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Last two decades see rising life expectancy in every province of China but substantial health inequalities remain

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First ever comprehensive studies of life expectancy, causes of death, and child mortality at provincial level in China suggest that localisation of policies will be crucial to government health reforms

Two new studies, published in *The Lancet*, reveal for the first time how health in different regions of China has changed in recent decades. The articles analyse life expectancy, causes of death, and child mortality for 31 provinces, municipalities, autonomous regions of China, and Hongkong and Macao special administrative regions, finding that in the last two decades, life expectancy has risen, and deaths in children under 5 years have fallen, in every province.

The studies were conducted by researchers in China and the USA, and led by the Chinese Center for Disease Control and Prevention, National Office for Maternal and Child Health Surveillance, and the Institute for Health Metrics and Evaluation (IHME) at the University of Washington, USA.

According to one study, 'Cause-specific mortality for 240 causes in China during 1990-2013: a systematic subnational analysis for the Global Burden of Disease Study 2013', Shanghai City had the highest life expectancy in China in 2013, at 80.2 for men and 85.2 for women. These figures are comparable to countries such as Japan or France, which have the highest life expectancies in the world, and represent a

gain of around six years on the highest life expectancies seen in China in 1990.

However, despite the gains in life expectancy seen across China, thought to be linked to increasing GDP and improved maternal education, large inequalities between provinces remain, with life expectancy around 10 years lower for both men and women in some provinces in the west part of China, comparable to less developed countries like Bangladesh.

Moreover, the study reveals striking differences in the leading causes of death in different provinces. Nationwide, cerebrovascular disease (the main cause of stroke) is the leading cause of death for both men and women, and is generally responsible for more deaths in poorer provinces. But some provinces, notably Yunnan province on China's southern border, have much lower rates of death from cerebrovascular disease.

In Yunnan, chronic obstructive pulmonary disease (COPD), associated with smoking and air pollution, is the leading cause of death, as it is in many southern and western provinces (including Chongqing, Sichuan, Gansu, Qinghai, and Guizhou). Northern provinces are generally worst affected by heart disease as a cause of death, with Heilongjang, the most-affected province, having a death rate due to heart disease that is four times greater than Zhejiang, the least-affected province.

According to one of the study's lead authors, Professor Maigeng Zhou, from the National Centre for Noncommunicable and Chronic Disease Control and Prevention in the Chinese Centre for Disease Control and Prevention, China, "There is an ongoing effort by the Chinese Government to reform the health-care system, especially in terms of ensuring equal access for all to basic public health services. Consideration of regional trends will be crucial to tackle the diverse health challenges faced by provincial governments, and localised health

policies will likely be the key for overall success at the national level. Our study also shows the importance of addressing the risk factors that lead to the most common causes of death in China, including cerebrovascular disease, smoking, and heart disease, as well as other important causes such as road accidents and cancer."

In a linked Comment accompanying the article, James Milner and Paul Wilkinson from the London School of Hygiene & Tropical Medicine, London, UK, write that, "China now faces the challenge of achieving further prosperity in a way that prioritises population health and environmental sustainability. There are encouraging recent signs. The Chinese Government has outlined plans for expansion of the health-care sector during the next five years, and Premier Li Keqiang has 'declared war' on environmental pollution. Even more promisingly, China has proposed plans for action to tackle climate change, pledging substantial cuts in greenhouse gas emissions and increases in low-carbon energy generation. If these and other commitments are kept, China has an opportunity to show that economic development does not have to be achieved at any cost."

Another study published at the same time, 'Under-5 mortality in 2851 Chinese counties, 1996-2012: a modelling study for the Global Burden of Disease Study 2013' finds that every province of China has seen falling deaths in children under 5 years since 1970, with most provinces achieving a decrease in child mortality more than twice as fast as the Millennium Development Goal 4 rate of 4.4% per annum. The decline in child deaths has been much faster than expected, even after gains in GDP and improvements in education are taken into account.

Child mortality has fallen dramatically even among China's minority groups, and in northwest and southwest regions, despite the fact that minority groups and underdeveloped areas are usually the hardest to reach and last to benefit from national health gains in most countries.

The study is the first ever national analysis of child mortality in China at a county (sub-province) level, and reveals that the differences in child mortality rates between counties can be just as dramatic as those seen between provinces.

According to Professor Jun Zhu from the National Office for Maternal and Child Health Surveillance in Sichuan, China, one of the study's lead authors, "Our findings show that since 1970, child deaths in China have fallen far more quickly than expected, at the country, province and county level. This is an extraordinary success story, but we should not be complacent—some regions of China have not performed as well as others, and the next step is to use lessons from the most successful regions to intensify efforts to improve child survival in the regions with the poorest child survival."

Writing in a linked Comment accompanying the article, Dr Yan Guo and Hui Yin from Peking University in Beijing, China, state, "China's accomplishments in reducing under-five mortality owe credit to rapid socioeconomic development in the country. After reform and the opening up of China's economy, the country's Gross Domestic Product (GDP) increased sharply, from ¥365·02 billion in 1987, to ¥58 801·88 billion in 2013; GDP per person increased from ¥382 to ¥43 320 during the same period. As a result of the large-scale actions aimed at alleviation of poverty, the size of poor populations in rural areas of China decreased from 250 million in 1978 to 82·49 million in 2010. Institutional delivery and preventive vaccination have been improved significantly. The implementation of compulsory education projects also brought about growth of net enrolment rate for school-age children from 95·5% to 99·7%. These socioeconomic developments laid a good foundation for the improvement of children's health status."

Professor Christopher Murray, Director of IHME and a co-author of both studies, says "China has experienced a remarkable demographic

and health transition in the last three decades, and this is reflected by the changing picture of the nation's health that we see during this period. However, until now, surprisingly little information has existed on how health in China varies between provinces and counties. These new studies provide remarkable new insights into the health of the world's most populous nation, which can now be used by policymakers to further advance the nation's health."

More information: 'Cause-specific mortality for 240 causes in China during 1990-2013: a systematic subnational analysis for the Global Burden of Disease Study 2013': www.thelancet.com/journals/lan … (15)00551-6/abstract

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