# The Challenge of Non-Communicable Diseases (NCD)

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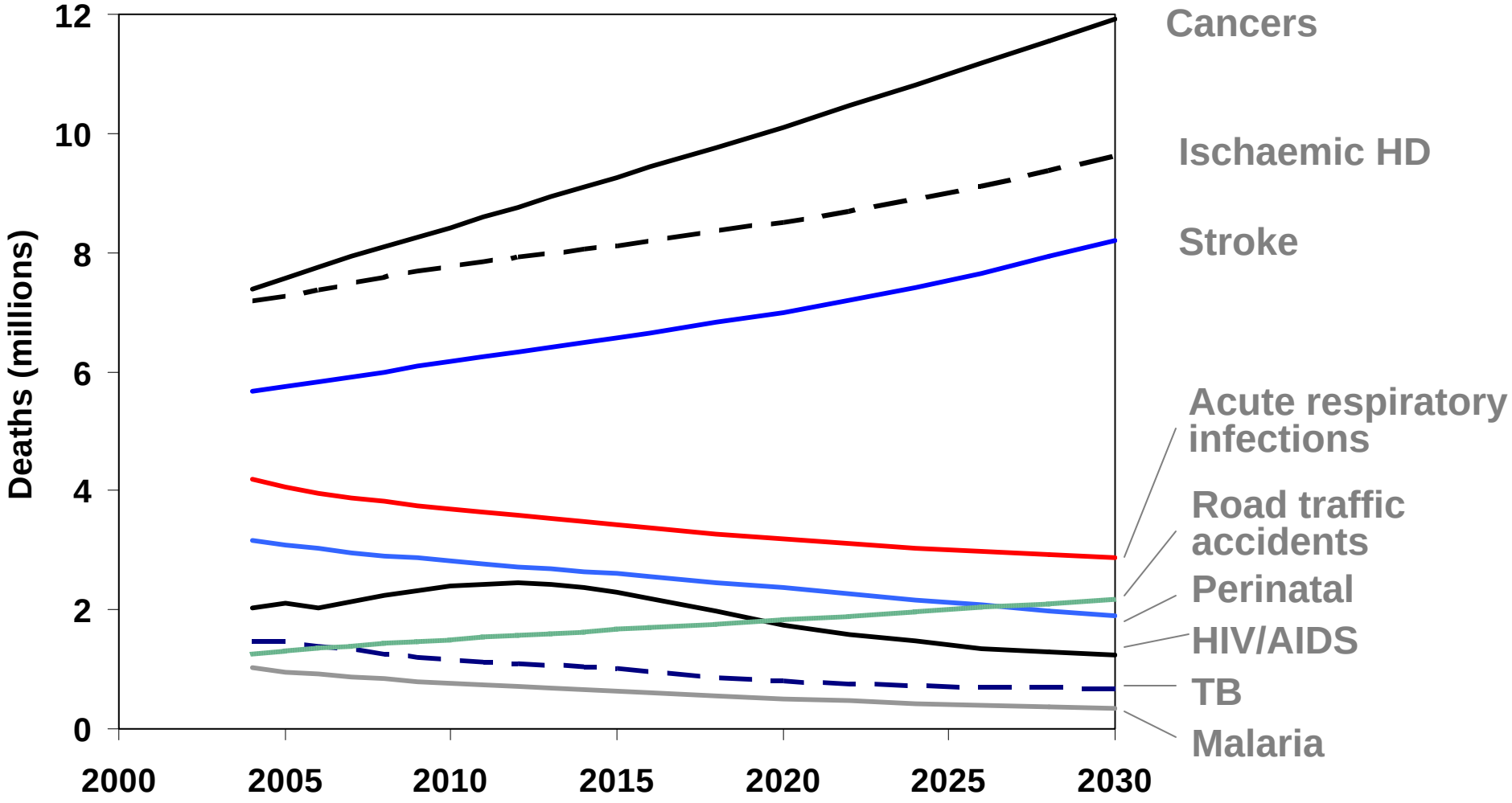
# The five leading causes of death in China (2007)

