China is a land of superlatives: It consumes the most concrete and steel, emits the most greenhouse gases, and now, to the chagrin of health specialists, it has more people with type 2 diabetes than any other country in the world. By testing more than 46,000 people, Yang Wenying, a diabetes specialist at the China-Japan Friendship Hospital in Beijing, and colleagues extrapolate that 92.4 million Chinese—nearly 10% of the adult population—have type 2 (formerly “adult-onset”) diabetes and another 148.2 million have pre-diabetes, or abnormally high blood sugar levels believed to presage the disease. Diabetes “has reached epidemic proportions,” they concluded in a report last month in The New England Journal of Medicine (NEJM).

China’s growing affluence is driving sharp increases in what were once considered scourges of the Western world: lung and breast cancer, obesity, diabetes, hypertension, and cerebro- and cardiovascular diseases. A rapidly changing lifestyle appears to be to blame, as Chinese are smoking more; consuming more fat, sugar, salt, and refined grains; and leading increasingly sedentary lives, particularly in cities and booming coastal regions. Somehow, most Chinese have not grasped that “as lifestyles change, diseases change,” says Hao Xishan, president of Tianjin Medical University and chair of the Chinese Anti-Cancer Association. Ignorance and a health care system focused on infectious diseases have left China “facing a huge pending burden” from behavior-driven illnesses that are likely to take “a larger toll in the years to come,” says Jeffrey Koplan, an epidemiologist at Emory University in Atlanta who works with Chinese colleagues on chronic-disease mitigation.

Fledgling efforts to retrain doctors to handle lifestyle diseases early and to raise awareness about disease prevention “need to be massively accelerated” for China to stave off a crisis, says Lincoln Chen, a public health scientist at China Medical Board, a foundation based in Cambridge, Massachusetts. “The whole of society should be mobilized to control noncommunicable diseases,” says Yang Gonghuan, a deputy director of the Chinese Center for Disease Control and Prevention (CDC) in Beijing. A health reform plan adopted in April 2009 calls for attention to a number of noncommunicable diseases, but it doesn’t go far enough, Yang says.

As rates of behavior-related diseases rise, China’s medical community looks for ways to change attitudes and advance preventive care.
Tobacco companies target young women with slim, fashionably packaged cigarettes. Novotny and his group report that women believe these “feminine” cigarettes to be less harmful than regular brands. And the Bengbu study found that fewer than 45% of those medical university students were fully aware of the health effects of smoking.

One glimmer of hope, Xiao says, is that some municipalities have banned smoking in public places. Most notable is Beijing’s pledge to make the 2008 Summer Olympics smoke-free. The city forbade smoking in taxis, sports arenas, museums, government buildings, and parks. These and other restrictions have remained in effect, says Xiao. Shanghai is now following suit by crafting an antismoking effort around the 2010 World Expo, which opens 1 May. Such restrictions have won broad support among educated professionals in China’s eastern cities, Xiao says. “The culture is slowly changing, and this is really the best hope for controlling tobacco use in China,” he says.

That enlightenment hasn’t penetrated far into China’s heartland. In Changsha, the capital of south-central Hunan Province where Xiao lives, “everybody still smokes,” he says. And nationwide, cigarette sales are increasing. Hao believes the government should slap heavy taxes on cigarettes and funnel the proceeds to health research, but he doesn’t see that happening any time soon.

Although some Chinese cities may be turning the corner on smoking, another deadly threat is gathering momentum. Breast cancer has become the most commonly diagnosed cancer among women in Beijing, Shanghai, and several other major urban areas, says Hao. Overall, breast cancer incidence in China is about one-third the incidence in the United States, he says. But that masks a startling discrepancy between rural areas, where the disease is still rare, and big cities—perhaps because of differing diets, Hao says. Shanghai, for example, in 2004 had 71 cases of breast cancer per 100,000 women. (The incidence among white U.S. women is about 128 per 100,000.) Mortality rates for breast cancer in China’s cities rose 39% between 1991 and 2000, the biggest increase of any type of cancer, Hao says.

