

**China Health Bibliography Update**  
January 2005 Special Issue on MDG indicators

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EASHD----China Rural Health AAA  
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Chen, C. M. (1996). "Nutrition status of the Chinese people." *Biomed Environ Sci* **9**(2-3): 81-92.  
Based on the available data collected with national nutritional survey, nutrition surveillance and the child surveys since 1987, analysis on food consumption, dietary pattern and nutrition status of the Chinese people has been done. The data sets used for the analysis are as follows. (1) 1987 Child Survey in 9 Provinces-91,011 preschool children were sampled. (2) 1992 National Child Survey-570,704 children under the age of 15 were sampled, with anthropometric measurement of 185,965 children under the age of 5. (3) 1990 Nutrition Surveillance-State Statistic Bureau (SSB) household survey in selected 7 provinces (including Beijing Municipality) with 8629 household samples in the urban and 11,840 households in the rural covered 5341 children under the age of 6, among which 1487 were in the urban and 3854 in the rural. (4) 1992 Third National Nutritional Survey-All the provinces and municipalities were covered with 25,033 household samples, among which 8474 were in the urban and 16,559 in the rural. 99,749 residents were surveyed, among which 30,723 were in the urban and 69,026 in the rural. Dietary survey data is used for comparison on food consumption and nutrient intake with 1990 nutrition surveillance data.

Du, S., B. Lu, et al. (2002). "A new stage of the nutrition transition in China." *Public Health Nutr* **5**(1A): 169-74.

OBJECTIVE: To fully explore the long-term shifts in the nutrition transition and the full implications of these changes in the Chinese diet. DESIGN: A descriptive, population-based study. SETTING: Data come from nationally representative surveys: the China Health and

Nutrition Survey (1989-1997), the China National Nutrition Survey (1982 and 1992), the annual household consumption surveys of the State Statistical Bureau, and the Annual Death Report of China. RESULTS: During the first part of the major economic transformation in China (before 1985), cereal intake increased but decreased thereafter. There was also a long-term reduction of vegetable consumption that has now stabilised. Intake of animal foods increased slowly before 1979 and more quickly after the economic reforms occurred. While the total energy intake of residents has decreased, as has energy expenditure, large changes in the composition of energy have occurred. The overall proportion of energy from fat increased quickly, reaching an overall average of 27.3% and 32.8% for urban residents in 1997. Over a third of all Chinese adults and 60.1% of those in urban areas consumed over 30% of their energy from fat in 1997. Large shifts towards increased inactivity at work and leisure occurred. These changes are linked with rapid increases of overweight, obesity and diet-related non-communicable diseases (DR-NCDs) as well as total mortality for urban residents. CONCLUSIONS: The long-term trend is a shift towards a high-fat, high-energy-density and low-fibre diet. The Chinese have entered a new stage of the nutrition transition.

Du, S., T. A. Mroz, et al. (2004). "Rapid income growth adversely affects diet quality in China--particularly for the poor!" *Soc Sci Med* 59(7): 1505-15.

To study the impact of income change--specifically rapid income growth--on diet behavior over time and by socioeconomic level, we used data from a prospective study of China begun in 1989 (followed up in 1991, 1993 and 1997). The subpopulation used in this study included 5783 subjects aged 20-45 years old from 3129 households. Dietary intakes were measured using a combination of the weighing method and three consecutive 24-h recalls. Detailed income and price data were collected, and predicted household per capita income was used in multivariate longitudinal random-effects models that described the consumption of several food groups and nutrients. Income elasticity was used to measure the changes for the effects of income over time on (a) the probability of consuming any food and (b) the quantity of food consumed. The structure of the Chinese diet is shifting away from high-carbohydrate foods toward high-fat, high-energy density foods. The variation in the income effects that we uncovered indicated that important changes in income effects took place between 1989 and 1997, with the changes varying considerably by socioeconomic status. These shifts in income effects indicate that increased income might have affected diets and body composition in a detrimental manner to health, with those in low-income groups having the largest increase in detrimental effects due to increased income. Extrapolating from our estimates, higher income levels in the future could lead to the reversal of the health improvements achieved in the last two decades, if diet-related noncommunicable diseases cannot be controlled.

Ge, K., R. Weisell, et al. (1994). "The body mass index of Chinese adults in the 1980s." *Eur J Clin Nutr* 48 Suppl 3: S148-54.

Patterns and trends in the body composition of Chinese adults are studied with data from the 1982 China Nationwide Nutrition Survey (CNS-82) and the 1989 China Health and Nutrition Survey (CHNS-89). The CNS-82 showed rural inhabitants were approximately 3 kg lighter than urban residents and approximately 2.2 cm shorter. Males were heavier (55.2 +/- 7.4 vs 50.7 +/- 8.0 kg) and taller (165.3 +/- 7.3 and 153.5 +/- 6.3 cm). Using a cut-off for underweight of a body mass index (BMI: kg/m<sup>2</sup>) < 18.5 and for obesity of > 25, 11.6% and 12.9% of the urban and rural sample were underweight and 9.8% and 6.9% respectively were overweight. The CHNS-89 surveyed 5138 adults aged 20-45 in eight selected provinces. The proportion of underweight in both urban and rural samples declined slightly (approximately 1.3%) but the proportion of obesity increased considerably (4.8% for the urban sample and 2% for the rural one). Increased income was significantly associated with reduced low body mass index (BMI: kg/m<sup>2</sup>) in the urban sample while, for the rural and overall samples, the opposite was found for obesity. Provincial patterns in energy intake were not associated with the distribution of BMI while occupation was. In particular, government officials and housewives were much more likely to be obese as also were subpopulation groups consuming greater proportions of energy from animal sources. Over 80% of the population fell in the normal BMI range (18.5-25). This may relate to the relatively even distribution of food in China during the past several decades.

Ke-You, G. and F. Da-Wei (2001). "The magnitude and trends of under- and over-nutrition in Asian countries." *Biomed Environ Sci* **14**(1-2): 53-60.

In order to understand the magnitude and trends of both under- and over-nutrition problems in Asian countries, we reviewed data available in a number of selected countries. In general, the prevalence of under-nutrition is declining in this region but is still heavy in many countries. The trends varied with complexity of individual countries. In China, the prevalence of underweight, stunting and wasting was 21.6%, 30.5% and 2.6% in children of 0-4 years old (90,662 subjects, 1987). Another large-scale survey in 1992 (176,976 subjects) presented a prevalence of 17.1%, 33.5% and 4.5%, respectively. Recent studies showed a remarkable improvement in both underweight and stunting. The National Student Survey in 1995, however, showed that the prevalence of under-nutrition was 26.9% for schoolboys and 38.3% for schoolgirls (7-18 yr). There was an increase of 4.7% and 3.5%, respectively, compared with the results of a similar survey conducted in 1985. The proportion of malnutrition in Chinese adults (BMI < 18.5) was 11.6% in 1982 and 9.0% in 1992 for urban areas, and 12.9% and 8.0% for rural areas, indicating a descending trend over the 10 years. The prevalence of underweight was the highest, over 50% among children below 6 years old, in both Bangladesh and India, between 50% and 20% in Malaysia, the Philippines, Thailand and Vietnam, and below 20% in Mongolia, Kazakhstan and Fiji. It showed a declining trend from the 1970s to the 1990s with an average annual reduction of 0.8 to 1.9 percentage points in these countries. The problem of over-nutrition is emerging quickly in this region, not only in some better-off countries but also in countries in economy transition. In China, the prevalence of overweight and obesity in young adults (BMI > 25) was increased from 9.7% to 14.9% for urban areas and from 6.15% to 8.4% for rural areas in a 10-year period (1982 - 1992), and the prevalence of overweight jumped from 3.38% and 2.75% in 1985 to 7.18% and 8.65% in 1995 for schoolboys and schoolgirls. In India, the increase of overweight and obesity in female adults was 5.0 percentage points from 1989 to 1994. The prevalence of overweight was 24.5% for male and 21.4% for female in Japan (1995), and 28.7% and 26.0% in Malaysia (1990). These results indicate that over-nutrition is a growing problem in this region. Many Asian countries are facing double challenges. They have to deal with both under-nutrition and over-nutrition problems. Among many possible interventions, the further strengthening mass education on healthy diet practice should be emphasized.

Popkin, B. M. (1998). "The nutrition transition and its health implications in lower-income countries." *Public Health Nutr* **1**(1): 5-21.

**OBJECTIVE:** This article reviews information on the rapid changes in diet, activity and body composition that lower- and middle-income countries are undergoing and then examines some of the potential health implications of this transition. **DESIGN AND SETTING:** Data came from numerous countries and also from national food balance (FAOSTAT) and World Bank sources. Nationally representative and nationwide surveys are used. The nationally representative Russian Longitudinal Monitoring Surveys from 1992-96 and the nationwide China Health and Nutrition Survey from 1989-93 are examined in detail. **RESULTS:** Rapid changes in the structure of diet, in particular associated with urbanization, are documented. In addition, large changes in occupation types are documented. These are linked with rapid increases in adult obesity in Latin America and Asia. Some of the potential implications for adult health are noted. **CONCLUSIONS:** The rapid changes in diet, activity and obesity that are facing billions of residents of lower- and middle-income countries are cause for great concern. Linked with these changes will be a rapid increase in chronic diseases. Little to date has been done at the national level to address these problems.

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Popkin, B. M. (2001). "Nutrition in transition: the changing global nutrition challenge." *Asia Pac J Clin Nutr* **10 Suppl**: S13-8.

The rapid shift in the stage of nutrition towards a pattern of degenerative disease is accelerating in the developing world. Data from China, as shown by the China Health and Nutrition Survey, between 1989 and 1993, are illustrative of these shifts. For example, an

increase from 22.8 to 66.6% in the proportion of adults consuming a higher-fat diet, rapid shifts in the structure of diet as income changes, and important price relationships are examples that are presented. There appears to reflect a basic shift in eating preferences, induced mainly by shifts in income, prices and food availability, but also by the modern food industry and the mass media. Furthermore, the remarkable shift in the occupations structure in lower-income countries from agricultural labour towards employment in manufacturing and services implies a reduction in energy expenditure. One consequence of the nutrition transition has been a decline in undernutrition accompanied by a rapid increase in obesity. There are marked differences between urban and rural eating patterns, particularly regarding the consumption of food prepared away from home. Other issues considered are the fetal origins hypothesis, whereby the metabolic efficiencies that served well in conditions of fetal undernutrition become maladaptive with overnutrition, leading to the development of abnormal lipid profiles, altered glucose and insulin metabolism and obesity. Furthermore, obesity and activity are closely linked with adult-onset diabetes. The shift towards a diet higher in fat and meat and lower in carbohydrates and fibre, together with the shift towards less onerous physical activity, carries unwanted nutritional and health effects. It is also clear that the causes of obesity must be viewed as environmental rather than personal or genetic.