| Rank | Urban | | | Rural | | |
|---|---|---|---|---|---|---|
| | Disease (ICD-10) | Mortality (1/100,000) | % | Disease (ICD-10) | Mortality (1/100,000) | % |
| 1 | Cancer (Lung) | 176.2 | 28.5 | Cancer (Lung) | 114.2 | 24.8 |
| 2 | Cerebrovascular diseases | 111.5 | 18.0 | Cerebrovascular diseases | 119.7 | 20.6 |
| 3 | Heart disease | 100.6 | 16.3 | Respiratory diseases | 100.2 | 16.2 |
| 4 | Respiratory diseases | 80.9 | 13.1 | Heart diseases | 86.0 | 14.8 |
| 5 | Trauma/ Poisoning | 37.6 | 6.1 | Trauma/ Poisoning | 52.1 | 9.0 |

# UN summit on Non-Communicable Diseases ( Nov19-20, 2011)

**Not only increase of treatment costs and economic slowdown, but also a substantial social problem, even creating a social crisis**

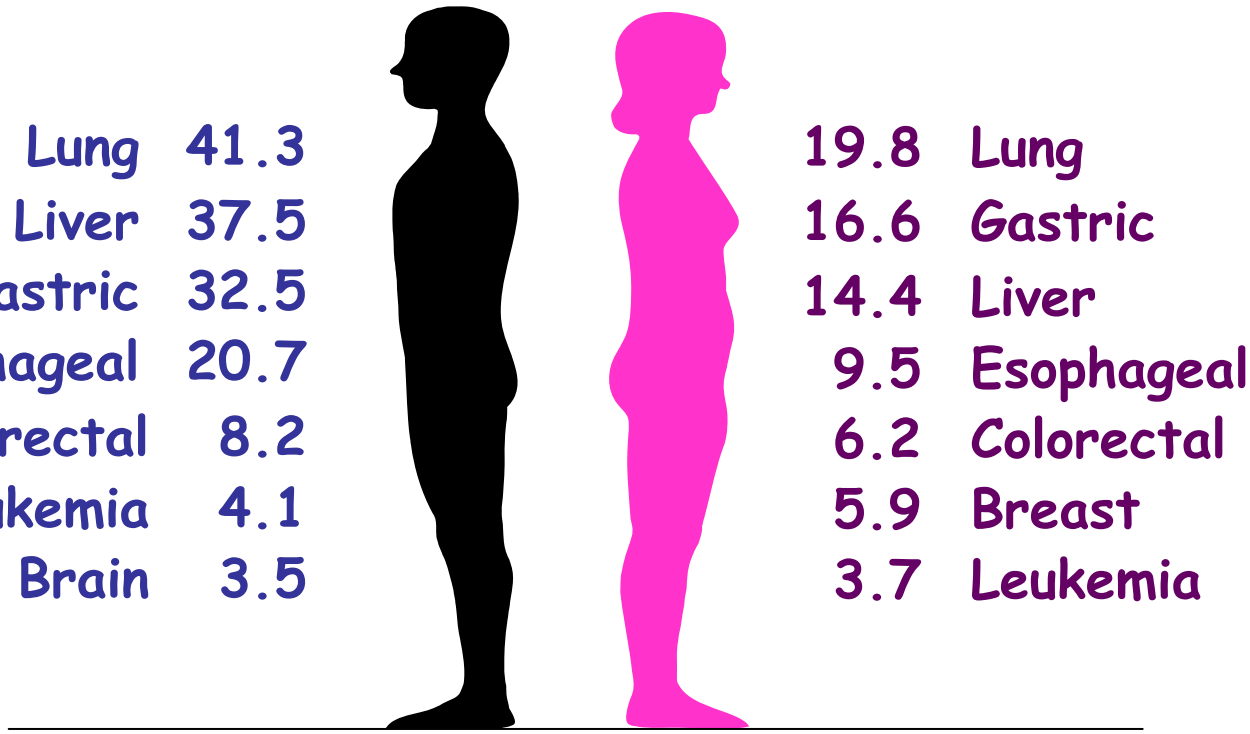
# Global projections for selected causes, 2004 to 2030



