An avalanche is “a sudden arrival or occurrence of something in overwhelming quantities”. Is this an accurate description of the emerging complications seen in those with youth-onset type 2 diabetes? Type 2 diabetes of youth onset (diagnosed <18 years of age) is increasing around the world. However, incident rates vary markedly between populations. The classic long-term microvascular complications of diabetes have now been described in young adults with youth-onset type 2 diabetes. Renal outcomes. Micro- and macroalbuminuria are frequently present at diagnosis of youth-onset type 2 diabetes. For example, albuminuria was present at diagnosis in 22% of Pima Indian youth, 29% of Canadian First Nation (FN) youth and in 14% of New Zealand Maori youth. Progression also appears to be rapid, with albuminuria described in 58% of Pima youth and 62% of Maori youth within 10 years of diagnosis. In a recent Canadian study, persistent, non-orthostatic albuminuria was present in 9.8% of FN children from Manitoba with type 2 diabetes had a four-fold increased risk of renal failure compared to youth with type 1 diabetes controlled for age, sex, and geographically matched control children without diabetes. FN children from Manitoba with type 2 diabetes had a four-fold increased risk of renal failure compared with youth with type 1 diabetes controlled for age at diagnosis, glycated hemoglobin (HbA1c), era of diagnosis, and body mass index z-score, and a 23-fold increased risk of renal failure compared to age-, sex, and geographically matched control children without diabetes. Other microvascular complications are also reported at high rates among those with youth-onset type 2 diabetes. Increased rates of neurological complications in those with type 2, compared with type 1 diabetes begin to appear by five years post-diagnosis and ophthalmologic complications begin to differ 10 years post-diagnosis. Major complications (defined as amputation, blindness, or dialysis) remained rare in youth-onset type 1 diabetes 20 years post-diagnosis, but occurred in 26% of youth-onset type 2 diabetes 10 years post-diagnosis and in almost 50% 20 years post-diagnosis.
The Emergence of Complications in Indigenous Youths with Type 2 Diabetes

Shocking mortality data are now available. In Manitoba, the mortality rate of youth-onset type 2 diabetes 20 years post-diagnosis has been shown to be 22.5%, comparing unfavorably with youth-onset type 1 diabetes of 2.4%. In Australia, the mortality rate in youth-onset type 2 diabetes was double that of youth-onset type 1 diabetes with a median follow up of 20 years. In these reports, youth with type 2 diabetes were predominantly indigenous youth.

Of equal or, perhaps even greater concern, is a ‘new’ complication of youth-onset type 2 diabetes that is now emerging—the transgenerational effects of intrauterine exposure to type 2 diabetes. With the increasing incidence of youth-onset type 2 diabetes, more youth will be diagnosed prior to their childbearing years and thus their offspring will be exposed to pregestational type 2 diabetes. In The Pima population, siblings born following a pregnancy complicated by diabetes have been shown to be at higher risk for the development of type 2 diabetes and at a younger age than their siblings who were not exposed to diabetes in utero. In Canadian FN children, offspring exposed to pregestational type 2 diabetes had a 14-fold increased risk for the development of youth-onset type 2 diabetes compared with offspring who were not exposed to diabetes in utero. The Next Generation of NextGen Cohort is a research cohort composed of the offspring of young FN women in Manitoba who had youth-onset type 2 diabetes diagnosed prior to their pregnancies. By definition, all offspring were exposed to pregestational type 2 diabetes. This cohort appears to be at very high risk for youth-onset type 2 diabetes, perpetuating the vicious cycle of exposure. To date, approximately 50% of the NextGen cohort >12 years of age have developed type 2 diabetes (personal communication, Brandy Wicklow, Winnipeg, 2016). In addition, exposure to pregestational diabetes is associated with an increased risk of congenital renal anomalies.

Little is known about the psychosocial health of youth with type 2 diabetes, though early reports suggest this is a concern. These issues may have significant effects on adherence to management regimes and ability to provide self-care. We must understand these issues in order to best support youth and their families living with type 2 diabetes.

Youth-onset type 2 diabetes is associated with very significant morbidity and mortality in young adulthood and indigenous youth are disproportionately affected. Indeed, we are now seeing an ‘avalanche’ of complications in youth-onset type 2 diabetes. ‘Avalanche prevention’ will require an increased understanding of the disease and the complex biopsychosocial interactions that limit access to healthcare, healthy diets, and physical activity opportunities and influence ability to self-manage. Diabetes and complication prevention will also likely involve intervention at many stages, including in the pre-conception period. The avalanche is gathering speed—the time for action is now.

15. Wong J, Constantino M, Yue DK, Morbidity and mortality in young-onset Type 2 diabetes in comparison to Type 1 diabetes: where are we now?, Curr Diab Rep, 2015;15:564.