Popkin, B. M., G. Keyou, et al. (1993). "The nutrition transition in China: a cross-sectional analysis." *Eur J Clin Nutr* **47**(5): 333-46.

Diets and activity patterns are changing rapidly in low-income countries, and problems of undernutrition and overnutrition commonly exist side by side. China has conquered problems of food scarcity at the national level and has undergone a remarkable transition in the structure of its diet in the last decade. In this paper, we use data from the 1989 China Health and Nutrition Survey and national data from the State Statistical Bureau to explore China's recent history with respect to nutrition and to identify patterns of under- and overnutrition. In particular, we see that higher income levels, particularly in urban areas, are associated with consumption of a diet higher in fat and with problems of obesity. At the same time, undernutrition is a problem in important segments of Chinese society. There is a need for the Chinese government to consider ways to address these problems of deficit and excess jointly.

Popkin, B. M., S. Paeratakul, et al. (1995). "Body weight patterns among the Chinese: results from the 1989 and 1991 China Health and Nutrition Surveys." *Am J Public Health* **85**(5): 690-4.

OBJECTIVES. A longitudinal survey assessed the distribution of adult body weight among the Chinese population. METHODS. Data from the 1989 and 1991 China Health and Nutrition Survey were used to study changes in the proportions of adults aged 20-45 years who were classified as underweight, normal weight, overweight, and severely overweight. RESULTS. There was a slight decline in the proportion of men and women classified as underweight, but among lower-income persons an increase occurred. The proportion of adults with normal body weight decreased, and the proportions of those classified as overweight and severely overweight increased during the same period. The observed increases in proportions of adults classified as overweight and severely overweight were largely confined to the urban residents and to those in the middle- and high-income groups. CONCLUSIONS. Results indicate increases in both obesity and undernutrition. Current efforts in China to develop a preventive health care policy emphasize the prevention of excess nutrient intakes and overnutrition and, hence, address the problem of the increase in obesity among well-to-do, mostly urban residents. However, the increase in undernutrition among low-income Chinese adults should not be overlooked and requires further research and serious policy consideration.

Shen, T., J. P. Habicht, et al. (1996). "Effect of economic reforms on child growth in urban and rural areas of China." *N Engl J Med* **335**(6): 400-6.

BACKGROUND: Beginning in 1978, China implemented economic reforms to transform the economy to a free-market system. We compared the effect of the reforms on the growth of children in urban and rural areas. METHODS: Using data from five large cross-sectional surveys conducted between 1975 and 1992, we examined the trends in height for age of children two to five years of age in urban and rural areas. Mean height for age was expressed as the height in

centimeters adjusted to a reference value of 99.1 cm for a 42-month-old boy. RESULTS: Height increased before and during the economic reforms. In 1975, the average height of children in periurban rural areas was about 3.5 cm less than that of children in urban areas. Between 1975 and 1985, the average height of children in periurban rural areas increased by 2.0 cm, as compared with 1.3 cm in urban children. Between 1987 and 1992, the average height of both urban and rural children increased, but the net increase for rural children was only one fifth that for urban children (0.5 vs. 2.5 cm). In a 1990 survey of seven provinces, the rural mean height was 92.5 cm, as compared with the urban mean of 96.9 cm and the reference value of 99.1 cm; 38 percent of rural children had moderate stunting of growth and 15 percent had severe stunting, as compared with 10 percent and 3 percent of urban children, respectively. Differences in height between rural and urban children were greater in provinces in which the average height of children was lower. CONCLUSIONS: Despite an overall improvement in child growth during the economic reforms in China, the improvement has not been equitable, as judged by increased differences in height between rural and urban children and increased disparities within rural area.

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**Banister, J. and K. Hill (2004). "Mortality in china 1964-2000." *Popul Stud (Camb)* 58(1): 55-75.**

This paper uses data from censuses and surveys to re-estimate mortality levels and trends in China from the 1960s to 2000. We use the General Growth Balance method to evaluate the completeness of death reporting above the youngest ages in three censuses of the People's Republic of China from 1982 to 2000, concluding that reporting quality is quite high, and revisit the completeness of death recording in the 1973-75 Cancer Epidemiology Survey. Estimates of child mortality from a variety of direct and indirect sources are reviewed, and best estimates arrived at. Our estimates show a spectacular improvement in life expectancy in China: from about 60 years in the period 1964-82 to nearly 70 years in the period 1990-2000, with a further improvement to over 71 years by 2000. We discuss why survival rates continue improving in China despite reduced government involvement in and increasing privatization of health services, with little insurance coverage.

Choe, M. K., H. Hao, et al. (1995). "Effects of gender, birth order, and other correlates on childhood mortality in China." *Soc Biol* 42(1-2): 50-64.

Using data from the 1988 Two-Per-Thousand Survey of Fertility and Birth Control, this paper examines the effects of gender, birth order, and other correlates of childhood mortality in China. Controlling for family-level factors, childhood mortality is found to be associated with the child's gender and birth order. Among firstborn children the difference between male and female childhood mortality is not statistically significant, but among others, female children between ages 1 and 5 experience higher mortality than male children. Childhood mortality is slightly higher for children who have older brothers only than for those who have older sisters only, and it is highest for those who have both older brothers and sisters. Other factors affecting childhood mortality in China include mortality of older siblings, birth interval, urban/rural residence, mother's level of education, and mother's occupation. All interactive effects between gender and family-level characteristics are found to be statistically insignificant.

Foggin, P., N. Armijo-Hussein, et al. (2001). "Risk factors and child mortality among the Miao in Yunnan, Southwest China." *Soc Sci Med* 53(12): 1683-96.

Environmental factors and the lifestyle of communities in developing countries as in the industrialized world have a great deal to do with their health status. This study carried out among the Miao people of southeastern Yunnan province in Southwest China has demonstrated important links between child mortality (one indicator of health status) and specific risk factors. These include lifestyle variables such as geographic mobility, the age of weaning and religious belief. In addition, the use of available health care facilities was another explanatory variable. Perhaps surprisingly, a history of tuberculosis seemed also to be empirically related to the

presence or absence of child mortality. Although it was impossible to show a significant statistical relationship between traditional practices and child mortality from the study's database, the authors have observed qualitatively that birthing customs play an important role in explaining the perinatal component of child mortality. These various relationships shed some light on potential areas for intervention with a view to reducing the levels of child mortality among minority peoples in China and elsewhere.

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Gao, Q., S. Lui, et al. (1994). "An analysis of mortality causes of children under five years of age in 10 cities and counties in Henan Province in 1991." *Chin J Popul Sci* **6**(1): 19-24.

Mortality of Children Under 5 Years of Age in China) was conducted in Henan Province among 10 representative cities and counties. The sample included the monitoring sites at Gongyi City, Mi County, and Lushi County. The sample population included 710,570 of which 55,740 were aged 0-4 years, 1473 were born in 1991, and 579 died in 1991. Child mortality was 55.58% and close to the national average. The ratio of male/female child mortality was 1:1.3. Infant mortality was 85.8% of total child mortality. 72.85% of infant mortality was newborn mortality (46.40% within the first 24 hours and 81.76% within 7 days of birth). Child mortality was higher in rural areas. 59.3% of mortality occurred while the child was at home and 28.7% on the way to medical treatment, and 24.35% did not have treatment or parents consciously decided not to seek treatment. The primary causes of death at 0-7 days were suffocation during birth, premature delivery at birth, pneumonia, neural tube defects, accidental suffocation, and newborn tetanus. Ranked causes at 0-18 days from high to low were suffocation during birth, pneumonia, premature delivery, neural tube defects, accidental suffocation, and newborn tetanus. At under 1 year the causes were pneumonia, suffocation during birth, premature delivery, accidental suffocation, neural tube defects, and congenital heart disease. At 1-4 years the primary causes were pneumonia, accidental suffocation, congenital heart diseases, other malformation, and other diseases. For mortality under 4 years of age the causes were pneumonia, congenital malformations, premature delivery, accidental suffocation, neural tube defects, and congenital heart diseases. The 1990 Summit Conference on Children's Issues in the World recommended reducing child mortality by 33% by the year 2000. This means a considerable reduction for China.

Huang, W., H. Yu, et al. (1997). "Infant mortality among various nationalities in the middle part of Guizhou, China." *Soc Sci Med* **45**(7): 1031-40.

This paper describes infant mortality, leading causes of death, and some associated factors among the Han, the Miao, the Bouyei and other minority nationalities in three counties of the middle part of Guizhou Province, China. The results showed that the overall infant mortality rate (IMR) in these areas was 125.7 per 1000 live births during 1985-1987. There existed a great disparity in IMR among different nationalities. The rate was 103.1 (Han), 148.8 (Miao), 161.2 (Bouyei) and 145.0 (other ethnic groups) per 1000 live births, respectively. The five leading causes of death in infants were respiratory diseases, neonatal tetanus, birth asphyxia, infectious diseases and diarrhoea. These causes of death combined resulted in an IMR of 104.1 per 1000 live births. However, these diseases varied in importance for infants of different nationalities. We considered the relationship between infant death and maternal and child health care. The location of birth, the kinds of birth attendants and utilization of health facilities might be associated with differentials of infant mortality among these nationalities. Maternal education was associated with infant survival, but it might not be the only factor in decreasing or eliminating the differential of IMR among various nationalities. Based upon the findings, it is urgent to improve maternal and child health care and investigate further cultural and sociological factors among various nationalities.

Jin, S. G., G. H. Yang, et al. (1998). "Child mortality patterns in rural areas of Anhui and Henan provinces in China, 1990." *Biomed Environ Sci* **11**(3): 264-76.