To reduce this toll through early detection, the Chinese Anti-Cancer Association in 2008 launched an effort to screen 530,000 women for breast cancer by the end of this year. The project includes training for at least 400 doctors. The health ministry is also funding a cervical cancer–screening program. The goal, Hao says, is to make screening a routine part of medical care. He would also like to see more basic cancer research. One mystery, Hao says, is that breast cancer is more common among women in their mid-40s in China than among same-aged women in developed countries; it’s not clear why.

CAUSES OF DEATH OVER TIME

Ebb and flow. China has brought infectious diseases to heel only to find that smoking, poor diets, and a lack of exercise are taking an increasing toll.

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The whole of society should be mobilized to control non-communicable diseases.

—YANG GONGHUAN, DEPUTY DIRECTOR OF THE CHINESE CENTER FOR DISEASE CONTROL AND PREVENTION

Off the scales

China’s rapid economic ascent is embodied in richer diets and less physical activity. Yang Gonghuan and colleagues reported in their 2008 paper in The Lancet that people are eating less cereal grains and much more fat than they were 20 years ago. Salt consumption, presumed to increase the risk of hypertension, has risen to twice the level recommended by Chinese dietary guidelines. At the same time, city dwellers are driving more and bicycling less. As a result, urban Chinese are growing flabbier. According to Chinese body-mass indices, Yang Gonghuan reports that 22.8% of Chinese adults were overweight in 2002 and 7.1% were obese—double the rate reported in 1992.

Overeating begins in childhood. In Shanghai and Beijing, 29% of boys and 15% of girls aged 7 to 12 were overweight or obese in 2000, up from about 6% and 4% in 1985. C. M. Chen of the Chinese CDC reported online on 28 February 2008 in Obesity Reviews. Even infants are getting heavier. Lin Xu, a nutritionist at the Chinese Academy of Sciences’ Institute for Nutritional Sciences in Shanghai, says there’s been an increase in newborns weighing more than 4 kilograms, which is very heavy for Asian populations and can cause complications at birth and later in life. “Even medical professionals don’t think of a big baby as a problem,” Lin says. Some clinics are now trying to clue in caregivers and expectant mothers to the importance of a moderate weight gain during pregnancy, Lin says.

Poor diets, putting on pounds, and lack of physical activity are behind the rise in cerebro- and cardiovascular diseases and deaths, says Yang Gonghuan. These factors are also driving the diabetes increase. It’s largely a silent epidemic: In the NEJM study, Yang Wenying says, 60% of Chinese with diabetes were unaware of their condition. Her group found that better educated people were more likely to know they have diabetes and take steps to control it. Particularly in rural areas, Yang says, “we need to educate people about [the benefits] of keeping a healthy lifestyle.” They are planning a pilot program targeting 7000 adults with prediabetes, hoping to head off disease progression and complications that can include heart problems.
limb amputations, and renal failure. And they are screening DNA samples collected from their 46,000 subjects to see if Chinese have a genetic susceptibility to diabetes.

The droves of undiagnosed diabetes cases point to a fundamental weakness in China’s health care system. Clinics and hospitals “are not set up to identify people with the precursors to diabetes. They don’t routinely test people, even people who might have a history of diabetes in the family,” says Brian Oldenburg, a public health specialist who heads the Initiative for Global Health Improvement at Monash University in Melbourne, Australia. Oldenburg, who is advising Beijing health officials on how to reduce the diabetes burden, says it will be critical to identify people at risk and get them into programs to modify their behavior. The challenge, he says, is to “reorient a health system focused on child and maternal health and infectious diseases to help people manage a chronic disease like diabetes.”

