The decomposition of health expectancy change during 1987-2006 among Chinese elderly population

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Content

Content

1.1 China is undergoing health transition, but the mechanism is not so clear.

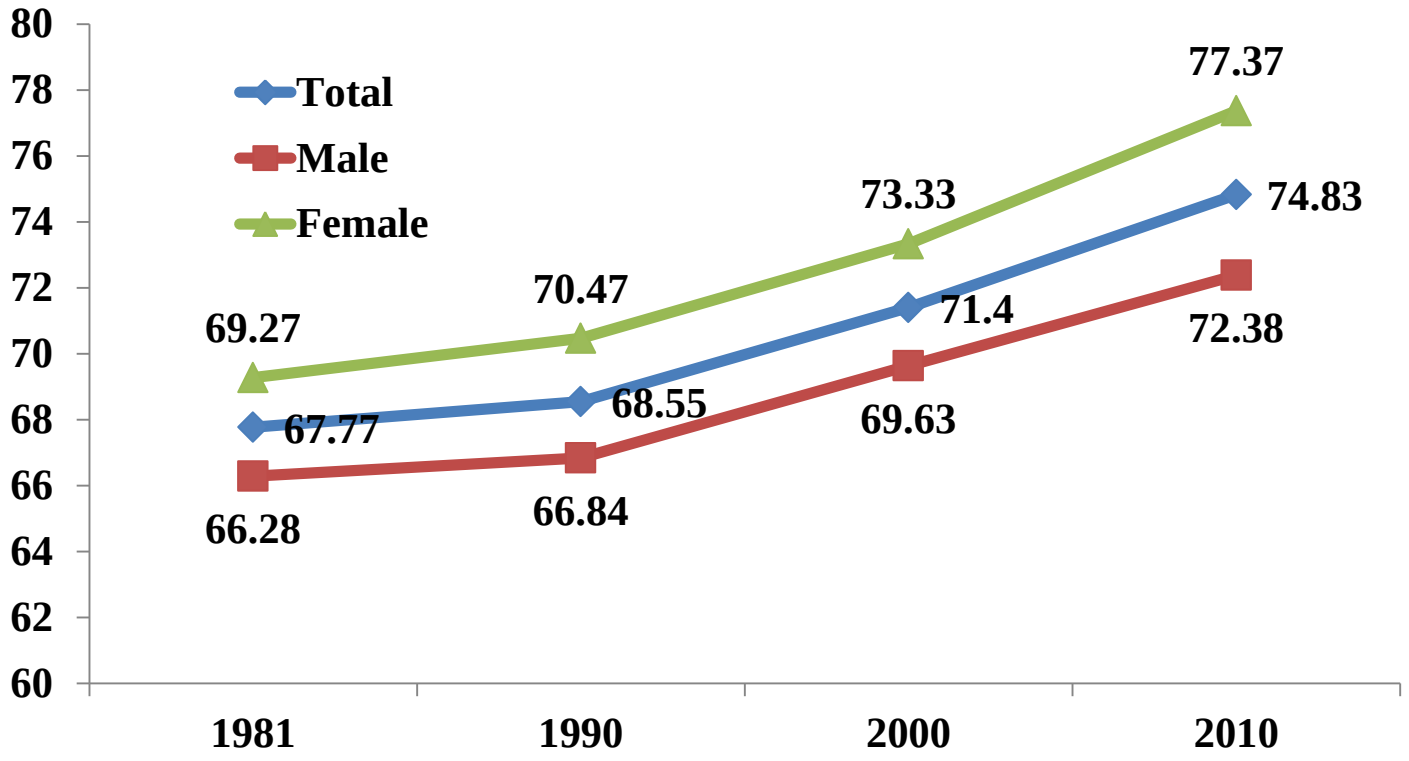


Figure 1. The life expectancy at birth in China during 1981~2010

Source: Tabulation on the 2010 population census of the People's Republic of China .