County-based IMR and U5MR in Anhui and Henan provinces in China were estimated and analyzed by using the 1990 Census Data. Census was conducted on July 1, 1990, the number of deaths only occurred in the first half year of 1990 was collected. In order to obtain the

total population and total number of deaths in the same year, the total number of deaths in each age-sex group for the whole 1990 was then estimated by taking the death number in the first half of 1990 as the base and multiplying a coefficient, which varied in different age-sex-region groups. Two major adjustments for some possible under-reporting cases in female birth and infant death were made. If the sex ratio at age 0 in some counties was beyond 1.2, then it was taken as 1.15 for rural counties and 1.10 for urban cities, which were the estimates of sex ratios for the children at age 5 in the national 1% Population Sampling Survey in 1995. The adjustment for IMR were made by comparing the segment of the county life table from age 15 through 59 with that from the same age groups in the international and Chinese Model Life Tables. The IMR in the county life table would be substituted by the one in the closest Model Life Table, if it was less than in the latter. The findings of the analysis may be summarized as follows: (i) Total county-based IMR and U5MR were 33.4 per 1,000 and 41.4 per 1,000 respectively, with great variations between urban cities (25.4 per 1,000 for IMR and 31.4 per 1,000 for U5MR) and rural counties (35.1 per 1,000 for IMR and 43.6 per 1,000 for U5MR). There were also significant differences in child mortality between nationally identified poor counties and other counties in rural areas. In the poor counties the total IMR was 40.7 per 1,000 living births in average while in non-poor counties it was only 33.2 per 1,000 in average ( $P < 0.05$ ). The U5MR in poor counties was 25 percent higher than in non-poor counties (51.5 vs 40.9 per 1,000 living births). (ii) Statistically significant correlation between child mortality and socio-economic variables was revealed from the data set, among which gross social economic products per capita was found to have the strongest relationship with child mortality. The negative correlation was found between child mortality and a set of so-called 'rich' variables including the gross social products, gross agricultural products, gross industrial products and the proportions of high-educated population at county level, whereas the positive correlation was found between child mortality and a set of 'poor' variables, such as proportions of residents with lower level of education and illiteracy rate. (iii) Differences in child mortality between these two provinces were found, which were identical to the trends of differences in socio-economic indicators between them. Lower child mortality proved to be associated with better socio-economic conditions (higher per capita products, higher proportions of residents with higher level of education, lower proportion of less educated people and illiteracy) in province Henan. (iv) A simple linear regression model was developed separately for Henan and Anhui to predict the IMR and U5MRs in each stage of economic development, where the dependent variables were the logarithm of IMR and U5MR, and the independent variables were the quintiles of the output value of gross products (GOP). It was found that at the first quintile, which was equivalent to 800 yuan of GOP in average, the predicted IMR and U5MR would reach 40 per 1,000 and 51 per 1,000 respectively. It would decline to 38 per 1,000 for IMR and 47 per 1,000 for U5MR in the second lowest quintile. Dramatic drop of child mortality was found between the second quintile and the third quintile, where 6 per 1,000 decline would occur for both IMR and U5MR. The decline would continue subsequently, but slower. The prediction of child mortality in rural counties could be used as a reference to assess counties at different stages of socio-

Li, S. and M. W. Feldman (1996). "Sex differential of infant mortality in China: level and trend." *Chin J Popul Sci* 8(3): 249-67.

Li, S. Z., C. Z. Zhu, et al. (2004). "Gender differences in child survival in contemporary rural China: A county study." *Journal of Biosocial Science* 36(1): 83-109.

Using data from a survey of deaths of children less than 5 years old conducted in 1997 in a county in Shaanxi Province, China, this paper examines gender differences in child survival in contemporary rural China. First, excess female child mortality in the county in 1994-96 is described, followed by an analysis of the mechanisms whereby the excess mortality takes place, and the underlying social, economic and cultural factors behind it. Excess female child mortality in this county is probably caused primarily by discrimination against girls in curative health care rather than in preventive health care or food and nutrition. Although discrimination occurs in all kinds of families and communities, discrimination itself is highly selective, and is primarily against girls with some specific characteristics. It is argued that the excess mortality of girls is caused fundamentally by the strong son preference in traditional Chinese culture, but exacerbated by the government-guided family planning programme and regulations. This suggests that it is crucial to

raise the status of girls within the family and community so as to mitigate the pressures to discriminate against girls in China's low fertility regime. Finally, the possible policy options to improve female child survival in contemporary rural China are discussed.

Ren, X. S. (1995). "Sex differences in infant and child mortality in three provinces in China." Soc Sci Med **40**(9): 1259-69.

Despite the Communist government's campaign to narrow the sexual inequality in China since the 1949 Revolution, male dominance and son preference are still evident in many parts of the country. Using retrospective reports on infant and child mortality from the 1985 and 1987 In-Depth Fertility Surveys in Shaanxi, Liaoning and Guangdong provinces of China, the study examines the effects of this persistence of sexual inequality on the differential survival for males and females. The study shows that female infants and children have higher than expected mortality rates, suggesting that son preference may lead to discriminatory practices against females. The study also reveals that the one-child policy of the late 1970s has a strong influence on the survivorship for female infants and children.

Ren, X. S. (1996). "Regional variation in infant survival in China." Soc Biol **43**(1-2): 1-19.

From retrospective survey reports 1985-87, the study examined the determinants of neonatal and post-neonatal survival in three provinces in China. Conditional logistic regression models were employed to estimate the effects of macro- and micro-level factors (such as socioeconomic conditions, familial relationships, as well as biosocial determinants) on the survivorship of neonatal and post-neonatal infants in China. The study yielded two findings: (1) Social changes in Chinese society had a strong positive effect on neonatal and post-neonatal survivorship; and (2) the magnitude of such social changes differed across regions which, in turn, led to the differential effects on neonatal and post-neonatal survivorship across provinces in China.

She, W. H. (1996). "Marked improvement in China's maternal and child health. Surveys and data." China Popul Today **13**(4): 10.

Weng, S. and S. Wang (1993). "An analysis of infant mortality in China." Chin J Popul Sci **5**(1): 75-81.

Contraception conducted in 1988 among two thousandths of the population was further sampled covering 29 provinces, autonomous regions, and municipalities in mainland China. China's infant mortality rate (IMR) during 1975-1988 was assessed. The IMR in China declined during 1975-1987 at an annual rate of 3.12%. IMR declined from 62.9/1000 live births to 36.6/1000 among males and from 45.6/1000 to 35.2/1000 among females. In urban areas the male IMR was 35.08/1000 in 1975 and 21.73/1000 in 1987, while the female IMR was 33.24/1000 in 1975 and 23.25/1000 in 1987. In rural areas the male IMR was 68.32/1000 in 1975 and 39.64/1000 in 1987, while the female IMR was 48.14/1000 in 1975 and 38.07/1000 in 1987. The IMR was substantially higher among infants whose parents engaged in agricultural work than among those parents were workers or civil servants. The IMR was approximately 50% lower among HAN people than among ethnic minorities. The IMR was substantially higher among infants whose mothers were illiterates than among infants whose mothers were high school graduates. The IMR of those who were the second child in a family tended to be higher than the IMR of those who were the first child, and the IMR of those who were the first or second child. The IMR was the lowest among infants whose mothers gave birth at the age of 25-29, followed by infants whose mothers gave birth at the age of 20-24 and 30-34. The second level of IMR (20-50/1000) was predominant in China. IMR was high in southwestern, northwestern, and central-southern China, probably attributable to the lower levels of economic and educational development and inadequate health care. The remarkable drop of IMR between 1975 and 1987 demonstrated the improvement of economy, education, and health care. In 1980, the IMR was 97/1000 for the world, 20/1000 among developed countries, and 110/1000 among developing countries.

Xu, B., A. Rimpela, et al. (1994). "Sex differences of infant and child mortality in China." Scand J Soc Med **22**(4): 242-8.

The purpose of this paper was to study the sex differences in infant mortality and mortality before the age of 5 in China, and the differences between urban and rural areas on the one hand and urban areas of mainland China and Hong Kong on the other. Published data from the 1982 and 1990 national censuses, the mortality survey of 1976, and UN's publications were used to calculate sex differences and sex ratios of mortality. Infant mortality of both sexes decreased notably from the 1970's onwards, the sex ratios of mortality being 1.15 in 1973-75, 1.06 in 1981 and 0.86 in 1990. A remarkable decline of mortality before the age of 5 was also seen in both sexes, but the sex ratios of mortality were not greatly altered, remaining less than 1 from the 1970's on. In rural areas female infants and young children had a higher mortality compared with males than in urban areas. In Hong Kong, the sex differences of infant and early child mortality were much smaller than in urban areas of mainland China.

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1990/01/01:2004/12/31, China, immunization)  
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(1996). "Progress toward poliomyelitis eradication--People's Republic of China, 1990-1996." MMWR Morb Mortal Wkly Rep **45**(49): 1076-9.

In 1988, the Western Pacific Region of the World Health Organization (WHO) adopted a resolution to eradicate poliomyelitis from the region by the end of 1995. The People's Republic of China has made rapid progress toward this goal by implementing the four WHO-recommended strategies for polio eradication: 1) achieving and maintaining high routine vaccination coverage levels among children aged < 1 year with at least three doses of oral poliovirus vaccine (OPV); 2) administering supplementary doses of OPV to all young children during National Immunization Days (NIDs) to rapidly interrupt poliovirus transmission; 3) establishing sensitive systems of surveillance for acute flaccid paralysis (AFP) and virologic surveillance for poliovirus; and 4) conducting "supplementary immunization activities" (SIAs)--localized campaigns targeted at high-risk areas where poliovirus transmission is most likely to persist at low levels. These strategies have resulted in the apparent interruption of wild poliovirus transmission in China. In 1995, no indigenous wild polioviruses were detected despite a strengthened surveillance system. This report describes progress toward achievement of the eradication goal and updates the status of polio-eradication efforts in China during 1990-1996.

Aiqiang, X., F. Zijian, et al. (2003). "Active case-based surveillance for measles in China: lessons learned from Shandong and Henan provinces." J Infect Dis **187** Suppl 1: S258-63.

To identify issues relevant to nationwide implementation, a project was conducted during 1999-2001 to support and evaluate the development of a case-based measles surveillance system (MSS) in Shandong and Henan provinces, China. The performance of MSS surveillance and the descriptive characteristics of reported measles cases and outbreaks were analyzed. Of the 5782 suspected cases in 2001, 85% were investigated and 66% had serologic results. In all, 39% of cases were confirmed, 36% were compatible, and 25% were discarded; 81% of outbreaks identified involved <15 cases. In all, 15% of cases were temporary (floating) residents. The MSS was useful in monitoring the impact of measles control activities. Standardized laboratory quality-assurance activities and indicators should be developed while the system is still in the early stages of implementation.

