Public health crisis in China is about to accelerate the public health crisis in our world’s population

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Our world population is facing a persistent epidemic of cardiovascular diseases. Unfavourable changes in cardiovascular risk factors have been seen in the western world for decades now. Yang et al. have now provided strong evidence to show that cardiovascular risk factors are becoming more common in China as well.

Increased cardiovascular risk in the Chinese population implies a huge public health threat. A worrying 30% of the sample studied by Yang et al. had ≥ 3 cardiovascular risk factors, which implies that at the Chinese population level, >300 000 million Chinese citizens have three or more cardiovascular risk factors. This number of Chinese subjects at increased risk is already a higher number than the total number of citizens in the USA, healthy and unhealthy subjects combined. If nothing happens, an enlarging Chinese population with cardiovascular risk factors will lead to an accelerated burden of public health in China, and at the world population level.

When considering approaches to combat the epidemic of cardiovascular risk factors in China, one needs insights into: (i) the need for action (what is the actual problem, in whom?); (ii) determinants; (iii) strategies and designs; and (iv) possibilities for implementation. As the western world does have data on these steps, the Chinese are likely to benefit from the western experiences and evidence.

Yang et al. clearly describe that smoking, being overweight or obese, hypertension, dyslipidaemia, and hyperglycaemia are now starting to become prevalent. This increase reminds epidemiologists from the western world of the ‘epidemiological transition’ that accompanied the process of modernization of western societies. During the last 100 years, infectious diseases made room for lifestyle-related chronic diseases as the major risk factor for mortality. Symptomatic for the epidemiological transition is the enormous increase in obesity levels. Obesity rates in the USA have more than tripled during the last 50 years. As far as data are available for Europe, we know that obesity levels have more than doubled during the last few decades. As the present study by Yang et al. is the first cross-sectional study on cardiovascular risk factors, it is hard to understand how obesity is increasing in Chinese adults. An increase in weight in Chinese children between 1985 and 2005 has been shown by Ji and Cheng, who estimate that >13 000 000 Chinese boys, and nearly 8 000 000 Chinese girls are now already overweight.

Obesity is more than symptomatic for the epidemiological transition. Fifty years ago, in the western world, obesity became known as the main cause of social exclusion; 40 years ago, the first epidemiological studies showed relationships with increased mortality; 30 years ago, evidence was appearing for a relationship with cardiovascular diseases and type 2 diabetes; and 20 years ago, the first epidemiological studies were showing relationships with musculoskeletal disorders, disabilities, and impaired quality of life. During the last decade, the relationship became apparent regarding cancer, and we started to learn that obesity, in addition to an increased risk of early mortality, was associated with an increased number of unhealthy life-years.

Nowadays, obesity is clearly acknowledged as a chronic disease. Obesity is a strong risk factor for cardiovascular diseases and type 2 diabetes. Hyperglycaemia, hypertension, impaired blood glucose control, and obesity often operate together in developing chronic conditions and increased mortality risk (Figure 1).

To date, >50% of chronic diseases are attributable to unhealthy behaviours. A complication in understanding how prevention and treatment strategies could intervene in these unhealthy behaviours is that, unlike in smoking prevention, we have to deal with many different behaviours. Obesity is the result of sustained changes in patterns of energy intake and/or physical activity. It is important to understand that the average yearly gain in body weight in Europe is <0.5 kg per person per year as a result of an energy surplus of ~10 kcal per day. That is the equivalent of less than one sugar cube, or a few minutes walking or cycling. Besides understanding that the underlying yearly changes in behaviour are small,
it is important to understand that the drivers of the obesity epidemic are very strong. The ANGELO framework describes an obesogenic environment, in which physical, socio-cultural, economic, and political environmental determinants make it too easy to eat too much, or to be not active enough. "Classical" behavioural, cognitive determinants such as attitude and knowledge have been shown to be associated with energy balance-related behaviours (nutritional intake and physical activity), but those behavioural determinants explain only a small proportion of worsened behaviours. The EnRG framework, based on both epidemiological and health promotion research, suggests that both cognitive and environmental determinants play a role. Although environmental determinants may well have a direct impact on some health behaviours, cognitive determinants may also act as mediators between environmental determinants and behaviour, or act as moderators, meaning that associations between environmental determinants and behaviour may differ when cognitive determinants have a different role.

The complexity of health behaviours having a role in the development of cardiovascular diseases, type 2 diabetes, and obesity, and our relative failure to understand what the real drivers are, how they interact, and how we can influence them, means that we should, by no means, blame those with increased risk factors. This is different from saying that we cannot hold individuals responsible for their own health behaviour. Indeed, central in prevention and chronic disease management approaches is the individual's own responsibility and the professional support in living accordingly, but it is now clear that many different determinants and stakeholders play a role.

From Rose’s strategy in prevention, we learned some 25 years ago that the population approach, in which many individuals are exposed to intervention resulting in small individual changes, has

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**Figure 1** The public health impact of obesity. Figure adapted from Visscher TLS, Seidell JC. The public health impact of obesity. *Ann Rev Public Health* 2001;22:355–75.
a larger impact on society than the individual approach.\textsuperscript{12} Community-based approaches are therefore undoubtedly of utmost importance in affecting the general population’s state of health (general prevention) and that of populations at increased risk (selective prevention), although at the same time those who already have symptoms (indicative prevention) or chronic conditions (care) should be exposed to individual support. Public health interventions aiming at improving health behaviour are abundant, but only a minority have been evaluated, and only some show long-term effects. It is now clear that prevention strategies should be multidisciplinary, involving several stakeholders and several strategies. The French EPODE approach shows that a multidisciplinary strategy combining political input, public–private partnerships, social marketing, and research is able to reduce the proportion of obese children in the population.\textsuperscript{13} Diabetes prevention trials show that a major risk reduction for diabetes occurs after losing a few kilograms.\textsuperscript{14} We now know that weight loss in the obese should aim at losing 5–10\% of the initial body weight, and that this effect should be sustained for a minimal period of 2 years. Obesity guidelines and protocols for standard care describe the principles of chronic disease management, in order to prevent risk factors becoming worse and preventing chronic conditions from occurring. Important in chronic disease management is patient-centredness when identifying disease and risk factors, supporting self-management, and monitoring the long-term actions and results.\textsuperscript{15}

The Chinese population and culture differ in many ways from western populations, although basal determinants of unhealthy behaviours may well lay in western obesogenic environmental factors that are entering China at a rapid rate. Thus, although a lot can be learned from the epidemiological transition that has taken place during the last hundred years in western societies, these lessons have to be taken from a Chinese perspective. Determinants of health behaviour may well differ in China and in western populations. Cognitive determinants are likely to be different in China, since the increase in available food and ways to become inactive are probably seen as cultural wealth, and have arrived even more rapidly than they have arrived into western societies. Environmental determinants of behaviour are also likely to be different, and, besides being different, these changes come at increased speed. A last difference is the emerging rather right-wing governments in the western world, losing their interest in prevention, imposing a major threat to public health initiatives that have got underway over the last few years. From this perspective, the western world is likely to learn from Chinese prevention strategies as cardiovascular disease are indeed going to appear on public health and policy agendas.

The increase in cardiovascular risk factors in China is dramatic. If no major efforts are made, the Chinese population is going to suffer from a major epidemic of cardiovascular diseases. This Chinese epidemic will have a major impact on the Chinese population, and will also have an accelerating negative effect on the world population’s public health status. A new epidemiological transition is about to happen, most probably at a faster rate than we have been seen in the western world, and definitely at a much higher level than in the western world.

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\textbf{References}