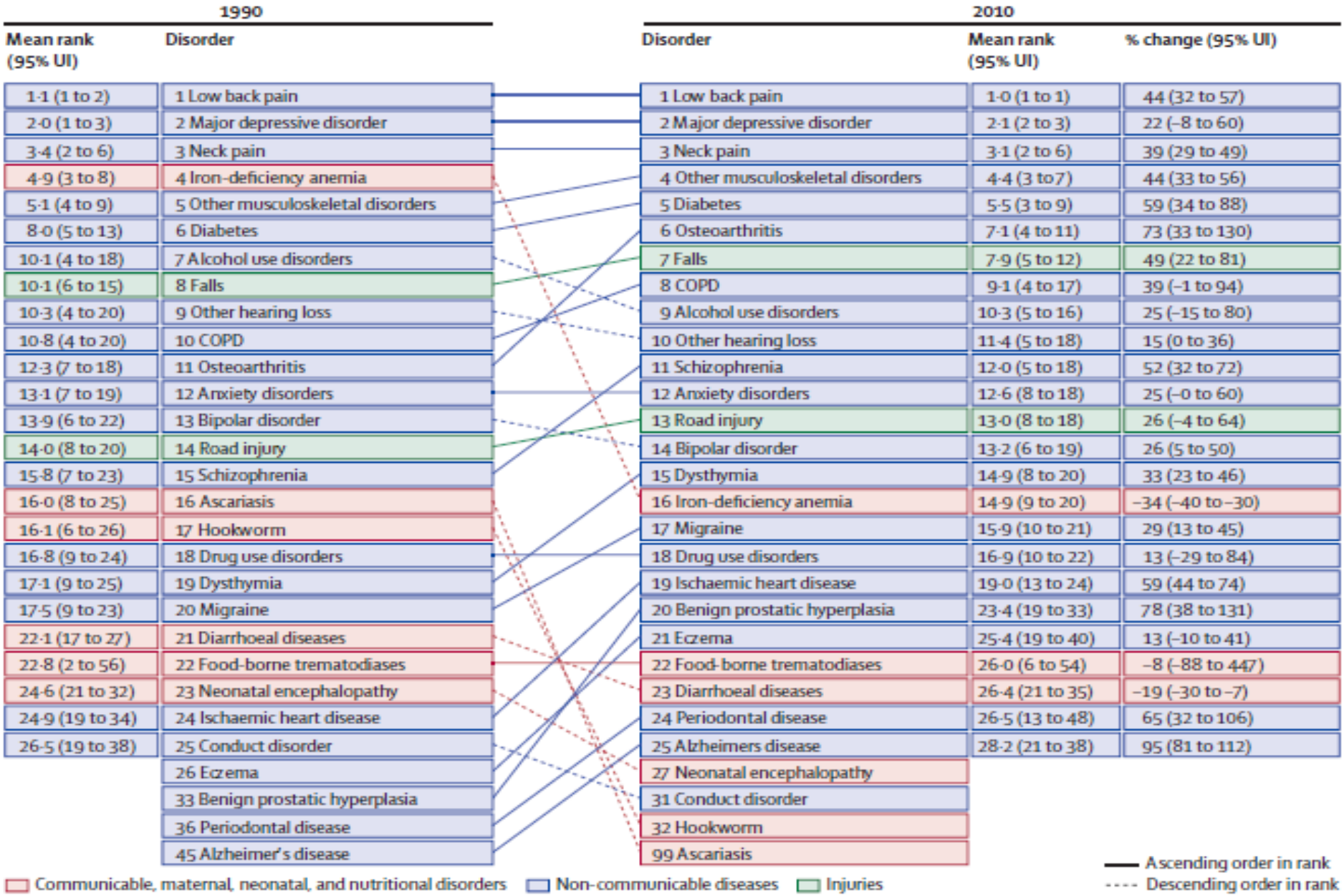