Chai, F., D. R. Prevots, et al. (2004). "Neonatal tetanus incidence in China, 1996-2001, and risk factors for neonatal tetanus, Guangxi Province, China." Int J Epidemiol **33**(3): 551-7.

BACKGROUND: In China during 1995-1996 widespread tetanus toxoid (TT) mass vaccination of women of childbearing age in high-risk areas was conducted and neonatal tetanus (NT) surveillance was initiated as part of NT elimination efforts. Despite a subsequent decrease in the estimated rate of NT, the NT disease burden remains high in poorer areas of China.

METHODS: To describe the recent epidemiology of NT in China and estimate its risk, we

analysed national surveillance data in China 1996-2001 and conducted a case-control study in one high-risk county (Bobai): 60 hospitalized cases were sex- and calendar-birth year matched to 60 controls from the same or neighbouring villages. RESULTS: Reported national annual NT incidence decreased from 0.21/1000 live births (LB) in 1997 to 0.16/1000 LB in 2001. Case mothers were more likely to be aged >30 years (odds ratio [OR] = 6; 95% CI: 2.2, 20.2), unschooled (OR = 3.2; 95% CI: 1.1, 11.6), and with an annual income of <1000 yuan (\$125 USD) (OR = 6.0; 95% CI: 1.9, 25.6). Only 28% of control mothers and 12% of case mothers reported any TT vaccination. In multivariate analysis, relative to hospital delivery, cases had a 64-fold increased odds of home delivery by a family member or neighbour (95% CI: 8.4, 982.2), and a 13-fold increased odds of home delivery by a traditional birth attendant (95% CI: 1.6, 322.6). CONCLUSIONS: Improved access to clean deliveries in high-risk areas is critically needed in China. Nonetheless, targeted TT vaccination appears to have helped reduce NT incidence in China.

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Lixia, W., Z. Guang, et al. (2003). "Progress in accelerated measles control in the People's Republic of China, 1991-2000." *J Infect Dis* **187 Suppl 1**: S252-7.

Measles incidence decreased dramatically following widespread use of measles vaccine in China in 1965. To evaluate continued progress in accelerated measles control, data on measles cases reported to the National Notifiable Disease Reporting System during 1991 to 2000 were analyzed. From 1991-1995 to 1996-2000, average annual measles incidence decreased from 9.0 to 5.7 cases per 100,000 population, mortality rates fell from <0.3 to 0.1 deaths per million population, and the percentage of China's total population residing in provinces with a measles incidence of <2 cases per 100,000 population and having a measles elimination goal increased from 21% to 29%. Incidence rates were highest in western provinces and in infants and young children. Additional attention must be focused on western provinces and toward ensuring that all infants are immunized. Achieving high routine two-dose coverage with measles vaccine and enforcing school entry requirements may be highly effective strategies to support further gains in measles control.

Qian, Y. F. (1994). "[Evaluation of BCG vaccination programme based on results of the Third Nationwide Tuberculosis Survey]." *Zhonghua Jie He He Hu Xi Za Zhi* **17(5)**: 281-5, 318.

Evaluation of BCG vaccination programme had been carried out by means of re-analyzing the results of the Third Nationwide Random Sampling Survey for Epidemiology of Tuberculosis conducted in 1990. The BCG vaccination coverage among children under 4 years was 65.0% in 1990. It was lower than other reports in the past. The positive rate of tuberculin testing among children under 4 years who had the history of BCG vaccination was only 26.3%. City had the highest rate of 55.8%. The fact indicated the unsatisfactory quality of BCG vaccination in the country. The factors inducing such a lower positive rate should be clarified and overcome as soon as possible in the near future. The protective effect of BCG vaccination for children under 4 years was apparent but it was not in 5-9 age group. In this connexion, the investigation and study on the necessity of re-vaccination among primary school entrants should be conducted.

Wang, K., L. B. Zhang, et al. (1997). "Status of the eradication of indigenous wild poliomyelitis in the People's Republic of China." *J Infect Dis* **175 Suppl 1**: S105-12.

A large nationwide outbreak occurred in 1989-1990 in China, in which nearly 10,000 poliomyelitis cases were reported. After two rounds of oral poliovirus vaccine (OPV) supplemental activity in nearly every province in the 1992-1993 winter season, no wild poliovirus was detected in 1993 in 22 provinces in the middle of China that contained 86% of the population. During the first national immunization days (NIDs) conducted in December 1993 and January 1994, 83 million children 0-47 months of age were immunized. In 1994, wild poliovirus was identified in only 6 of 2397 children with stool specimens tested. After a second NID in December 1994 and January 1995, no wild poliovirus was detected in 1995 despite a very high level of virus surveillance. In summary, double-round mass supplemental OPV immunizations in children 0-3

years old in two consecutive winters eliminated wild poliovirus from 23% of the world's population (1.2 billion people).

Xu, A. Q., L. Li, et al. (1995). "[Poliomyelitis surveillance in Shandong Province from 1991-1994]." Zhonghua Liu Xing Bing Xue Za Zhi **16**(6): 354-8.

After a series of poliomyelitis outbreaks came about in Shandong province from 1988 to 1990, comprehensive measures including establishment of acute flaccid paralysis (AFP) surveillance system, introduction of mass immunization campaign of oral poliovirus vaccine (OPV) and enhancing management of poliomyelitis eradication activity, were carried out. The incidence of poliomyelitis decreased with the reported number of cases 95, 25, 22 and 17, in 1991, 1992, 1993 and 1994, respectively. A geographically sporadic distribution was noticed with no peak on seasonality. No confirmed case caused by wild poliovirus was identified from 1991 to 1994. Reporting incidence of AFP cases among children under 15 years old was increasing gradually with 1.00 per 10(5) population in 1993 and 1.89 in 1994. The results showed that the poliomyelitis eradication activity in Shandong province had reached a final stage but much efforts still need to be made to reach the target on poliomyelitis eradication.

Yang, B., J. Zhang, et al. (1995). "Eradication of poliomyelitis: progress in the People's Republic of China." Pediatr Infect Dis J **14**(4): 308-14.

China and the other countries of the Western Pacific Region have a goal of eradication of wild poliovirus by the end of 1995. In this report we examine the progress made toward eradication through the end of 1993. We examined the information about poliomyelitis and wild poliovirus based on the acute flaccid paralysis surveillance system. The number of reported poliomyelitis cases decreased from 4623 cases in 1989 and 5065 cases in 1990, which occurred during a large nationwide poliomyelitis epidemic, to 538 cases in 1993. Mass supplemental immunization sessions were conducted during the 1991 to 1992 and 1992 to 1993 winters. After the two rounds of supplemental immunizations in the 1992 to 1993 winter, wild poliovirus was not detected for the subsequent 21 months in 22 contiguous provinces in central and northern China, in which 980 million persons reside. In 1993 wild poliovirus was detected in only 5 provinces in southern China and in 2 provinces in the remote Western region; these provinces have only 14% of the total population in China. China is close to achieving its 1995 poliomyelitis elimination goal. Mass supplemental immunizations in children 0 to 3 years old can rapidly eliminate wild poliovirus from large, very densely populated areas, low income rural areas and remote mountainous areas. There appears to be no technical obstacle, even in the most difficult areas, to achieving global eradication of wild poliovirus by the year 2000.

Zeng, X. J., G. H. Yang, et al. (1999). "Survey of coverage, strategy and cost of hepatitis B vaccination in rural and urban areas of China." World J Gastroenterol **5**(4): 320-323.

AIM: In order to understand the coverage, immunization strategy and cost of hepatitis B (HB) vaccination of China in recent years. METHODS: A two-stage household random sampling method was used in the survey. RESULTS: The survey carried out at 112 Disease Surveillance Points (DSPs) of 25 provinces, autonomous regions and municipalities of China in 1996, showed that the coverage rates of HB vaccination among neonates were 96.9% in the urban DSPs and 50.8% in the rural DSPs in 1993-1994, while in students aged 7-9 years, they were 85.8% and 31.5% in 1994, respectively. Up to 1994, 97.5% of the urban DSPs and 73.9% of the rural DSPs on a neonate vaccination against HB program were included in EPI. About 93% of the urban DSPs and 44% of the rural DSPs did HBsAg and HBeAg screening for all or part of pregnant women. The neonates received the regimen of high-dose HB vaccine in combination with hepatitis B immune globin (HBIG) if their mothers were HBsAg and/or HBeAg positive in pregnancy, otherwise they received the low-dose vaccine (10 $\mu$ gX3). Part of DSPs had a lower neonate coverage due to unreasonable allocation of the vaccines (used for adults not at risk) or higher cost or insufficient supply of the vaccines. It is necessary to evaluate the quality of serological lab test to HBVMs in the maternal prescreening. CONCLUSION: Remarkable achievements have been made according to the national planning and policy of HB immunization in China.

Zhang, L., W. He, et al. (2001). "[Analyses on the risk factors of Measles in Anhui province during 1998 and 1999]." Zhonghua Liu Xing Bing Xue Za Zhi **22**(2): 93-5.

OBJECTIVE: To evaluate the measures targeting measles control. METHODS: Measles cases were studied serologically under AFP surveillance system. RESULTS: The incidence was 1.36/100 000 in 1999. The incidence of children under 5 was 3.65/100 000, with 84.00% and 87.49% reduction, as compared with the incidence in 1991 and 1997 before intensified vaccination campaigns in children aged 1 - 6. The indicators of surveillance showed an improvement in 1999 than that in 1998. CONCLUSION: Training for health staff at county, township, village levels played an important role in improving the sensibility and timeliness of measles surveillance system. Routine immunization is a key element in curbing measles outbreaks and reducing measles incidence.

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Note: Below are selected results from PubMed using EndNotes (search terms:  
1990/01/01:2004/12/31, China, maternal health)  
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Anson, O. (2004). "Utilization of maternal care in rural HeBei Province, the People's Republic of China: individual and structural characteristics." Health Policy **70**(2): 197-206.

