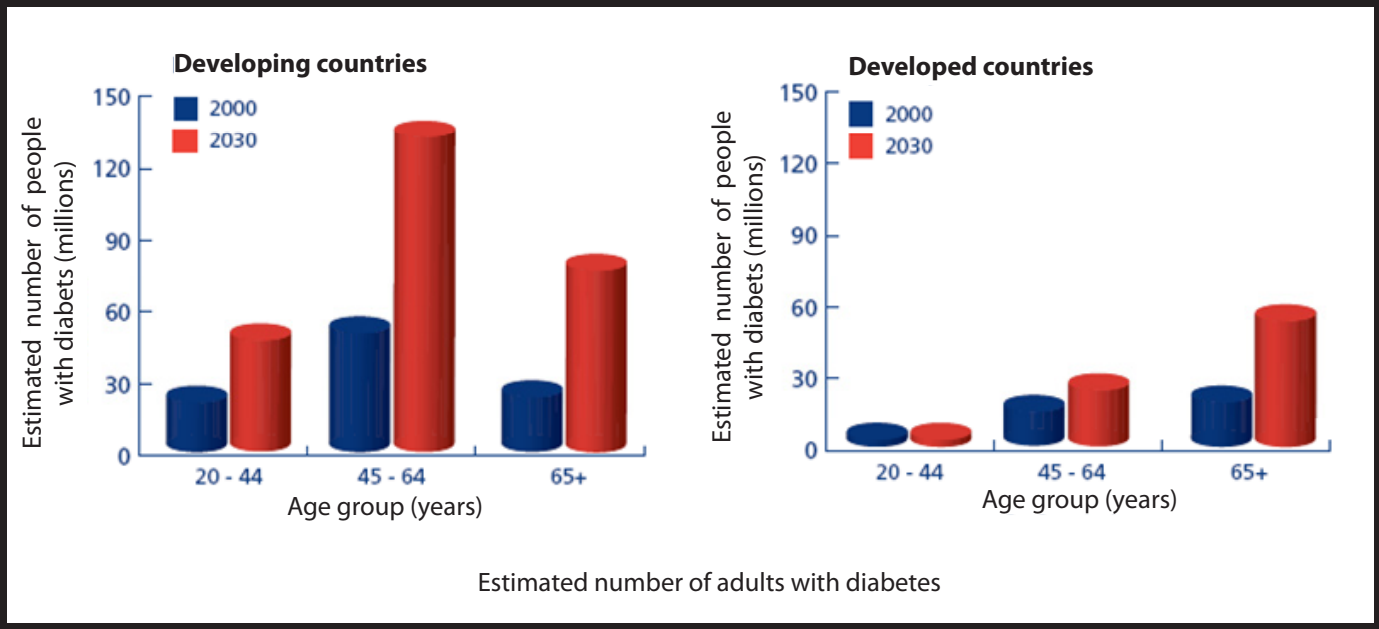



**Figure 2** Developing countries have higher absolute morbidity and faster projected growth rates of absolute morbidity than developed countries. Of significant importance are the differences in age distribution between developing and developed countries (Wild et al., 2004).