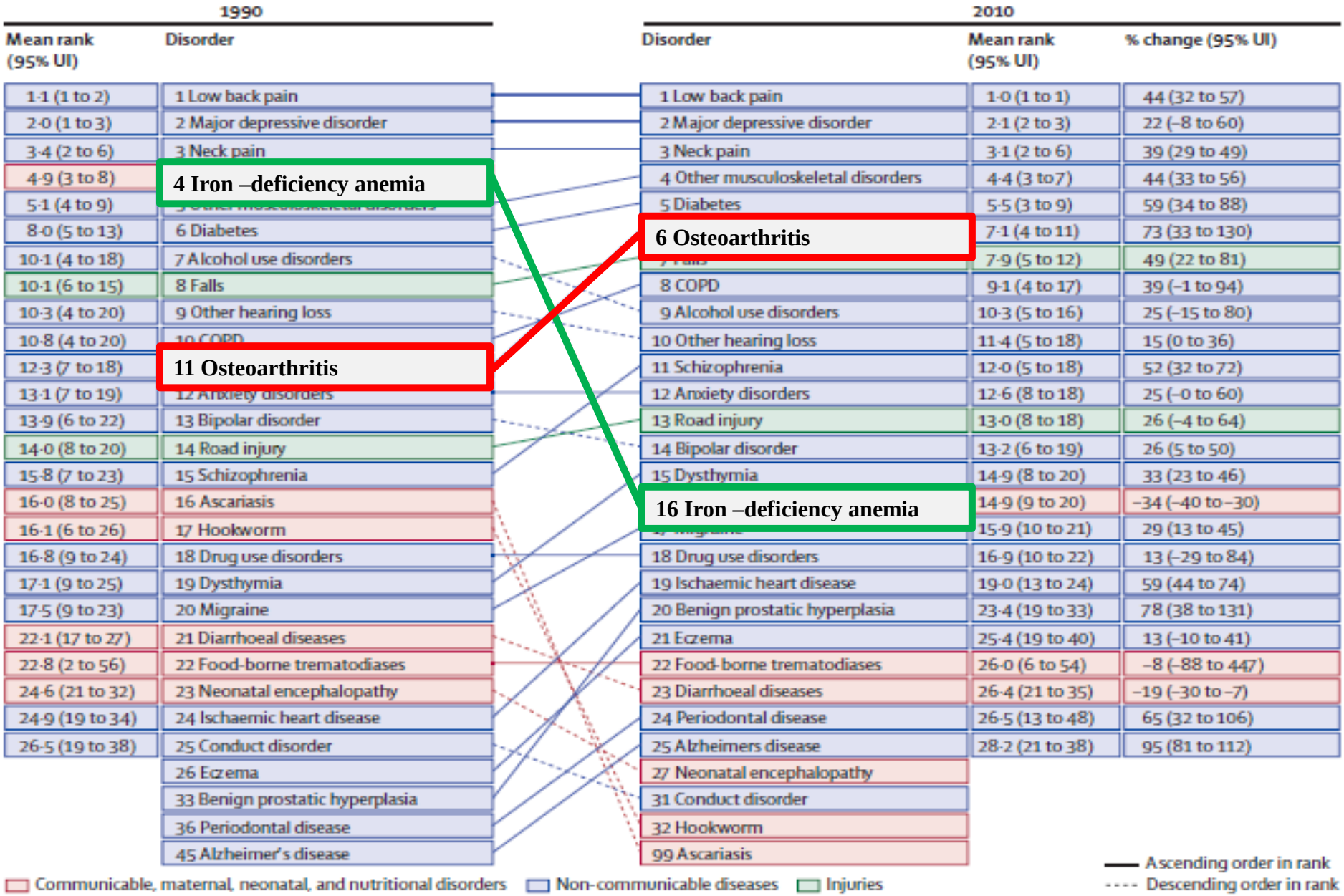