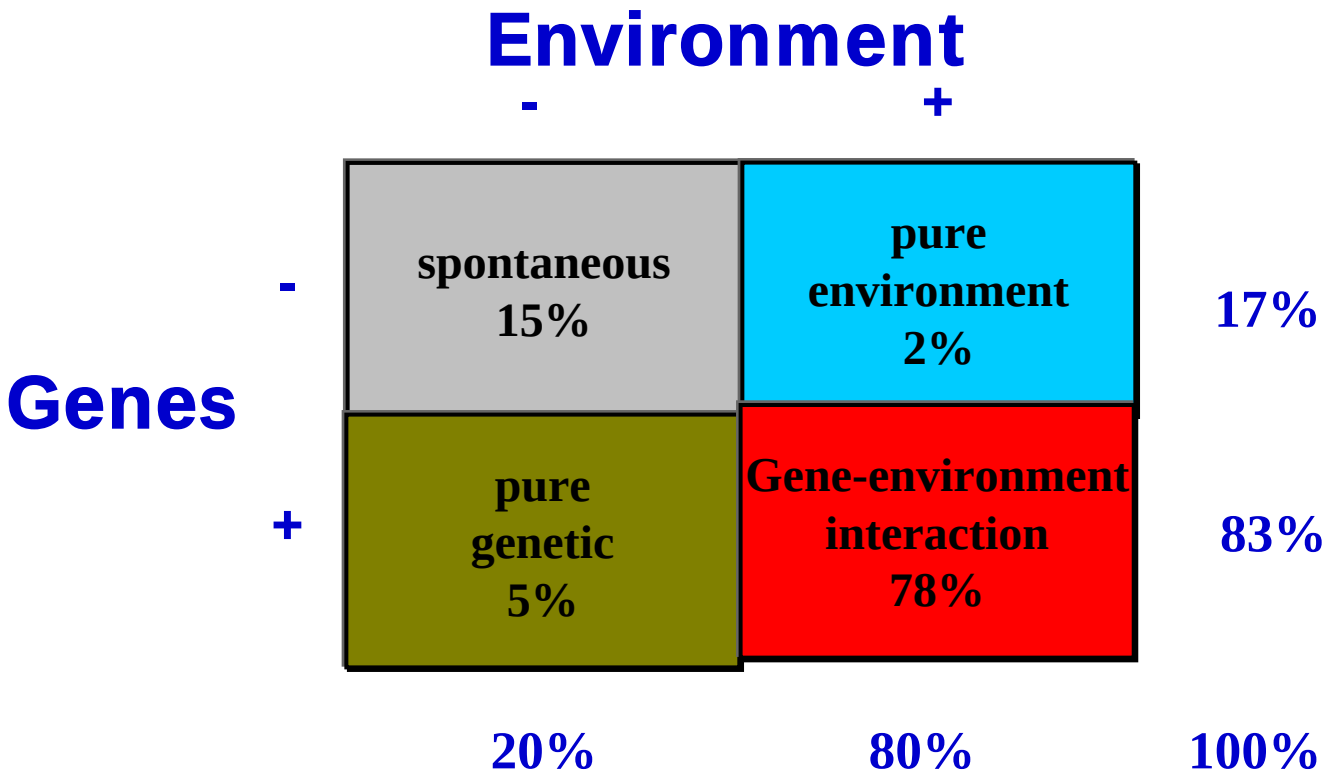

Updated from Mathers and Loncar, PLoS Medicine, 2006

# Mortality rates of major types of cancer in China in 2004~2005

(data source: The Ministry of Public Health, 2008)