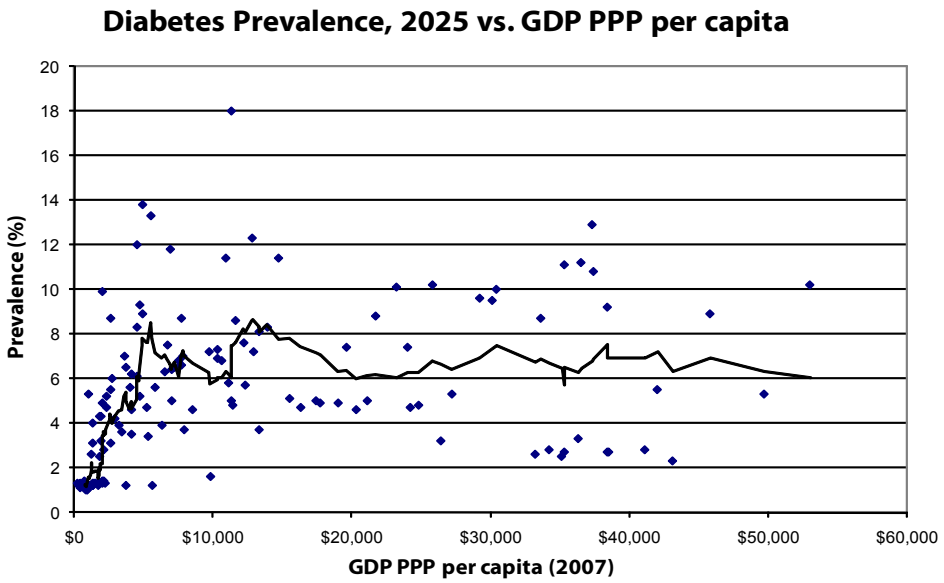



**Figure 3** Increase in diabetes prevalence over the years 2000-2025 compared with GDP PPP for the year 2007. Generally, the $10 000 + range corresponds to the GDP PPP of developed countries. Thus, the greatest increase in diabetes prevalence will likely occur among the developing countries at the higher end of the GDP PPP spectrum. These countries are the most rapidly developing undeveloped countries (Central Intelligence Agency, 2008).

(65+) (World Health Organization, 2008). This acts as further evidence of a possible link between wealth and diabetes (Figure 2). However, it should be noted that this data could simply be a reflection of life expectancy differences among countries.

The possibility of a connection between a country's socioeconomic status and the risk of Type 2 Diabetes has not been fully understood. In order to examine this possibility, we investigated the effect of gross domestic product at purchasing power parity (GDP PPP) per capita, an indicator of socioeconomic status on diabetes prevalence (Figures 3). Diabetes prevalence estimates from the year 2000 and predictions for the year 2025 were used, in order to see current and future trends (King et al., 1998). GDP PPP per capita data was obtained from the year 2007, as this was the most complete and reliable data set available (Central Intelligence Agency, 2008). To further analyze these trends, we examined the relationship between GDP PPP per capita and the estimated increase in diabetes prevalence from 2000-2025.

***Analysis***

There appears to be a trend of increase in diabetes prevalence by GDP PPP per capita with a pronounced peak around $6000-10 000. While it appears that a relationship exists, the significance of such a relationship is limited, as the comparison is between only the GDP PPP per capita figures. Since this data is used at a national level, it may not be assumed that all members of these countries will face increased risk of diabetes. Instead, it is more appropriate to look at this potential connection holistically, considering other factors within nations that could explain the increase in diabetes prevalence.

> "Developing countries will experience the greatest burden of diabetes over the next two decades... "

Many behavioural risk factors for Type 2 Diabetes are characteristic of the lifestyles of industrialized countries. Thus, developed countries have a high prevalence of this illness. Since Type 2 Diabetes affects an older population and these countries are generally aging, the frequency of the disease will continue to increase.

As developing countries are becoming wealthier and increasingly interdependent on developed countries, diabetes risk factors characteristic of developed countries may be starting to affect developing countries as well. The availability and marketing of lipid-rich and processed foods, time-saving gadgets, occupational reforms and urbanization are likely contributing towards the increase of diabetes prevalence seen in developing countries (Siegel & Narayan, 2008).

***Implications of the Diabetes Pandemic***

The diabetes pandemic is very costly for all countries; direct medical costs are approximately five times higher for diabetics than the general population. These high costs are causing a great strain on national and individual

spending in many poorer nations. Countries afflicted may see a drop in productivity, which will lead to a lower quality of life for its citizens (Siegel & Narayan, 2008).

## Conclusion

Our analysis shows that there may be a connection between a socioeconomic indicator – GDP PPP per capita and diabetes prevalence of diabetes. While there is no simple or direct correlation between the two variables, overall trends indicate that greater increases in diabetes prevalence will occur in rapidly developing countries. These countries will experience the greatest burden of diabetes over the next two decades, as they will be forced to reform healthcare systems to deal with a rapidly changing morbidity profile.

The exposure of diabetes in medical literature and the media has significantly increased in recent times, although several misconceptions still surround the illness. Some believe that it is a completely preventable disease, while others feel that current treatment methods are adequate and do not support investing into better cures and long-term solutions. Nonetheless, Type 2 Diabetes is a serious, chronic illness which severely affects the quality of life of those who suffer from it. Estimates of increases in diabetes prevalence over the next twenty years are astounding and drastic changes to public health policy are crucial to better manage this pandemic.

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