Figure 2. Ranks for the top 25 causes of years of life lost in China for both sex and all ages combined with 95% UIs in 1990 . Source: Yang GH, Wang Y, Zeng YX, et al. Rapid heIth transition in China, 1990-2010: findings from the Global Burden of Disease Study 2010. Lancet 2013; 381: 1987-2015.



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1.2 Disparity in the health pattern between urban and rural China

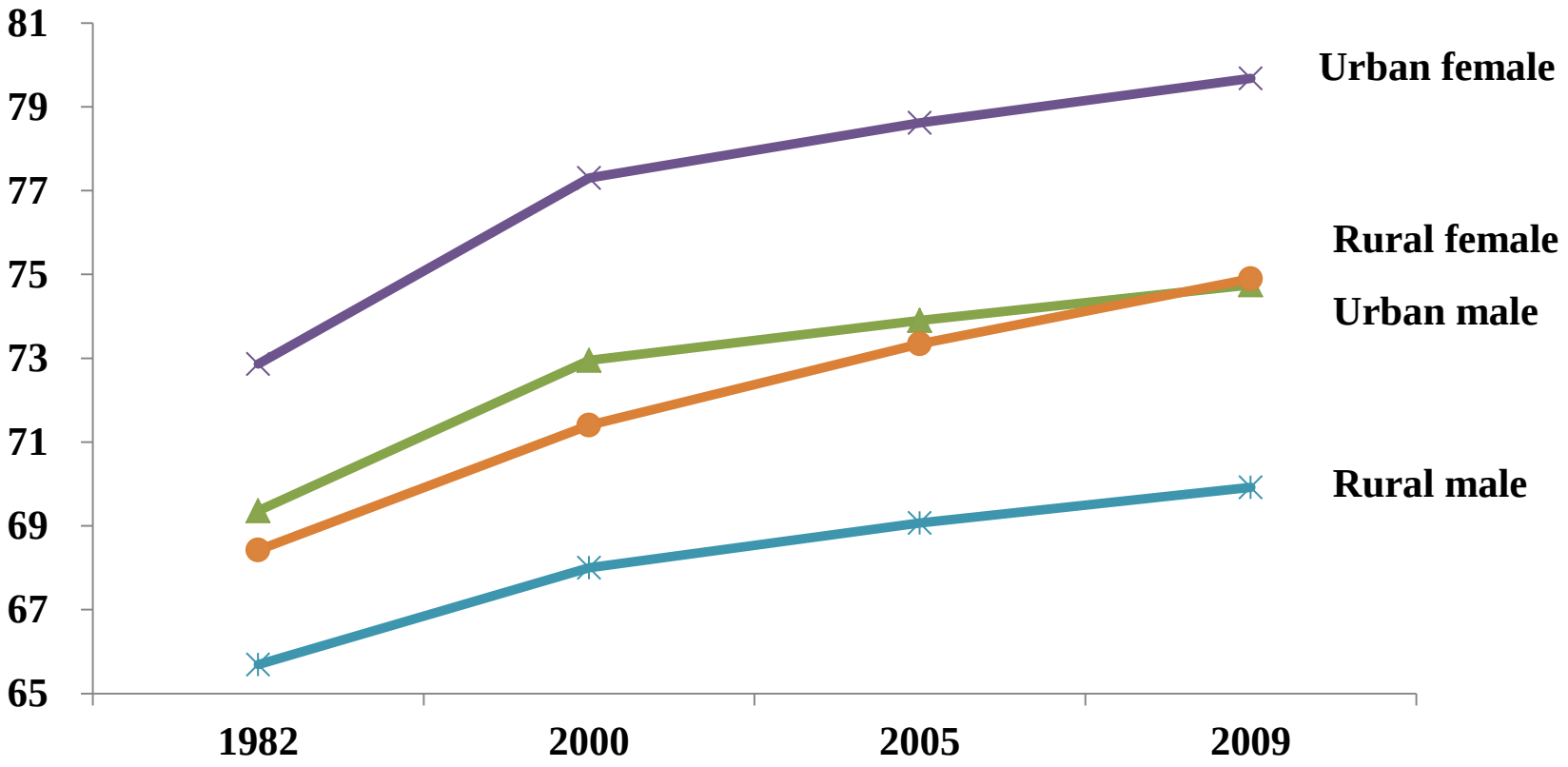

Figure 3. The life expectanty for urban and rural Chinese from 1982 to 2009

Source: Ying Hu. The Average life expectancy analysis on China's current population in urban and rural. Population & Development (Chinese), 2010; 16: 41-7.

