

Glucose intolerance in Wisconsin's Hmong population

Daniel J. McCarty, PhD

Rapid change from traditional to westernized lifestyles almost always results in higher rates of obesity and type 2 diabetes.¹ Whether a population develops these metabolic problems is dependent on the interaction of their genetic susceptibility and the extent to which they adopt the high fat, high caloric diets and lower levels of physical activity characteristic of modern lifestyles. Many ethnic groups, such as North American Indians, Mexican Americans, Australian Aborigines, Pacific Islanders, Asian Indians, and Chinese are particularly susceptible to developing obesity and glucose intolerance. Immigrants of these ethnicities who settle in developed countries face a particularly high risk, especially offspring who may be more likely than their parents to adopt westernized diets and low levels of physical activity.

The high prevalence of diabetes and obesity in many countries has been described as "arising from a collision of our hunter-gatherer

genes with our new twentieth-century lifestyle."² In 1961, Neel proposed a "thrifty genotype" to explain this phenomenon.³ Neel postulated the existence of metabolically thrifty genes that permitted more efficient food utilization, fat deposition, and rapid weight gain during times of food abundance, thereby allowing a survival advantage in subsequent times of nutritional hardship. These same thrifty genes that offered an advantage under conditions of feast or famine in traditional human lifestyle now act as a disadvantage in modern society where nutrition is always plentiful, often in the form of refined foods, and physical activity levels are comparatively low. In modern environments, people with thrifty genotypes may experience obesity, hyperinsulinemia, and insulin resistance, which may ultimately lead to pancreatic beta cell decompensation, type 2 diabetes mellitus, and other lifestyle-related non-communicable diseases.³

In this issue of the *Wisconsin Medical Journal*, Her and Mundt present the results of an important pilot study of glucose intolerance and type 2 diabetes risk factors in Hmong living in Wisconsin.⁴ Using a finger prick glucose meter, the authors measured casual capillary whole blood glucose in 144 non-randomly selected Hmong volunteers. Other measures in-

cluded body mass index (BMI), blood pressure, and demographic characteristics. Their results, which need to be confirmed in larger, population-based studies, showed 47% of women and 32% of men had whole blood glucose values ≥ 140 mg/dl. These findings suggest a very high prevalence of glucose intolerance and undiagnosed diabetes in Hmong residing in Wisconsin. This is a potentially large public health problem as extended periods of poor glycemic control increase the chance for severe, costly complications and premature mortality.

In Wisconsin, the Hmong population has grown 106% from 16,000 in 1990 to almost 34,000 in 2000, and due to recent immigration, this number may have increased to almost 40,000.⁵ The authors correctly state that nothing is published regarding the prevalence of glucose intolerance in Hmong living in the United States and there are only a few papers regarding high rates of childhood obesity⁶ and hypertension.⁷ Therefore, these pilot data are very important to help sound the alarm.

Hmong health should be a public health priority in Wisconsin as we have the opportunity to work with Hmong communities to establish culturally appropriate health promotion initiatives and reduce future health problems. Educational efforts may be

Dr McCarty is with the Marshfield Epidemiology Research Center, Marshfield Clinic Research Foundation, Marshfield, Wis. Please address correspondence to: Daniel J. McCarty, PhD, Marshfield Clinic Research Foundation, ML2, 1000 N Oak Ave, Marshfield, WI 54449; e-mail mccarty.daniel@mcrf.mfldclin.edu.

required to ensure that medical professionals are aware of the potential health problems facing Hmong and other recent immigrant populations. For example, health care professionals should be aware that Hmong likely become insulin resistant at lower levels of BMI than Caucasians, and they should be routinely checked for glucose intolerance—particularly overweight children and young adults. Although we probably cannot completely avoid the collision between Hmong thrifty-genes and modern Wisconsin lifestyles, we now have some evidence that it is occurring and we have a public health responsibility to act now to reduce the damage.

References

1. Zimmet P, Alberti KG, Shaw J. Global and societal implications of the diabetes epidemic. *Nature*. 2001;414(6865):782-787.
2. Diamond J. Sweet death - genes that used to help us survive starvation may be causing current diabetes epidemic. *Nat Hist*. 1992;9:2-6.
3. Neel J. Diabetes mellitus: a thrifty genotype rendered detrimental by "progress"? *Am J Hum Genet*. 1962;14:353-362.
4. Her C, Mundt M. Risk prevalence for Type 2 Diabetes Mellitus in adult Hmong in Wisconsin: a pilot study. *WMJ*. 2005;104(5):79-86.
5. Wisconsin's Hmong Population. University of Wisconsin Extension & Applied Population Laboratory (2002). Available at: www.ssc.wisc.edu/poplab/Hmong%20Chartbook%20full.pdf. Accessed June 15, 2005.
6. Himes JH, Story M, Czaplinski K, Dahlberg-Luby E. Indications of early obesity in low-income Hmong children. *Am J Dis Child*. 1992;146(1):67-69.
7. Munger RG, Gomez-Marin O, Prineas RJ, Sinaiko AR. Elevated blood pressure among Southeast Asian refugee children in Minnesota. *Am J Epidemiol*. 1991;133(12):1257-1265.

Wisconsin Medical Journal

The mission of the *Wisconsin Medical Journal* is to provide a vehicle for professional communication and continuing education of Wisconsin physicians.

The *Wisconsin Medical Journal* (ISSN 1098-1861) is the official publication of the Wisconsin Medical Society and is devoted to the interests of the medical profession and health care in Wisconsin. The managing editor is responsible for overseeing the production, business operation and contents of the *Wisconsin Medical Journal*. The editorial board, chaired by the medical editor, solicits and peer reviews all scientific articles; it does not screen public health, socioeconomic or organizational articles. Although letters to the editor are reviewed by the medical editor, all signed expressions of opinion belong to the author(s) for which neither the *Wisconsin Medical Journal* nor the Society take responsibility. The *Wisconsin Medical Journal* is indexed in Index Medicus, Hospital Literature Index and Cambridge Scientific Abstracts.

For reprints of this article, contact the *Wisconsin Medical Journal* at 866.442.3800 or e-mail wmj@wismed.org.

© 2005 Wisconsin Medical Society