PURPOSE: To study the effect of individual's socio-economic characteristics and the structure of the health services in the village on utilization of maternal care in rural HeBei, the People's Republic of China (PRC). DATA: Data were collected from 4273 women who gave birth to one child at least, living in a stratified sample of 288 villages in HeBei Province. FINDINGS: 54.8% of the women had at least one pre-natal care visit, 27.5% gave birth in a health care facility, and 18.1% had post-natal check-up. Utilization was inversely related to age and parity and positively to education. Occupation was related to use of pre- and post-natal services, but not to home birth. Per-capita income and living arrangement are not related to utilization. MCH worker in the village promote pre- and post-natal care, but also home delivery. Village doctors promote pre-natal care and hospital delivery but do not promote post-natal check-up. Women tend to avoid the maternal services in the township health centers but some are ready to travel to city hospitals for delivery and post-natal care. CONCLUSIONS: Health education programs regarding the importance of all three maternal care services are clearly needed. These programs should address not only women of child bearing age but also care providers, MCH workers in particular. Township health center should reach-out and motivate women to use their accessible services.

Bogg, L., K. Wang, et al. (2002). "Chinese maternal health in adjustment: claim for life." Reprod Health Matters **10**(20): 95-107.

Health sector reforms in China, instituted starting in 1985, have centred on cost recovery, with fee-for-service revenue replacing public budget funding. The share of public funding for maternal health services was reduced greatly, forcing an increasing proportion of pregnant women to pay for deliveries and treatment of pregnancy-related complications out of pocket, as most had no health insurance to cover these costs. This study aimed to identify socio-economic variables associated with utilisation of essential maternal health services and linked to health sector reforms in China, with a focus on cost recovery. A retrospective household survey (n = 5756) was carried out in six counties in three provinces of Central China in 1995. Antenatal service utilisation continued to improve in 1990-95, but only in relation to the number of visits, which were pre-paid if the woman was participating in a maternal pre-payment scheme or covered by another health insurance scheme. Significant decreases were found in the utilisation of skilled attendance at delivery and hospital delivery, as well as differences in adverse pregnancy outcomes (miscarriages and stillbirths) between women paying out of pocket and those covered by insurance. This study confirms a strong association between utilisation of delivery services and financing variables of amount of savings in the bank, maternal pre-payment schemes and health insurance. It also shows the critical importance of out-of-pocket, fee-for-service payments for maternity care as a barrier to the utilisation of these services.

Hesketh, T. and W. X. Zhu (1997). "Maternal and child health in China." Bmj **314**(7098): 1898-900.

China has made great progress in improving the health of women and children over the past two generations. The success has been attributed to improved living standards, public health measures, and good access to health services. Although overall infant and maternal mortality rates are relatively low there are large differences in patterns of mortality between urban and rural areas. The Chinese have developed a hierarchical network of maternal and child health services, with each level taking a supervisory and teaching role for the level below it. Maternal and child health in China came to international attention in 1995 with the promulgation of the maternal and child health law. In China this was seen as a means of prioritising resources and improving the quality of services, but in the West it was widely described as a law on eugenics.

Kaufman, J. and F. Jing (2002). "Privatisation of health services and the reproductive health of rural Chinese women." Reprod Health Matters **10**(20): 108-16.

China's rural health care system has undergone major changes since the early 1980s, when the country began privatising rural health services. Following fiscal devolution, the rural primary health service was transformed into a fee-for-service system, dependent on the availability of local resources. This article reports some of the results of a study undertaken in 1994-96 to examine the impact of privatization on financing, provision and use of reproductive health services by women in two rural counties in Yunnan Province, China. The most common self-reported symptoms of reproductive morbidity were abnormal vaginal discharge and vaginal tears during home delivery, which went mostly untreated. Hospital-based delivery and use of antenatal care was very low, adversely affected by costs and perceived low quality. Service quality was affected by low investment in training, maintenance and supervision of workers. Most of the burden for maternal and child health care fell on local health workers, yet resources for these services had declined from 1985 to 1995. Only support for family planning services, which were funded and provided separately, had increased. Rural women's reproductive health needs were inadequately attended to by rural health services following reforms. Our data has helped to increase attention to those needs within planned reform efforts.

Li, J. (2004). "Gender inequality, family planning, and maternal and child care in a rural Chinese county." Soc Sci Med **59**(4): 695-708.

This study examines the determinants of prenatal and obstetric care utilization within the context of recent social and economic changes in contemporary rural China. The aim of this study is to test the general hypothesis that gender inequality (women's status and son preference) and the state's family planning policy have a significant influence on maternal and childcare utilization. Both qualitative and quantitative data from a field survey in 1994 in rural Yunnan were used in the study. The findings lend support to this hypothesis. For example, the extent to which the husband shares housework and childcare, as an important marker of rural Chinese women's position within the family, is positively associated with the likelihood that a woman receives prenatal examinations, stops heavy physical work before birth, and gives birth under aseptic conditions. Also, a woman's exposure to the larger world beyond the village increases her chances of giving birth with the assistance of a doctor or health worker. Son preference is an impeding factor for maternal and child health care utilization. Already having a son in the family reduces the chances that the mother will stop heavy physical work before birth for a subsequent pregnancy. Female infants with older sisters are the least likely to receive immunizations. Women with "outside the plan" pregnancies are less likely than those with "approved" pregnancies to receive prenatal examinations, to stop strenuous work before birth, and to deliver under aseptic conditions. Thus, the study provides further evidence that the family planning policy has a negative impact on women and their families, whose fertility and son preferences conflict with the birth control policy.

Li, Q. and M. D. Fottler (1996). "Determinants of maternal mortality in rural China." Health Serv Manage Res **9**(1): 45-54.

A case-control study of maternal mortality was conducted in selected rural areas of two provinces in China: Henan province, which has a relatively lower socio-economic status and higher maternal mortality rates, and Jiangsu province with higher socio-economic status and

lower maternal mortality rates. The major cause of maternal mortality in the two provinces was postpartum hemorrhage and the largest proportion of deaths occurred on the road between the women's home and the health care facility. Results indicate that the expectant mother's socio-economic status, knowledge of maternal care, and the nature and level of maternal care provided all influence rural maternal death rates. However, socio-economic factors were only significant predictors of mortality in the poorer province. Implications for health policy and future research are discussed.

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Liang, J., W. M. Li, et al. (2003). "[Analysis of maternal mortality in China from 1996 to 2000]." Zhonghua Fu Chan Ke Za Zhi **38**(5): 257-60.

OBJECTIVE: To study the trend and characteristics of maternal mortality in China from 1996 to 2000. METHODS: Population-based epidemiological survey in 116 monitoring units in China were used. RESULTS: Maternal mortality in China dropped by 17.1% from 63.9 per 100,000 live births in 1996 to 53.0 in 2000, in rural area dropped by 22.2% from 86.4 per 100,000 live births to 67.2, and in urban area only 1.0% from 29.2 per 100 000 live births to 28.9, the leading causes of maternal mortality in China are hemorrhage, preeclampsia/eclampsia and amniotic fluid embolism the maternal mortality due to hemorrhage in national level and rural level has declined by 33.8%, 34.9% respectively. CONCLUSION: The maternal mortality appears a declined trend on both the national and rural levels in China from 1996 to 2000, the maternal mortality due to hemorrhage dose also, bur the maternal mortality in urban area keeps unstable.

Liang, J., Y. P. Wang, et al. (2004). "[Maternal mortality in rural areas of China]." Sichuan Da Xue Xue Bao Yi Xue Ban **35**(2): 258-60.

OBJECTIVE: To understand with clearness the trend and epidemiological characteristics of maternal mortality, as well as the leading causes of maternal deaths in rural areas of China from 1996 to 2001. METHODS: The data analyzed were those from the population-based epidemiological survey conducted by the national maternal mortality surveillance network which covered a total population of about 35,000,000 in China. RESULTS: The maternal mortality ratio (MMR) in rural areas of China dropped by 28.4% from 86.4 per 100,000 live births in 1996 to 61.9 in 2001. The leading causes of maternal deaths were obstetric hemorrhage, preeclampsia and embolism of amniotic fluid. The MMR for obstetric hemorrhage decreased from 48.3 per 100,000 live births in 1996 to 33.0 in 2001. The pregnant women mainly gave childbirths and died in their home, accounting for 44.6% and 30.1% respectively in 2001. CONCLUSION: The MMR showed a downward trend in rural areas of China during the period from 1996 to 2000, and so also did the MMR for obstetric hemorrhage. Reducing obstetric hemorrhage and increasing the rate of hospitalized delivery are the most important methods for reducing the MMR in rural areas in China.

Short, S. and F. Zhang (2004). "Use of maternal health services in rural China." Popul Stud (Camb) **58**(1): 3-19.

We use data from the nationally representative 1997 Demographic and Reproductive Health Survey to examine use of maternity services in rural China. The data indicate that roughly 60 per cent of women had at least one prenatal visit, while 40 per cent had a professionally assisted birth over the period 1988-97. Despite China's shift from a more socialist to a more privatized health care system, use of maternity services increased over this period. These increases are consistent with the push toward integration of reproductive health into family planning that emerged after the 1994 International Conference on Population and Development and the 1995 Fourth World Women's Conference held in Beijing. At the same time, we find indirect evidence that the target-based population policy may well have exerted downward pressure on use of maternity services; differences by parity are marked and multilevel models predicting use of maternity services indicate underdispersion at the individual level.

Tolhurst, R., T. Zhang, et al. (2004). "Factors affecting the implementation of health legislation and its impact on the rural poor in China: a case study of implementation of the maternal and infant health care law in two poor counties." *Int J Health Plann Manage* **19**(3): 247-65.

This paper presents and discusses a case study of health legislation in China. In the transition to a market economy, legislation has been developed to offset the weakening in the central planning mechanism and political control that have historically influenced the behaviour of institutions and individuals in the Ministry of Health. There has been relatively little empirical examination of the implementation and impact of legislation as a tool for influencing health service provision in low-income countries. The study aimed to contribute towards filling this gap by exploring the factors affecting the implementation and impact of the Maternal and Infant Health Care Law, through a case study of two poor, rural counties in Chongqing municipality, China. The study found that key local actors perceive health legislation to be an important tool for safeguarding access to essential health care. However, the implementation of health legislation is inevitably a political process. The study illustrates the difficulties involved in efforts to influence provider behaviour through a national level legislative framework in a situation of decentralization of control over those providers, due to extreme regional variation in economic situations and limited resource inputs from the centre. Lessons are drawn for Chinese and international policy makers.

Wu, Z., K. Viisainen, et al. (2003). "Perinatal mortality in rural China: retrospective cohort study." *Bmj* **327**(7427): 1319.