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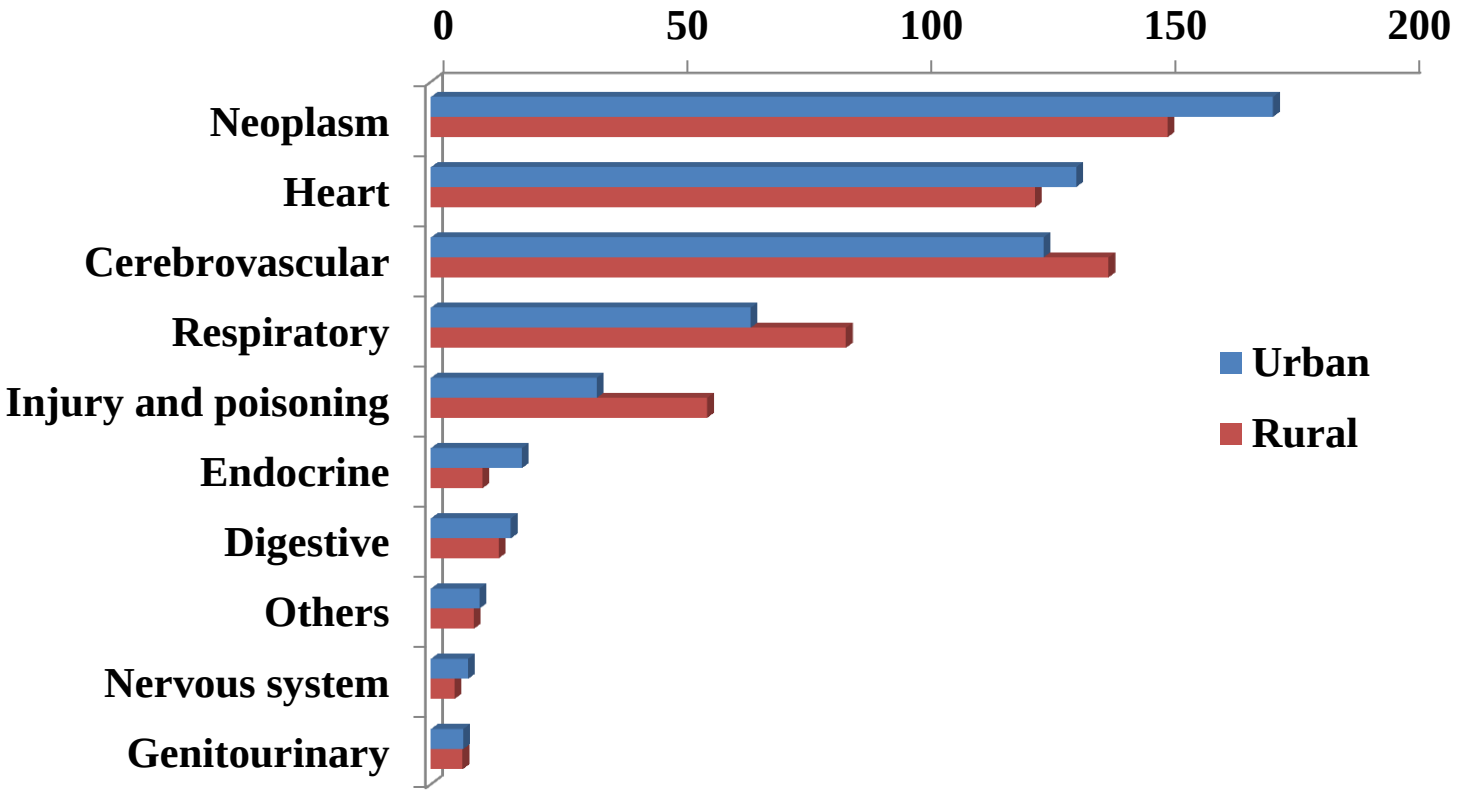


Figure 4. The 10 most highest disease-specific crude death rates for urban and rural China in 2011