Improving disease prevention will take new regulations, awareness campaigns, and leadership by health care professionals, says Lincoln Chen. The China Medical Board has a program to urge doctors to stop smoking and adopt and enforce no-smoking rules in hospitals and clinics. Yang Gonghuan wants the food industry to cut back on salt as part of a broader effort to rein in hypertension. And to battle diabetes, Chen Yan, who heads the Institute for Nutritional Sciences, says he and others are lobbying the government and industry to fortify milk products with vitamin D. Recent studies have found that more than 90% of middle-aged and older people in Beijing and Shanghai suffer vitamin D deficiency, which exacerbates diabetes and prediabetes.

The central government is tuning in to the shifting disease burden. In spring 2009, the State Council adopted sweeping health care reforms that aim primarily to broaden coverage and improve delivery. The plan calls for hepatitis B vaccinations to stave off liver cancer and breast and cervical cancer screening. “It’s a start,” says Yang Gonghuan, who argues that greater emphasis should be placed on tobacco control and tackling stroke and heart disease.

China was caught off-guard by an “onslaught of chronic and noncommunicable diseases,” says Lincoln Chen. “I have no doubt that the Chinese will respond as recognition mounts and as health care costs mount, but how quickly and how effectively they can respond is not known,” he says. The key may be teaching a lesson that many Westerners are only beginning to fathom: The “good life,” without moderation, can be bad for one’s health. –DENNIS NORMILE

ARCHAEOLOGY

Unprecedented Excavation Brings Maritime Silk Road to Life

Raising the medieval Nanhai 1 wreck was a technical tour de force; now archaeologists are preparing to take the vessel apart plank by plank

HAILING ISLAND, CHINA—In 1987, treasure hunters searching for a 16th century shipwreck off the coast of southern China stumbled instead upon relics from a much older merchant vessel. The serendipitous find “confirmed the existence of an ancient maritime trade route linking China and the West,” says Zhang Wanxing, vice director of Guangdong Maritime Silk Road Museum here. In an unprecedented feat 20 years later, the 30-meter-long, 10-meter-wide ship, called Nanhai 1, or South China Sea 1, was scooped up along with a thick blanket of silt that entombs and preserves it, and hauled en masse to the museum. Now, at long last, archaeologists are about to embark on the next stage of Nanhai 1’s journey: a plank-by-plank excavation that will recover upward of 80,000 artifacts nestled inside.

A preliminary excavation last autumn lifted the veil on medieval Chinese shipbuilding, whetting appetites for more. The next phase will be “the first systematic and comprehensive study of a maritime silk route ship and its cargo,” says archaeologist Bill Jeffery of James Cook University in Queensland, Australia. “Nothing like it has ever been done before anywhere in the world.”

Chinese merchant vessels plied the Maritime Silk Road from about the 2nd century B.C.E. to the 18th century C.E., starting out from ports along China’s southeast coast and making for lands as far away as India and the Middle East. A handful of wrecks from the period had yielded precious few artifacts—until Nanhai 1, which promises to shed light on everything from navigation and shipbuilding to porcelain making and metalwork, says Wei Jun, vice director of Guangdong Cultural Relics Bureau. And as Science went to press, salvage archaeologists were about to commence recovery of relics from another Silk Road-era wreck, Nan’ao 1, off the coast of Guangdong.

Nanhai 1’s serendipitous recovery began in the summer of 1987, when Guangzhou Salvage Bureau of the Chinese Ministry of Communications and Maritime Exploration and Recovery Ltd. were searching for the Yhrhynsburg, an East India Company vessel known to have sunk near the Chuanshan Archipelago in the South China Sea, off the coast of Guangdong Province. Scouring the seabed, the treasure hunters made an intriguing discovery: green porcelain bowls and other relics that were at least 800 years old. Chinese officials immediately halted the operation and called in archaeologists. The relics pegged the wreck to the Song Dynasty, which lasted from 960 C.E. to 1279 C.E. Archaeologists were especially astonished by a 1.7-meter-long golden belt that was like...