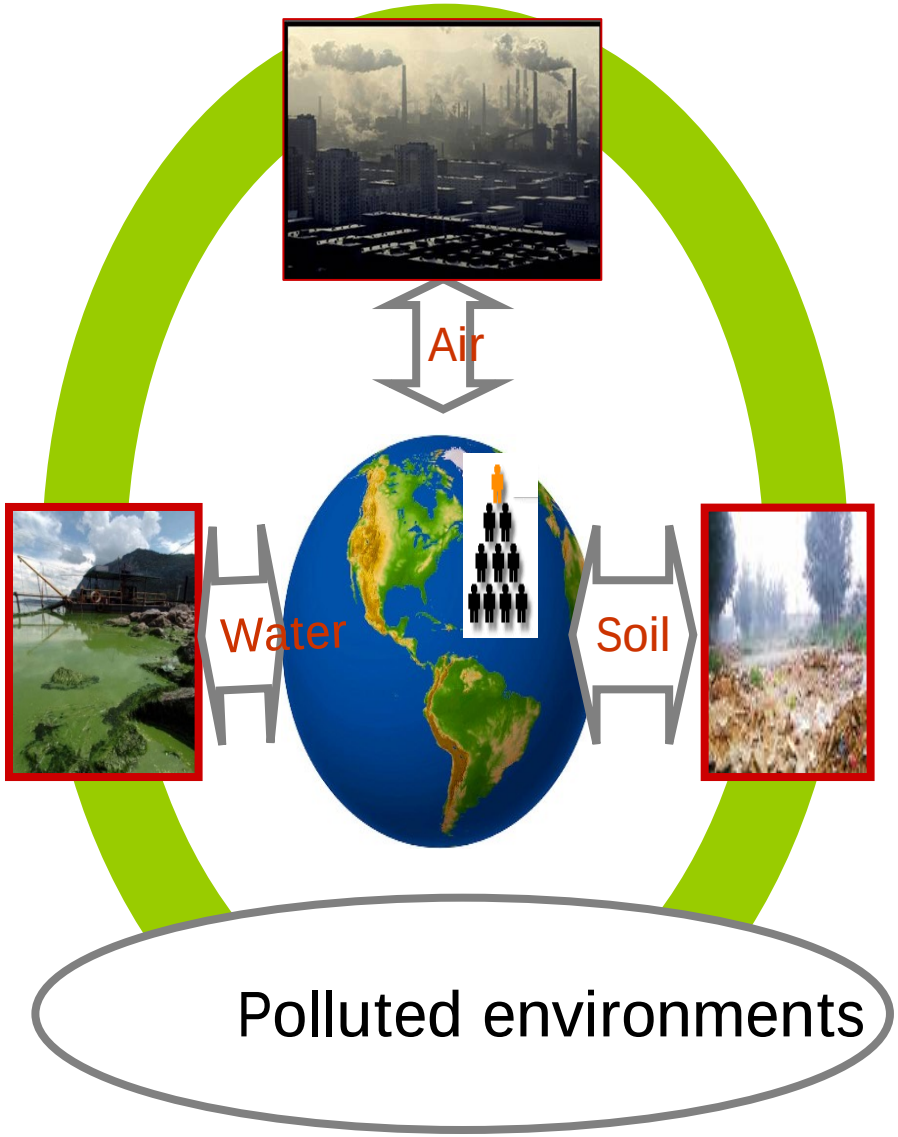
# Interaction of Gene and Environment



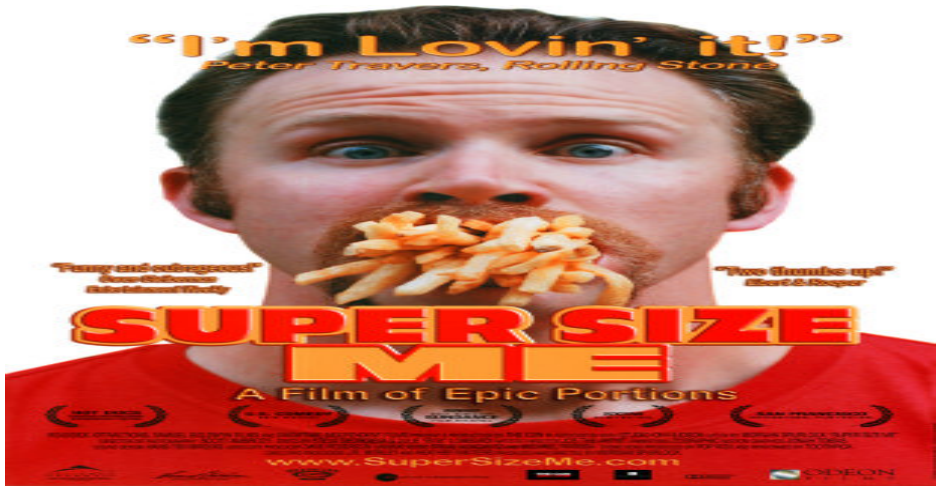

"*Genetics* loads gun, but *Environments* trigger"

***Schulte, 1994***

***Willett, 2002***




Polluted environments

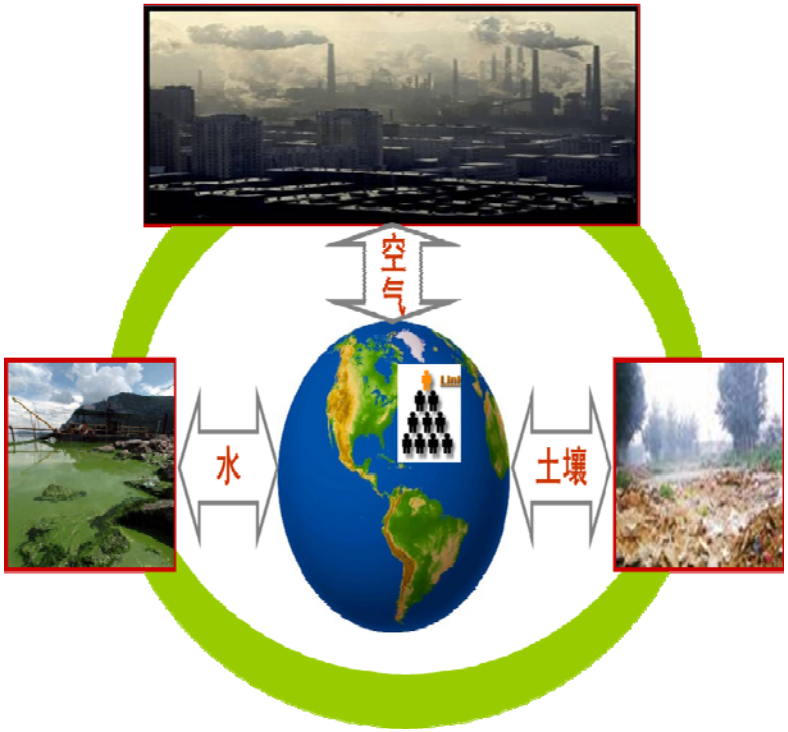




Changing lifestyle

# Social, economic, and environmental changes

# The cost of air pollution per year (2003)




| | Air | Water |
|---|---|---|
| **Death** | **394,000** | 52000 |
| **Economics** | **157.3 B** | 9.5 B |
| **Other Economics** | 36.7 B | 158B |

Sourced from 《Cost of Pollution in China》

# What are the contributors?
# Polluted environment

The NEW ENGLAND JOURNAL of MEDICINE

Long-Term Exposure to Air Pollution and Incidence of Cardiovascular Events in Women

and stroke. In 2000, levels of $PM_{2.5}$ exposure varied from 3.4 to 28.3 μg per cubic meter (mean, 13.5). Each increase of 10 μg per cubic meter was associated with a 24% increase in the risk of a cardiovascular event (hazard ratio, 1.24; 95% confidence interval [CI], 1.09 to 1.41) and a 76% increase in the risk of death from cardiovascular disease (hazard ratio, 1.76; 95% CI, 1.25 to 2.47). For cardiovascular events, the between-city effect appeared to be smaller than the within-city effect. The

**$PM_{2.5}$ increased CHD**
**（NEJM 2007）**

JAMA®

Online article and related content current as of June 11, 2010.