**OBJECTIVES:** To explore the use of local civil registration data to assess the perinatal mortality in a typical rural county in a less developed province in China, 1999-2000. **DESIGN:** Retrospective cohort study. Pregnancies in a cohort of women followed from registration of pregnancy to outcome of infant seven days after birth. **SETTING:** Routine family planning records in 20 rural townships in eastern China. **SUBJECTS:** 3697 pregnancies registered by the local family planning system during 1999. **MAIN OUTCOME MEASURES:** Abortions, stillbirths, early neonatal mortality, perinatal mortality. **RESULTS:** Only three cases were lost to follow up. The average age of the women at pregnancy was 25.9 years. Three hundred and twelve pregnancies were aborted and 240 ended in miscarriage (total 552, 15%). The perinatal mortality rate was 69 per 1000 births, the rate of stillbirth was 24 per 1000 births, and the early neonatal mortality was 46 per 1000 live births. The early neonatal mortality was 29 in boys and 69 in girls per 1000 live births. The perinatal mortality rate increased notably with parity and was higher in townships having lower income per capita. **CONCLUSIONS:** The family planning system at the most local level is a useful data source for studying perinatal mortality in rural China. The perinatal mortality rate in the study county was higher than previously reported for both rural and urban areas in China. The results by parity and sex of the infant raise concern over the impact of the one child policy.

Zhang, T., Y. Q. Wu, et al. (2004). "[An evaluation of effects of intervention on maternal and child health in the rural areas of China]." *Sichuan Da Xue Xue Bao Yi Xue Ban* **35**(4): 539-42.

**OBJECTIVE:** To evaluate the impact of training maternal and child health care providers in the rural areas of China on improvement of health care to pregnant and puerperal women. **METHODS:** The data originated from the Reproductive Health/Family Planning Project implemented by the State Family Planning Commission and the Ministry of Health from 1998 to 2002, which covered 32 counties in 22 provinces of China. A quasi-experimental design was used. 6 counties were selected from 32 project counties as the intervention group, while 6 non-project counties were taken as the control group with the condition similar to that of the selected project counties in respect to their number of population and economic level. The subjects of the study were mothers with child under 3 years. A total of 348 mothers were interviewed using a structured questionnaire by strictly trained surveyors. It was focused on prenatal care and postpartum follow-up in the survey. **INTERVENTION:** According to the plan of the project, all maternal and child health care providers at the grass-root level were given a 2-week theoretical training, and some of them were assigned to hospitals where they were given a 1-month clinical skills training. **RESULTS:** With regard to prenatal care, the mothers in intervention group received more prenatal care than those in control group (mean number of obstetric visits: 6.64 vs 5.64,

P<0.05). The number of items of examination taken in intervention group was more than that in control group (6.71 versus 5.67, P<0.05). The proportion of the mothers in intervention group who were told that they must visit doctors if they felt uncomfortable in pregnant period, was higher than that in control group (P<0.05). 8 symptoms or signs that possibly occur in pregnant period were listed; in this connection, the mothers in intervention group knew more than those in control group (3.43 vs 2.09, P<0.05). In the postpartum follow-up, more mothers in the intervention group were examined by the doctors. The proportion of mothers who were informed of contraceptive methods was higher in intervention group than in control group (94% vs 78.5%, P<0.05). The descending rate of maternal mortality rate in the intervention areas was much higher than that in the control areas. CONCLUSION: The training of maternal and child health care providers had a significant impact on improving their service skills and quality; consequently, the women covered by their service could receive better maternal and child health care. This indicates that the Reproductive Health/Family Planning Project implemented in the rural areas of China is successful.

Zhang, X. S., L. H. Wang, et al. (2003). "[An analysis of related factors for maternal mortality rate at county level]." *Zhonghua Yu Fang Yi Xue Za Zhi* 37(5): 342-5.

OBJECTIVE: Data collected during a period of six years in implementation of the Health VI Project sponsored by the World Bank were used to analyze maternal mortality rates (MMR) at county level and its related factors, so as to decrease MMR further. METHODS: Routine data on maternal deaths, as well as its related economic, social and cultural factors, during 1995 to 2000 were collected at county level, and univariate analysis was conducted for them. RESULTS: Average MMR reduced remarkably by 51.33% from 159.74/100 000 in 1995 to 77.75/100 000 in 2000 in the areas with implementation of the Health VI Project. However, there was still a gap in MMR between the Project areas and the nation as a whole. MMR correlated with local topography, economic and cultural levels, traffic and communication, health resource, and quality of obstetric care service. CONCLUSIONS: In order to lower MMR further, it is necessary to increase financial investment for health, to improve health care service establishments, to strengthen health education for pregnant women and to increase their health awareness so as to improve their use of maternal care and health care services, to improve quality of obstetric care service, to strengthen training for health professionals and to improve their knowledge and skills, and to accelerate construction of traffic and communication.

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Note: Below are selected results from PubMed using EndNotes (search terms: 1990/01/01:2004/12/31, China, tuberculosis, and TB)

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(2004). "The effect of tuberculosis control in China." *Lancet* 364(9432): 417-22.

BACKGROUND: China has 1.4 million new cases of tuberculosis every year, more than any country except India. A new tuberculosis control project based on short-course chemotherapy was introduced in half the country in 1991, after a national survey of tuberculosis prevalence in 1990. Another survey was done in 2000 to re-evaluate the national tuberculosis burden, providing the opportunity to assess the effect of the control project. METHODS: The survey in 2000 identified 375599 eligible individuals at 257 investigation points chosen from all 31 mainland provinces by stratified random sampling. Children (aged 0-14 years) were suspected of having tuberculosis if they had an induration of 10 mm or greater after a tuberculin skin test, and an abnormal fluorograph. Adults were suspected if they had a persistent cough, abnormal fluorograph, or both. Tuberculosis was diagnosed by chest radiograph, sputum-smear microscopy, and culture. FINDINGS: 365097 people were examined (97% of those eligible). Prevalences of pulmonary, culture-positive, and smear-positive tuberculosis in 2000 were 367 (95% CI 340-397), 160 (144-177), and 122 (110-137) per 100000 population, respectively. Between 1990 and 2000, prevalences of these three forms of the disease had fallen, respectively, by 32% (5-68), 37% (7-66), and 32% (9-51) more in areas in which the project was implemented than in non-project areas. For culture-positive disease, a 30% (9-48) reduction was directly attributable to the project. INTERPRETATION: Between 1991 and 2000, prevalence of

tuberculosis was reduced significantly in areas of China by use of short-course chemotherapy following WHO guidelines. We estimate that in 2000, in a population of more than half a billion, there were 382000 fewer prevalent culture-positive cases and 280000 fewer prevalent smear-positive cases than there would otherwise have been.

Duanmu, H. J., L. Y. Wan, et al. (2003). "[Forecast about number of patients with pulmonary tuberculosis 2001 - 2010]." *Zhonghua Yi Xue Za Zhi* **83**(8): 641-3.

OBJECTIVE: To forecast the number of patients with pulmonary tuberculosis in 2010. METHODS: A mathematical model was established based on the nationwide epidemiological survey on tuberculosis conducted in 2000 so as to forecast the numbers of patients with pulmonary tuberculosis in 2000s. RESULTS: (1) The number of patients with pulmonary tuberculosis would be a little more than that in 2000, with the pulmonary tuberculosis case detection rate  $\rho$  of 0.26 being adopted. (2) The number of patients with pulmonary tuberculosis would be smaller than that in 2000, with the pulmonary tuberculosis case detection rate  $\rho$  of 0.30 being adopted. (3) If the current intervention strategy manages to keep the pulmonary tuberculosis case detection rate at the level of 0.35, the decline in number of patients with pulmonary tuberculosis will approach the goal set by the national program that the number of patients with pulmonary tuberculosis be decreased by 50%. CONCLUSION: The goal set by the national program can be achieved only when the pulmonary tuberculosis case detection rate reaches 0.35.

Dye, C., Z. Fengzeng, et al. (2000). "Evaluating the impact of tuberculosis control: number of deaths prevented by short-course chemotherapy in China." *Int J Epidemiol* **29**(3): 558-64.

BACKGROUND: Tuberculosis (TB) is still amongst the most important causes of human morbidity and mortality, killing approximately two million people each year. Standard short-course chemotherapy (SSCC) can rapidly control illness and dramatically reduce the chance of death, but the impact of treatment has rarely been evaluated in these terms. METHOD: We developed a mathematical model that makes use of routinely-collected data to calculate the number of deaths directly prevented by TB treatment (i.e. excluding those due to reduced transmission). The method was applied to the world's largest TB control programme covering over 500 million people in 12 provinces of China. RESULTS: Counties which had been enrolled in the programme since 1991 were, by 1997, preventing at least 46% (37-56%) of the TB deaths that would otherwise have occurred. If replicated across the entire TB control programme area, this would amount to 30 000 (range 26 000-59 000) deaths directly prevented each year. CONCLUSIONS: Short-course chemotherapy has substantially reduced TB mortality in half of China. The analytical method described here could be applied to TB control operations in many other countries, and should help to quantify the true burden of tuberculosis alleviated by SSCC.

Liu, H., Q. Zhong, et al. (2001). "[The effect analysis of tuberculosis control project loaned by World Bank in Guangdong province]." *Zhonghua Jie He He Hu Xi Za Zhi* **24**(8): 477-80.

OBJECTIVE: To evaluate the effect of tuberculosis control project loaned by World Bank in Guangdong province. METHODS: The registration and the treatment effect of pulmonary tuberculosis patients according to Guangdong tuberculosis report were analyzed. RESULTS: The above program had been conducted widespread since 1995. Over the past five years, 601,913 cases of suspicious tuberculosis patients have been received and diagnosed, in which 111,164 infectious patients (containing 91,612 newly-attacked infectious cases) were found. Just in 1999, the number of newly-attacked infectious patients was 1.2 times to that (19,858 newly-attacked infectious cases) of 1981-1990 prior to this program. And the average cure rate of infectious patients reached to 95.2%. The cure rate showed an uptrend amounting to 97.2% from 87.6%. CONCLUSION: Satisfactory effect have been achieved by the World-Bank loaned TB control project in Guangdong province.

National Technic Steering Group Of The Epidemiological Sampling Survey For, T. and H. Duanmu (2002). "[Report on fourth national epidemiological sampling survey of tuberculosis]." *Zhonghua Jie He He Hu Xi Za Zhi* **25**(1): 3-7.

