Increased trend in the incidence of diabetes among youths in the USA during 2002–2012

The SEARCH for Diabetes in Youth Study (SEARCH Study) reported on estimated trends in the incidence of type 1 and type 2 diabetes, and among youths at five centers in the USA during 2002–2012. The SEARCH Study previously showed increases in the prevalence of both types of diabetes during 2001–2009. After calculating the annual incidence rates for the period from 2002 to 2012, the incidence trends were analyzed by generalized autoregressive moving-average models with 2-year moving averages. In total, 11,245 young people, aged 0–19 years, in 4.9 million young people of this age group were diagnosed as type 1 diabetes, and 2,846 young people, aged 10–19 years, in 2.5 million young people of this age group were diagnosed as type 2 diabetes.

From unadjusted models, a significant increasing trend was confirmed in the overall incidence of type 1 diabetes (from 19.5 /100,000 young people annually during 2002–2003 to 21.7/100,000 young people annually during 2011–2012; annual increase, 1.4%, P = 0.03), with substantial variation between different ethnic groups (Figure 1). In the adjusted pairwise comparisons, an increase in the annual incidence rate was higher among Hispanic young people than among non-Hispanic white young people (4.2% vs 1.2%, P < 0.001). It is well recognized that the incidence of type 1 diabetes varies greatly between racial and ethnic groups. There is a 40-to-50-fold difference in the disease incidence among countries, and the incidence rates are associated with the frequency of human leukocyte antigen susceptibility genes present in the general population.

In Asian countries, the incidence of type 1 diabetes is substantially lower than European countries. The incidence rate is estimated to be approximately 2/100,000 person-years in Japan, 3/100,000 person-years in China (Shanghai) and 5/100,000 person-years in Taiwan. Furthermore, type 1 diabetes has unique and different human leukocyte antigen correlations in Asians compared with Caucasians. In recent decades, there was an increasing trend in the incidence of young people with type 1 diabetes worldwide. Some reports have shown that this increase is disproportionately greater in developing countries and countries undergoing economic transition. In contrast, there is evidence that the incidence of type 1 diabetes has not changed recently in some countries. The increasing trend in the incidence of type 1 diabetes is, in some racial ethnic groups, related to an increased frequency of individuals with low-risk human leukocyte antigen genotypes. The previous SEARCH Study reported there was increase in the incidence of type 1 diabetes among non-Hispanic white young people during 2002–2009. In the current report, this incidence was significantly greater among Hispanic young people than among non-Hispanic white young people, suggesting that environmental or behavioral factors, including dietary habits, infections or psychosocial factors, could play an essential role in the increasing incidence of type 1 diabetes in young people.

The unadjusted overall incidence of type 2 diabetes has greatly increased worldwide over the past two or three decades among both young people and adults, and that marked differences in the incidence of type 2 diabetes are observed between racial and ethnic groups. Young people in some racial and ethnic groups, such as Hispanics, Native Americans, African Americans and particularly Asian or Pacific Islanders, have a substantially higher prevalence of type 2 diabetes than Caucasian young people. It has been reported that 90% of youth-onset diabetes is type 2 diabetes in Hong Kong, and 50% and almost 60% in Taiwan and in Japan, respectively. A study carried out in all major cities in Japan investigated the incidence of type 2 diabetes among Japanese schoolchildren, aged 7–15 years, by means of a school-based urine glucose screening. According to that study, the estimated overall annual incidence was 2.5–3.5/100,000 schoolchildren. Furthermore, the Tokyo Study showed that the incidence among junior high school children, aged 13–15 years, is sixfold higher than that among children in primary school, aged 7–12 years, with an incidence of 0.9 versus 6.5/100,000 schoolchildren annually (P < 0.0001, respectively). It is noteworthy that the incidence of type 2 diabetes is almost twice that of type 1 diabetes in Japanese schoolchildren. The incidence of type 2 diabetes in Japanese young people is believed to be the highest worldwide. However, the current SEARCH Study reported much higher rates among young people residing in the USA, for whom the incidence of type 2 diabetes increased significantly during 2002–2012: the incidence per 100,000 persons in the 2012 period was 3.9 in non-Hispanic white people, 32.6 in non-Hispanic black people, 18.2 in Hispanics, 12.2 in Asian or Pacific Islanders and 46.5 in Native Americans. The incidence in all racial and ethnic groups reported, except non-Hispanic white people, was definitely higher than that...
reported in Japanese schoolchildren. Ogden et al. reported no significant increase in the prevalence of obesity among young people in the USA from 2003–2004 to 2011–2012. Accordingly, there must be other reasons for the recent increasing trend of type 2 diabetes in this specific population. First, worsening dietary habits, such as consuming more sugar-containing beverages and snacks, and fat-rich meals, and the sedentary lifestyle, with playing electronic games and watching television, adopted by youths in recent years might have contributed to the observed increase. Second, in developed countries, youth-onset type 2 diabetes is predominately found in low socio-economic populations, because children living in such conditions tend to eat cheaper, sugar- and fat-rich meals. Worsening economic conditions in recent years, particularly among minority groups with a genetically high risk of developing type 2 diabetes, might also play a role in the increase of incidence of the disease.

The current SEARCH Study concludes that the incidence of both type 1 diabetes and type 2 diabetes among young people in the USA significantly increased over the period during 2002–2012, particularly in minority racial and ethnic groups, and that the incidence of type 2 diabetes among young people in the USA might be the highest worldwide. Environmental and behavioral factors play an essential role in developing both types of diabetes. Reducing the prevalence of youth-onset diabetes is crucial; hence, improving dietary habits and lifestyle is important, particularly among minority racial and ethnic groups that make up a great proportion of the USA population.

DISCLOSURE
The author declares no conflict of interest.

Tatsuhiko Urakami
Department of Pediatrics, Nihon University School of Medicine, Tokyo, Japan

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