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More vigorous efforts are needed to fight obesity, a serious public health problem in China

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Obesity has become a serious public health problem in the world, and affects both high- and low-income countries. Presently, China has the highest number of people with overweight/obesity worldwide. Recently, *Lancet Diabetes and Endocrinology* published three papers covering the obesity problems in China including, the epidemiology (1), the treatment and management (2), and the public health and policy implications (3). China has seen steady increases of overweight and obesity rates among children, adolescents, and adults in the past several decades, reported in these new papers and in previous studies (1-5).

Overweight and obesity in China had increased about 10 times from 1982 to 2015-2019 (Table 1) (1). The 2015-2019 China Health and Nutrition Survey (CHNS) estimated that the prevalence of overweight and obesity, based on the Chinese criteria, were 6.8% and 3.6% of children aged 5 years or younger, 11.1% and 7.9% of children and adolescents aged 6-17 years, and 34.3% and 16.4% of adults aged 18 years or older, respectively (Table 1) (1). It estimated that ~10 million children aged 5 years or younger, ~38 million children and adolescents aged 6-17 years, and ~566 million adults aged 18 years or older are overweight and obese based on the China's population of 2020 (Table 1). The Chinese criteria for overweight and obesity are: for children aged 5 years or younger, weight-for-height greater than 2 (for overweight) and 3 (for obesity) Standard Deviations (SDs) above the World Health Organization Child Growth Standards; for children and adolescents aged 7–18 years, body mass index (BMI) greater than cutoffs corresponding to the 85th (for overweight) and 95th (for obesity) percentile of sex-specific and age-specific BMI reference standards for Chinese children and adolescents; for adults aged 18 years or older, BMI of 24.0–27.9 kg/m² for overweight and 28.0 kg/m² for obesity (1).

If the observed obesity/overweight trends would continue without effective intervention efforts, Wang et al. (3) projected future prevalence and number of affected people in China as well as the medical costs attributable to the condition. By 2030, the prevalence of overweight and obesity (BMI \geq 24 kg/m²) might reach 65.3% in adults, 31.8% in school-aged children, and 15.6% in preschool-aged children, while the number of people with overweight/obesity might reach 790 million, 59 million, and 18 million, respectively. In addition, the projected medical cost attributed to overweight and obesity in China in 2030 will be 418 billion CNY (approximately 61 billion US dollars), accounting for about 22%

of total national medical costs. These would put an alarming burden on China's health-care system.

A set of population-level determinants and individual-level risk factors may have fueled the rising obesity epidemic in China. With rapid economic development since the 1980s, the Chinese population has been experiencing rapid lifestyle changes, trending towards a more sedentary and high-energy/high-fat diet lifestyle (1). Moreover, the effects of dietary factors and physical inactivity intersect with other individual-level risk factors such as genetic susceptibility, psychosocial factors, obesogens, and *in-utero* and early-life exposures on the changes in overweight and obesity. These individual-level lifestyle factors are largely driven by the economic, social, and political factors, such as, economic growth, sociocultural norms, urbanization, urban planning, built environments, and food systems and environments.

China would see more health and economic consequences when the rising obesity epidemic collides with rapid population aging in the coming decades. Strong evidence from prospective studies indicates that overweight and obesity are associated with increased risks of major non-communicable diseases (NCDs) including hypertension, type 2 diabetes, coronary heart disease, stroke, and several types of cancer (breast cancer, colorectal cancer, endometrial cancer, liver cancer, ovarian cancer, and pancreatic cancer), and premature mortality in Chinese populations (1-3). Overweight and obesity contributed to 11.1% of deaths associated with NCDs in 2019, an increase from 5.7% in 1990 (1).

Wang et al. systematically identified 70 obesity-related national policies and programs implemented in China since 1949 (4, 5). Unfortunately, such programs were inadequate in containing the rising obesity epidemic. Clearly stronger actions and more effective policies are needed in China to face the rising burden of obesity. Based on international recommendations, research findings and input they obtained from experts from inside and out of China, Chinese researchers made a set of recommendations for China's future efforts including policy options (4, 5). These range from improving governmental responsibility and accountability, enhancing cross-sector collaboration, and taking comprehensive measures to implement obesity prevention and control policies, to improving the obesogenic environment including the food- and built environment.

New national efforts are being made in China in fighting obesity. For example, on April 10, 2021 in Xi'an, China, the first national academic organization specifically targeting obesity, the Obesity Prevention and Control Society of Chinese Nutrition Society led by Prof. Youfa Wang was founded. The new Society aims to facilitate more cross-sector intervention efforts and collaborations with international organizations, in joint efforts combating obesity.

The public health- and economic consequences of obesity in China are enormous and may become worse in the future. Given its many unique challenges and strengths, China is well positioned to explore an effective model to fight the obesity epidemic, which may provide other countries with useful insights. As the official journal of The Obesity Society, the Editorial staff at *Obesity* applaud these efforts and welcome Chinese researchers, clinicians and epidemiologists to the global obesity community that is fighting this disease.

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Summary of overweight and obesity statistics based on Chinese criteria in China National Nutrition Surveys, by year

Table 1.

Study Years	Children <6 years			Children or adolescents 6-17 years			Adults 18 years		
	Overweight	Obesity	Overweight & obesity	Overweight	Obesity	Overweight & obesity	Overweight	Obesity	Overweight & obesity
1982	-	-	-	1.0-2.2%	0.2-0.6%	1.2-2.8%	5.4%	0.1%	5.5%
1992	2.3%	1.6%	3.9%	3.9%	1.8%	5.7%	16.4%	3.6%	20.0%
2002	3.4%	2.0%	5.4%	4.5%	2.1%	6.6%	22.8%	7.1%	29.9%
2010-2012	8.4%	3.1%	11.5%	9.6%	6.4%	16.0%	30.1%	11.9%	42.0%
2015-2019	6.8%	3.6%	10.4%	11.1%	7.9%	19.0%	34.3%	16.4%	50.7%
Estimated numbers*	~6.50 M	~3.45 M	~10 M	~22.2 M	~15.8 M	~38 M	~383 M	~183 M	~566 M

Modified from Pan et al.(1)

* Estimated numbers are calculated based on the 2020 China's population.