**OBJECTIVE:** To investigate the epidemiological trend of tuberculosis, to evaluate the efficacy of control measures and to provide scientific basis for making National Tuberculosis Control Programme 2001 approximately 2010. **METHODS:** Tuberculin testing was carried out among 0 approximately 14 years old children; fluoroscopy was carried out for  $\geq 15$  years old population and children with  $\geq 10$  mm reaction of tuberculin testing; chest X-ray film, sputum smear and culture were done for the patients of fluoroscopy abnormal and suspects of tuberculosis symptom (persistent cough for 3 weeks or more); drug sensitivity test was done for the patients with culture positive; a retrospective study of tuberculosis mortality in 1999 was conducted at all investigation points; social economic study was done for the active pulmonary tuberculosis cases; the survey of tuberculosis infection rate for all population was carried out in 59 investigation points. **RESULTS:** The population actually examined in this survey numbered 365 097. The examination rate was more than 95%. The prevalence of active pulmonary tuberculosis was 367/100 000, the prevalence of smear positive pulmonary tuberculosis was 122/100 000 and the prevalence of bacteriological positive pulmonary tuberculosis was 160/100 000. In comparison with 1979, the annual reduction rates were 4.5% for the standardized prevalence of active pulmonary tuberculosis and 3.8% for the standardized prevalence of smear positive pulmonary tuberculosis. In comparison with 1990, the annual reduction rates were 5.4% and 3.2%, respectively. The smear positive prevalence standardized showed a 44.4% decrease in the regions of implementing project of Health V but only 12.3% decrease in the regions without the project. The prevalence in the west region was higher than national average prevalence. **CONCLUSIONS:** The epidemic of tuberculosis is still serious and prevalence decrease was slow. The governments at different levels must pay more attention to tuberculosis control programme, increase budget, implement DOTS strategy.

Squire, S. B. and S. Tang (2004). "How much of China's success in tuberculosis control is really due to DOTS?" *Lancet* **364**(9432): 391-2.

Full-text: 

Wang, G., Y. L. Peng, et al. (2002). "Sample survey of drug-resistant tuberculosis in Henan, China, 1996." *Respirology* **7**(1): 67-72.

**BACKGROUND:** There is little reliable data on the global drug resistance to tuberculosis (TB) as most of the existing data is based upon biased samples, is not standardized or was obtained using poor techniques. For this reason, the World Health Organization (WHO) and the International Union Against Tuberculosis and Lung Disease (IUATLD) developed a global project on anti-TB drug resistance surveillance (DRS) in 1994. China joined this project in 1995 and the province of Henan was selected as the first site for collection of representative samples to survey the prevalence of drug-resistant TB. **METHODOLOGY:** Standard drug susceptibility testing by the proportion method against streptomycin (S), isoniazid (H), rifampicin (R), and ethambutol (E) was performed with *Mycobacterium tuberculosis* isolated from 916 new cases and 456 previously treated cases. Treatment outcome of these patients has been evaluated according to the regimens and drug susceptibility patterns. **RESULTS:** Drug resistance among new cases to any drug was found to be 43.0% and any resistance: S, 32.5%; H, 31.0%; R, 20.7%; and E, 10.3%. Drug resistance among previously treated cases to any drug was 68.2% and any resistance: S, 52.2%; H, 49.3%; R, 48.3%; and E, 20.4%. The cure rate for new cases was 43.3% and 29.4% for previously treated cases. The poor cure rate resulted mainly from a high defaulter rate. **CONCLUSION:** Drug-resistant TB was found to be highly prevalent in Henan and the cure rate remained poor. The results strongly indicated that Henan should take immediate action to improve the cure rate of patients through expansion of the introduction of the directly observed treatment short-course strategy.

WHO (2004). Country Profile: China. *Global Tuberculosis Control*. Geneva, WHO.

Wilkinson, G. (2000). "Treating a hidden problem: tuberculosis among China's 'floating people'." *J R Soc Health* **120**(2): 76-7.

Xianyi, C., Z. Fengzeng, et al. (2002). "The DOTS strategy in China: results and lessons after 10 years." Bull World Health Organ **80**(6): 430-6.

OBJECTIVE: To analyse the five-point tuberculosis (TB) strategy, DOTS, 10 years after its implementation in one-half of China's population, and to suggest lessons for future implementation of the DOTS strategy. METHODS: We analysed trends in case-finding and treatment outcome over time following implementation of the DOTS strategy in each county, using routine reporting data from the Infectious and Endemic Disease Control (IEDC) project (1991 - 2000). We also determined the proportion of counties with different levels of case-finding for the fifth and sixth years of DOTS implementation. FINDINGS: From 1991 to 1995, DOTS expanded rapidly to cover more than 90% of target population and counties. By 2000, 8 million TB suspects had received free diagnostic evaluation: 1.8 million TB cases were diagnosed, free treatment was provided to 1.3 million smear-positive cases, and more than 90% were cured. During DOTS implementation, the percentage of previously treated cases decreased among all smear-positive cases and treatment outcomes improved. Despite these achievements, the detection rate for new smear-positive cases in the project was estimated to be only 54% in 1998, and 41.2% of the counties had a below average or low level of case-finding (with substantial variation between provinces). CONCLUSIONS: The IEDC project demonstrated that it is feasible to rapidly expand DOTS on a large scale. The global target of an 85% cure rate was quickly achieved, and the level of drug-resistance was probably reduced by this project. However, case-detection did not reach the 70% global target, and more research is needed on how to enhance this.

Zhao, F., Y. Chi, et al. (1995). "[Progress report on a World Bank loan to China for a tuberculosis control project]." Zhonghua Jie He He Hu Xi Za Zhi **18**(1): 19-22, 62.

The progress of the World Bank loaned TB control project implemented from the second quarter of 1991 to the fourth quarter of 1993 was described in this paper. In the past three years, 737 counties of the 12 provinces with the population of 360 million has been covered by the project. Among 95176 new smear positive cases discovered, 93909 patients received free treatment of TB. The treatment coverage is 98.7%, of which 95% were treated under full course supervision. The smear conversion rate at two, three months of new smear positive TB patients are 83.4% and 90.6% respectively. The cohort analysis showed that the cure rate is 89.8%, which has reached the advanced level of the modern national tuberculosis control programme in the world.

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Note: Below are selected results from PubMed using EndNotes (search terms:  
1990/01/01:2004/12/31, China, HIV and AIDS)

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Cohen, J. (2004). "HIV/AIDS in China. A new treatment campaign, but with limited weapons." Science **304**(5676): 1433.

Cohen, J. (2004). "HIV/AIDS in China. A scoop of international proportions." Science **304**(5676): 1439.

Cohen, J. (2004). "HIV/AIDS in China. An unsafe practice turned blood donors into victims." Science **304**(5676): 1438-9.

Cohen, J. (2004). "HIV/AIDS in China. Changing course to break the HIV-heroin connection." Science **304**(5676): 1434-5.

Cohen, J. (2004). "HIV/AIDS in China. Poised for takeoff?" Science **304**(5676): 1430-2.

Cohen, J. (2004). "HIV/AIDS in China. Vaccine development with a distinctly Chinese flavor." Science **304**(5676): 1437.

Crabb, C. (2004). "HIV/AIDS in China." *Aids* **18**(7): N3-4.  
Full-text: <http://gateway.ut.ovid.com/gw2/ovidweb.cgi>


Park, A. (2003). "China's secret plague." *Time* **162**(24): 54-8, 60, 62.

Portsmouth, S., J. Stebbing, et al. (2003). "HIV and AIDS in the People's Republic of China: a collaborative review." *Int J STD AIDS* **14**(11): 757-61.

The number of individuals diagnosed with HIV in China has risen dramatically in the last two years coincident with increased awareness and an attitude change within government. UNAIDS has suggested that China could have 10 million HIV infected people by 2010. However, antiretroviral treatments and HIV testing are not yet widely available and infected individuals often live in remote areas. It is unlikely that cheaper, locally produced, generic antiretroviral formulations will be available in China in the near future. Consequently, alternative strategies to manage HIV infection are being considered including the use of hydroxyurea, chloroquine and traditional Chinese herbal medicines. It is recognized in China that prevention and educational strategies will need to be at the forefront of approaches to control this epidemic.

UN Theme Group on HIV/AIDS in China and State Council AIDS Working Committee Office (2004). *A Joint Assessment of HIV/AIDS Prevention, Treatment and Care in China*. Beijing, <http://www.unchina.org/un aids/>.

Watts, J. (2003). "China faces up to HIV/AIDS epidemic. World AIDS day is marked by launch of huge public-awareness campaign." *Lancet* **362**(9400): 1983.

Full-text: 

Watts, J. (2004). "China's shift in HIV/AIDS policy marks turnaround on health. Pledge to provide free HIV tests shows China is starting to take action on combating the disease." *Lancet* **363**(9418): 1370-1.

Full-text: 

Wu, Z., K. Rou, et al. (2004). "The HIV/AIDS epidemic in China: history, current strategies and future challenges." *AIDS Educ Prev* **16**(3 Suppl A): 7-17.

This article reviews the epidemic of HIV infection and AIDS, the Chinese national policy development in response to the epidemic, and disparities between policies and the need for AIDS prevention in China. The HIV epidemic in China has gone through three phases, and it is now at the rapid expansion phase. Since 1988, HIV/AIDS has been addressed from a legal perspective, but in the early stages laws and regulations actually hindered HIV control efforts. Since 1995 efforts have been made to improve policy decisions. Two major strategic plans were issued in 1998 and 2001, with increased government funding for implementation. Although the challenges facing HIV/AIDS control in China are many, the Chinese government is making a stronger commitment for implementing effective AIDS control measures in the country.

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Note: Below are selected results from PubMed using EndNotes (search terms:  
1990/01/01:2004/12/31, China, malaria)  
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(1999). "[Malaria situation in the People's Republic of China in 1998]." *Zhongguo Ji Sheng Chong Xue Yu Ji Sheng Chong Bing Za Zhi* **17**(4): 193-5.

