The prevalence of overweight (OW) and obesity (OB) is increasing in both adult and child populations throughout the world. Childhood OB has been rising at an alarming rate in the United States (U.S.) and may be even more prevalent in Hawaii, causing a wide range of serious complications.

OW and OB is defined as a condition of pathological excess of body fat, and generally is measured by body mass index (BMI = weight in kg over height in meter squared). Cut off points for adult OW and OB are set at ≥25 kg/m² and ≥30 kg/m², respectively. Although the measurement of childhood OB and adolescent OW and OB is a highly debated issue, the most widely applied and feasible method uses an age adjusted BMI developed from averaging international percentile data. More accurate methods for excess fat measurement exist but are more costly, hazardous and/or time consuming.

Never before in the history of human evolution was childhood obesity a general health problem, but during the last several decades not only obesity in adults but excess weight in children and adolescents has reached epidemic proportions. Data from 1999-2000 revealed that the prevalence of OW in the United States was 15.5% among the 12 to 19 year-olds, 15.3% among 6 to 11 year-olds, and 10.4% among the 2 through 5 year-olds, compared with 10.5%, 11.3%, and 7.2%, respectively, in 1988-1994 (National Health and Nutrition Examination Survey III, NHANES III). Few such data exist for children in Hawaii. One study examined the prevalence of OW between 1992 and 1996 among 1437 students ages 6 to 17 years in one school district in Hawaii. This longitudinal study included more residents of Hawaiian ancestry (62-71%) and reported that relative to the nationwide OW prevalence rates (NHANES III) the investigated population had a 2.1-2.5 fold and 1.5-2.5 fold higher OW rate in Hawaiian and in non-Hawaiian children, respectively. Similar trends were reported a decade ago.

OB is now recognized as one of the most common health problem facing children. OW and OB not only in adulthood but already in childhood are known to have significant impacts on both physical and psychosocial health including insulin resistance, type 2 diabetes mellitus (T2DM), dyslipidemia (high total cholesterol, LDL cholesterol, and triglycerides and low HDL cholesterol), increase in CRP (marker for inflammation), premature atherosclerosis, hypertension and increased left ventricular mass, all of which are major risk factors for cardiovascular causes for death. T2DM, a known risk factor for cardiovascular disease and typically considered a disease of adults, parallels the epidemic of OB in children. There is data suggesting the disease process moves faster in children than in adults.

Other health problems associated with childhood OB include obstructive sleep apnea, increasingly severe asthma, pseudotumor cerebri, blunt capsul femoral epiphysis, flatfeet, decreased bone mineral content for age, cholelithiasis, hepatic steatohepatitis and many psychologic and social complications. As health problems associated with OB in childhood, adolescence, and adulthood may not be fully reversible by weight loss, prevention has to gain more interest.

Childhood OB tends to persist into adulthood in 30% to 80% of the cases, and an adult who was an obese child has a likelihood of more serious comorbidities than if the OB developed in adulthood. In the U.S. OB is estimated to account for 14 percent and 20 percent of all deaths from cancer in men and women, respectively and represents a high risk factor especially for pancreatic and liver cancer in males, and kidney, uterus, and postmenopausal breast cancer in females. High energy intake, large body mass index, and physical inactivity increase risk of colorectal cancer independently. Earlier menarche, a risk factor for breast cancer due to longer lifetime estrogen exposure, is reached with higher body weight, while exercising decreases female breast cancer risk. This is important to note because native Hawaiian girls were reported to have more body fat and a significantly lower age at menarche than non-Hawaiian classmates.

Risk of OB related complications differs by ethnic origin and may be a result of cultural factors. For example, Asian Americans and Pacific Islanders who constitute the majority (over 50%) of the populations in Hawaii are at high risk for T2DM. Among Japanese school-children, the incidence of T2DM increased from 0.2 to 7.3 per 100,000 children per year between 1976 and 1995. For Pacific Islanders there is a dearth of information in this respect especially in children. A few studies in adult Pacific Islanders have shown that indigenous people such as the Samoans, Hawaiians, and the Marshallese have developed substantially higher rates of OB than the U.S. population over the last 40 to 50 years. In migrants to Hawaii the situation might be worse because the prevalence of OW in female Western Samoan adults was 46% in Western Samoa but 80% once moved to Hawaii. These studies also noted a more central distribution of fat based on the waist/hip ratio, which is associated with “atherogenic” serum lipid profiles. In Pacific Islanders the risk for comorbidities despite the same degree of adiposity was several times higher than among the U.S. Population. Statewide surveys showed that native Hawaiians have higher than average mortality rates from T2DM, coronary heart disease and various cancers and that life expectancy of both Hawaiians and part Hawaiians is the lowest among all major ethnic groups in Hawaii.

The cause of OB represents a complex interaction of genetics, diet, metabolism, and physical activity but is mostly due to increased energy intake and/or decreased energy expenditure.
foods high in fat and sugar (foremost fast-food, snack food and sodas) lead to increased malnutrition and overnutrition. The problem is aggravated by a decrease in physical activity (physical education programs, leisure-time physical activity, biking, walking, outdoor playing, etc.), and more inactive time at the TV, computer game, boy telephone, and others.

Although prevention is clearly the best way to try to solve this health problem, treatment can be successful once OB has occurred, particularly in children, who can lose and maintain weight loss easier than adults. Culturally competent treatment strategies need to be developed to increase physical activity and to encourage healthy eating patterns among children and their families. For example, the Waianae Diet program has been a successful clinical program for the Native Hawaiian population. Family-based programs appear to be the most efficacious in reducing OB prevalence and in long-term maintenance of a healthy diet and lifestyle as compared to school-based programs. Best results are achieved if physicians, behavioral psychologists, dietitians and exercise specialists are involved in a concerted effort with frequent interactions.

However, without comprehensive actions by many sectors of our society (removing fast foods and sodas from schools, curbing food advertisement and marketing directed at children, increasing physical education programs, building bike paths, pedestrian zones and playgrounds, subsidizing nutritious foods, improving insurance coverage for effective obesity treatment, etc.) Hawaii will suffer the effects of an increasing obese population with substantial obesity related morbidity and mortality.

Today’s obesity-associated annual hospital costs in the U.S. increased more than three fold to $127 million since 1980b despite a significantly decreased life expectancy caused by obesity. Direct medical costs in 1995 accounted for an estimated $70 billion and ranked as the second leading cause of preventable premature death in the U.S. In view of this trend childhood obesity in Hawaii must be studied further and aggressively pursued as an important health problem. Our societies will not be able to bear the socioeconomic burden inadvertently connected with the qualitatively and quantitatively worsening commodity cases of future obese generations.

For more information on the Cancer Research Center of Hawaii please visit our website at www.crch.org.

References