Lung Cancer, Cardiopulmonary Mortality, and Long-term Exposure to Fine Particulate Air Pollution

C. Arden Pope III; Richard T. Burnett; Michael J. Thun; et al.

*JAMA*. 2002;287(9):1132-1141 (doi:10.1001/jama.287.9.1132)

**Results** Fine particulate and sulfur oxide–related pollution were associated with all-cause, lung cancer, and cardiopulmonary mortality. Each 10-μg/m³ elevation in fine particulate air pollution was associated with approximately a 4%, 6%, and 8% increased risk of all-cause, cardiopulmonary, and lung cancer mortality, respectively. Mea-

**$PM_{2.5}$ increased lung cancer（JAMA 2002）**

The NEW ENGLAND JOURNAL of MEDICINE

Fine-Particulate Air Pollution and Life Expectancy in the United States

RESULTS

A decrease of 10 μg per cubic meter in the concentration of fine particulate matter was associated with an estimated increase in mean (±SE) life expectancy of 0.61±0.20 year (P=0.004). The estimated effect of reduced exposure to pollution on life expec-

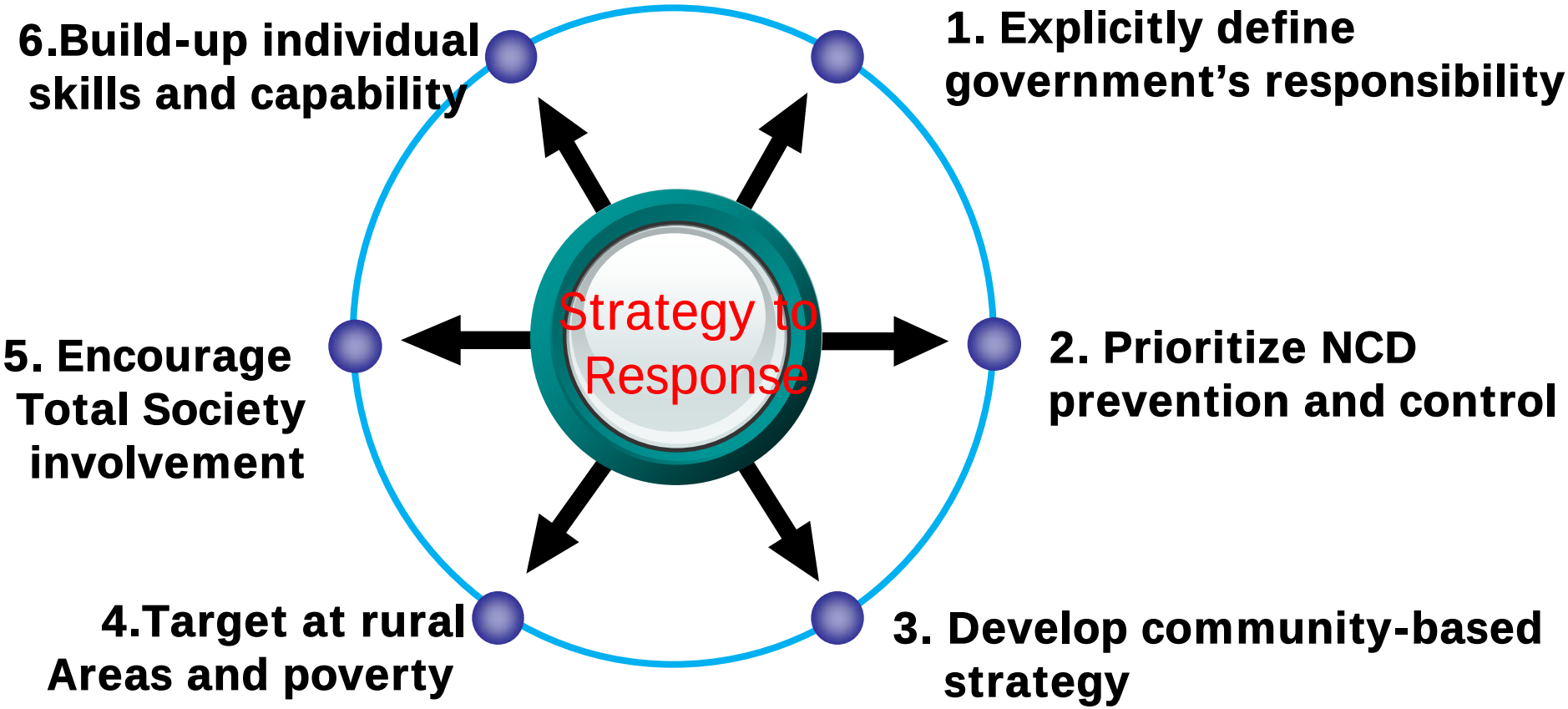
**$PM_{2.5}$ shortened life**
**（NEJM 2009）**