Notwithstanding there was a flood over the five provinces located at the middle and lower reaches of the Changjiang River, i.e. Hunan, Hubei, Jiangxi, Anhui and Jiangsu, in the summer and autumn of 1998, the prevalence of malaria in these areas was basically stable or slightly decreased as a result of timely implementing active and effective preventive measures. According to the case reporting system, the number of malaria cases of the whole nation totaled 31,319 in

1998, with a mean incidence of 2.53 per a hundred thousand, and 24 deaths. A decrease of 12.0% in incidence was revealed as compared with that in 1997. The county-based reckoning showed that absence of malaria cases or drop of the incidence to lower than 1@10000 was reported from areas in 2,774 counties with a coverage of 1.2016 billion people; areas with 30.6 million people distributed in 75 counties showed an incidence of 1.1-10@10000, and areas with 6.50 million people distributed in 27 counties showed an incidence of 10.1@10000-100@10000. Of the 17 provinces, autonomous regions and municipalities (P/A/M) where major malarious areas are located, 6 showed more or less increase in malaria incidence, particularly noteworthy for Hainan and Yunnan Provinces, where 5,043 and 12,988 malaria cases were reported respectively, accounting for 57.6% of the national total. However, the actual number of malaria cases of the two provinces was estimated to be ten folds the number of the reported cases. Malaria surveillance was performed in areas covering 1,298 counties in 17 P/A/M with a coverage of 589 million people. Blood examination on febrile patients for 8,712,454 man/time detected 27,090 cases positive for malaria parasite, showing a mean positive rate of 0.31%, of which the number of falciparum malaria cases was 4,042 (including mixed infections with vivax malaria, the same below), a proportion of 14.9% of the total parasite positives was exhibited. Altogether 597,111 targeted people, inhabitants in epidemic spots and migratory people were also examined, 4,326 people were found to be positive for malaria parasites, showing a mean parasite rate of 0.72%, while falciparum malaria carriers were noted as 748 among them. As a whole, the endemicity of falciparum malaria was still confined to 47 counties of Hainan and Yunnan Provinces. Imported falciparum malaria cases were reported in 84 counties of 15 P/A/M (including non-endemic areas of Hainan and Yunnan), whereas no introduced falciparum malaria cases were recorded. The distribution of malaria did not show conspicuous changes in recent years. The prevalence was most severe in mountainous regions in Hainan with *Anopheles dirus* as the major vector, followed by areas south to 25 degrees N.L. where *An. minimus* distributed and areas between 25 degrees N.L. with *An. anthropophagus* as the vector. The three mentioned anopheline species were distributed in areas where more than 200 million people resided, the number of malaria cases amounted to 90% odd of the national total, the prevalence of malaria was unstable there, and focal outbreaks were often reported. Nevertheless, in areas only distributed with *An. sinensis*, the endemicity of malaria was stable, and its incidence has been reduced to less than 0.1@10000.

(2000). "[Malaria situation in the People's Republic of China in 1999]." Zhongguo Ji Sheng Chong Xue Yu Ji Sheng Chong Bing Za Zhi **18**(3): 129-31.

Although the middle and lower reaches of Changjiang River were consecutively stricken by severe flood in 1998 and 1999, the transmission of malaria was not frequent and prevalence of the disease was basically stable with no reports of outbreaks in the above areas, which was attributed to the intensification of malaria surveillance, prompt implementation of integrated measures including mosquito control and chemoprophylaxis, as well as the zoophilous trend of *Anopheles sinensis*, the vector in the stricken areas. According to the case reporting system established on the basis of professional institutions of 22 provinces, autonomous regions and municipalities (P/A/M), the number of malaria cases in the country totalled 29,039 in 1999, with lethal cases of 67. Based on pilot-site surveillance and investigation of some localities, the actual number of malaria cases was estimated to be 250,000-300,000 in 1999. Hainan and Yunnan are still the major malarious provinces. The elongated borderline and increase in migratory population contributes to the difficulties in malaria control in Yunnan, consequently, the incidence of malaria was progressively upgrading in the last three years, the reported number of falciparum malaria cases and deaths was markedly increased in 1999 as compared with that in 1998, exhibiting a crucial status of prevalence in the province. In Hainan, circa 80% of malaria cases were infected via transmission by *An. dirus* away from villages, hence difficulties existed in malaria control; in areas affected by *An. anthropophagus* where a population of more than 100 million resided, relatively high incidence of malaria was noted, the prevalence was unstable, sometimes focal outbreaks occurred, and incidence of 20% was reported in a few villages and townships; in area where the only vector was *An. sinensis*, the prevalence was rather stable, the incidence of malaria was decreased to < 0.1 @1000 in most places. A total of 26,797 people proved to be positive for malaria parasite in the process of blood examination on febrile cases of 7,816,182

man/time in area where lived 691 million population, covering 1,336 counties in 19 P/A/M, the mean parasite rate being 0.34%, however, the rate was as high as 2.09% in migratory people. Blood examination on targetted people including the inhabitants in the epidemic foci, children and migratory population for 362,512 man/time detected 1,781 malaria parasite carriers, with a mean parasite rate of 0.49%. Prevalence of falciparum malaria was still confined to 44 counties of Hainan and Yunnan provinces. Imported falciparum malaria cases were found in 114 counties of 16 P/A/M (areas not endemic for falciparum malaria in Hainan and Yunnan also included). Altogether 5,466 cases and 227 carriers of falciparum malaria (including mixed infection of Plasmodium vivax and Plasmodium falciparum) were detected this year.

Sheng, H. F., S. S. Zhou, et al. (2003). "[Malaria situation in the People's Republic of China in 2002]." *Zhongguo Ji Sheng Chong Xue Yu Ji Sheng Chong Bing Za Zhi* **21**(4): 193-6.

This summary was made on the basis of the annual reports of malaria control from the professional institutions in the 21 Provinces/Municipality/Autonomous Region (P/M/A). The number of malaria cases reported in the country was 35,298 in the year 2002 and the incidence rate was 0.348/10,000, an increase of 68.2% than that of the last year and the largest increase since 1994. The total number of suspected cases was 136,902, and the death toll due to malaria was 42. Based on the numbers of malaria cases and suspected cases from the case reporting system of P/M/A, and on the field investigations of the cases missed (failed to report), the estimated total number of malaria cases was 387,000 in 2002. In the South, the provinces of Yunnan and Hainan have been the major area of malaria historically. About 50% of the reported cases in the country were from the two provinces in 2002. There were 12,218 cases reported from Yunnan with 33 deaths, the incidence was 3.026/10,000, 31.6% increase than that in the last year. Among the reported cases, 2,922 were cases of falciparum malaria. The estimated number of malaria cases was 18 times more than that reported. The number of reported cases in Hainan was 5,354 with an incidence of 6.645/10,000, 15.5% increase than that of the last year; there were 1,210 cases of falciparum malaria, and 1 death. The estimated number of malaria cases was 100,000. Covered were also the other P/M/A in the South: Fujian, Guizhou, Guangxi, Guangdong, Sichuan and Chongqing. In Fujian province, 92 malaria cases were reported, all imported, with an incidence of 0.028/10,000 which increased by 272.8% than that in the last year. There were 713 cases reported in Guizhou with an incidence of 0.193/10,000, increased by 17.1%. The number of reported malaria cases was 392 in Guangxi, with an incidence rate of 0.082/10,000, increased by 14.0%. The incidence slightly decreased in Sichuan, Guangdong and Chongqing, and the case number was 443, 403 and 130 respectively. The cases from the 6 provinces/municipality occupied 6.2% of all cases reported from the country. The 5 provinces in central China were also important in malaria control program. Hubei province reported 5,101 malaria cases (incidence 0.895/10,000), increased by 161.6% than that of the last year; plus suspected cases of 5,614, the total number of malaria cases was estimated to be 11,000. The number of reported cases in Anhui province was 5,999 (0.958/10,000), second largest to that of Yunnan province, increased by 123.6%; with 22,615 suspected cases, the total number of malaria cases was estimated to be 28,000. The case number reported in Henan and Jiangsu provinces was 2,921 and 686 respectively, the incidence decreased by 35.1% and 41.7% respectively, but in Shandong province, 52 cases reported with an increase of 23.8%. Focal outbreaks occurred in 81 villages of 17 counties in the provinces of Hubei, Anhui, Henan and Jiangsu, where *Anopheles sinensis* is the principal transmitting vector. Malaria cases reported from the 5 provinces in central China accounted for 42% of the national figure. Three hundred and thirteen and 229 cases respectively reported from Hunan and Zhejiang provinces, the incidence increased by 44.2% and 288.1% with 3 and 1 death respectively. There were 28 cases in Jiangxi province with a little fluctuation situation. In Shanghai, 135 cases were recorded with an increase of incidence by 66.7%; 16 were infected locally and others all imported. In the provinces of Shaanxi, Shanxi, Liaoning and Gansu, sporadic malaria cases were still reported. The number of Plasmodium falciparum malaria cases was 4,319, accounting for 12.2% of the total cases; of which 13.4% (556) were imported cases. The locally infected falciparum malaria was found in 61 counties/cities of Hainan, Yunnan, Guangxi, and Shaanxi; of which 42 counties/cities were in Yunnan, increased by 11, 16 counties/cities in Hainan, increased by 5, 2 counties in Guangxi and 1 county in Shaanxi. Imported falciparum malaria cases were reported in 114

counties of 14 P/M/A, 2 provinces less but 6 counties more than that in 2001. Due to the strengthening of surveillance and effective management of dubious epidemic conditions, there was no local transmission of falciparum malaria in the above provinces except 2 locally infected cases in Guangxi and 1 in Shaanxi. In areas where the transmission of falciparum malaria has been interrupted but vectors and transmission conditions exist, it is of great importance to prevent the transmission of falciparum malaria by imported source of infection. The main reasons for the considerable increase of malaria transmission in 2002 were as follows: the provinces of Yunnan and Hainan still faced a severe situation of malaria epidemic with a spread of Plasmodium falciparum, especially in the mountainous area of Hainan and the 25 frontier counties in the south and west of Yunnan. Following the development of economy and trade, more frequent population movement occurred among the provinces and between Yunnan and bordering countries, malaria situation becomes more challenging. In central part of the country including Hubei, Anhui, Henan and Jiangsu, where Anopheles sinensis was the principal vector, the malaria situation was highly unstable and local outbreaks took place from time to time. Meanwhile, the increase of the floating population brought more imported cases into Guangdong, Guangxi, Guizhou, Hunan, Fujian, Jiangxi, Chongqing, Shandong, Zhejiang, and Shanghai, which accounted for 47%-100% of the cases reported in the P/M/A. Furthermore, because of the faultiness in the public health system and the network of the case reporting system, more malaria cases failed to be reported and it is therefore a challenge in implementing the program of malaria control and prevention.