**Physical activity subtypes and risk of metabolic syndrome (cluster of NCD) in middle-aged and older Chinese people: The unique role of tai chi and dancing**

**Table 4: Odds ratio and 95% CI for MetS according to categories of physical activity subtypes**

| Physical activity subtypes | Physical activity levels (hours per week) | | | | | $P_{\text{for trend}}$ | Continuous |
|---|---|---|---|---|---|---|---|
| | 0 | 0.1-2.0 | 2.1-3.5 | 3.6-6.0 | >6.0 | | |
| Dancing | | | | | | | |
| No. of cases | 4845 | 77 | 92 | 75 | 55 | | |
| No. of person | 14310 | 275 | 342 | 320 | 267 | | |
| Model 1 OR (95% CI) | 1.00 | 0.72 (0.55, 0.95) | 0.65 (0.51, 0.83) | 0.55 (0.42, 0.72) | 0.46 (0.34, 0.62) | <0.001 | 0.92 (0.89, 0.94) |
| Model 2 OR (95% CI) | 1.00 | 0.59 (0.40, 0.86) | 0.68 (0.50, 0.93) | 0.54 (0.39, 0.75) | 0.45 (0.31, 0.65) | <0.001 | 0.91 (0.88, 0.94) |
| Tai chi | | | | | | | |
| No. of cases | 4877 | 61 | 104 | 48 | 54 | | |
| No. of person | 14570 | 227 | 338 | 197 | 182 | | |
| Model 1 OR (95% CI) | 1.00 | 0.66 (0.49, 0.89) | 0.80 (0.63, 1.01) | 0.59 (0.42, 0.82) | 0.74 (0.54, 1.03) | <0.001 | 0.95 (0.92, 0.98) |
| Model 2 OR (95% CI) | 1.00 | 0.59 (0.40, 0.88) | 0.83 (0.61, 1.13) | 0.62 (0.41, 0.94) | 0.71 (0.47, 1.10) | 0.002 | 0.95 (0.91, 0.98) |
| Biking | | | | | | | |
| No. of cases | 4846 | 88 | 88 | 50 | 54 | | |
| No. of person | 14397 | 328 | 348 | 226 | 215 | | |
| Model 1 OR (95% CI) | 1.00 | 0.90 (0.70, 1.16) | 1.08 (0.85, 1.36) | 0.70 (0.51, 0.96) | 0.86 (0.63, 1.17) | 0.089 | 0.97 (0.95, 1.00) |
| Model 2 OR (95% CI) | 1.00 | 0.88 (0.63, 1.22) | 1.23 (0.91, 1.65) | 0.78 (0.52, 1.18) | 0.72 (0.47, 1.11) | 0.236 | 0.97 (0.93, 1.01) |

# Strategy to Respond to challenge:
# —Six Key Components




(data source: The Ministry of Public Health, 2012)


谢谢
Thanks !