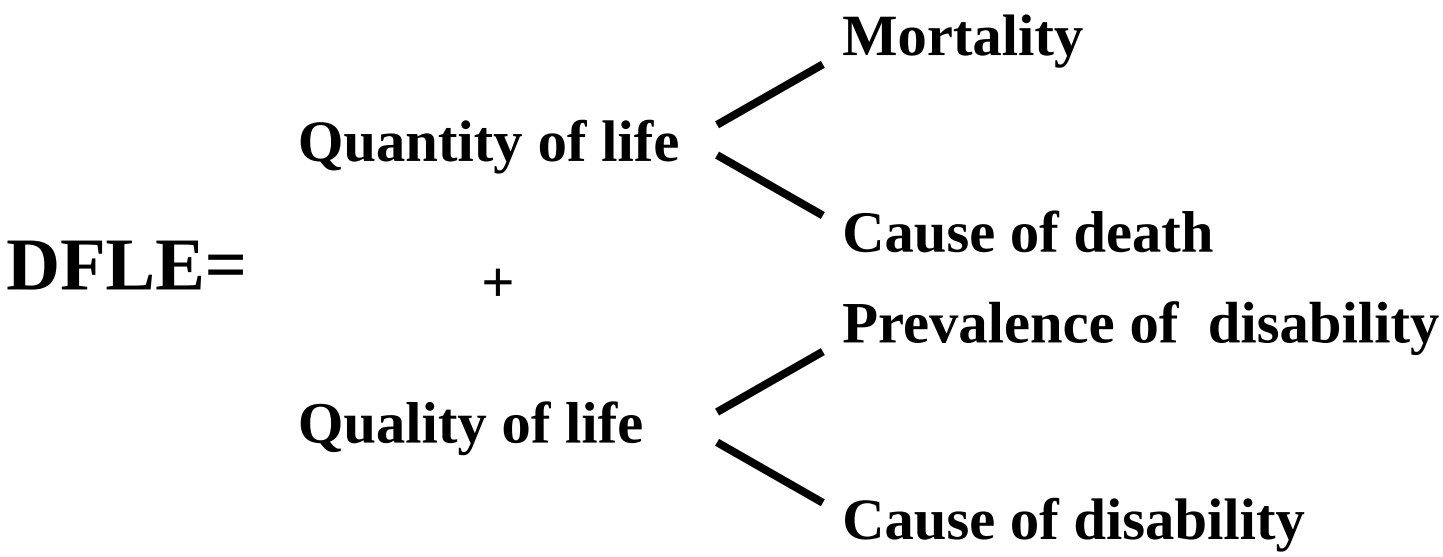
Source: China Health Statistical Yearbook 2012

1.3 Stuty aim

- To calculate the change in disability-free life expectancy (DFLE) among elderly population (aged 60 and over) in China
- To decompose the $DFLE_{60}$ changes into contribution of different disease groups
- To explore the different health transition trajectory between urban and rural elderly population in China

Content

2.1 Data


DFLE=
Quantity of life
Mortality
Cause of death
+
Quality of life
Prevalence of disability
Cause of disability

2.1 Data---Mortality

1. Data sources (NBS)

-1987 1% Population Sample Survey in China

-2006 National Sample Survey on Population Changes (0.907‰)

2. Evaluation

-Basically, both are nationally reprensentative (NBS, 1988, 2007)

-**But**, the mortality is **under-reported,** especially among elderly population (You & Zheng, 2005).

3. Adjustment

-The life table was adjusted according to **west model life table** by Coale, Demeny, and Vaughan (1983)

2.1 Data---Death cause

1. Data sources (National CDC)

1990 &2006 National Death Cause monitoring System

2. Evaluation

The disease-specific mortality is under-reported

But, the structure of diseases, as cause of death**, is generally reliable**. (Ren et al., 2005)

2.1 Data---Disability level & cause

1. Data sources (mainly implemented by NBS)

-1987 National Sample Survey on Disability in China (1987 CSSD)

-2006 National Sample Survey on Disability in China (2006 CSSD)

2. Evaluation

-The data quality is **acceptable**. (Zheng et al., 2011)

-The two surveys are basically **comparable** (Liu et al., 2009)

2.2 Measures---Cause of Death

1. Coding rules

1987-ICD 9 & 2006-ICD 10

2. Comparability

-How to compare?

-Finally, 18 disease or injury groups.

2.2 Measures---Disability

- **Definition**

  A disabled person as someone who suffered from one or more abnormalities in anatomical structure or the loss of a certain organ or function (either psychological or physiological), and lost (totally or in part) the ability to perform an activity in the normal way.

2.2 Measures---Disability

- How to identify a disabled person and the causes?

STEP 1
Trained interviewers
Questionnaire
Find the suspected disabled persons

STEP 2
Physicians
Medical examination
Confirm the disability and causes

Disability – dummy variable
Causes-coded according to ICD rules

2.3 Statistical Analysis

1. Sullivan method (Sullivan, 1971)

- to compute the change of $DFLE_{60}$ between 1987 and 2006

2. Nusselder & Looman decomposition method (Nusselder & Looman, 2004)

-to decompose the $DFLE_{60}$ change into contributions of diseases and injury.

-four steps are carried out

Step 1. $DFLE_{60}$ change =Mortality effect + Disability effect

Step 2. Mortality effect = $\sum$ Mortality effect (k)

Step 3. Disability effect= $\sum$ Disability effect (k)

Step4. Contribution (k)= Mortality effect (k) + Disability effect (k)

Details

Content

3.1 The change of $DFLE_{60}$

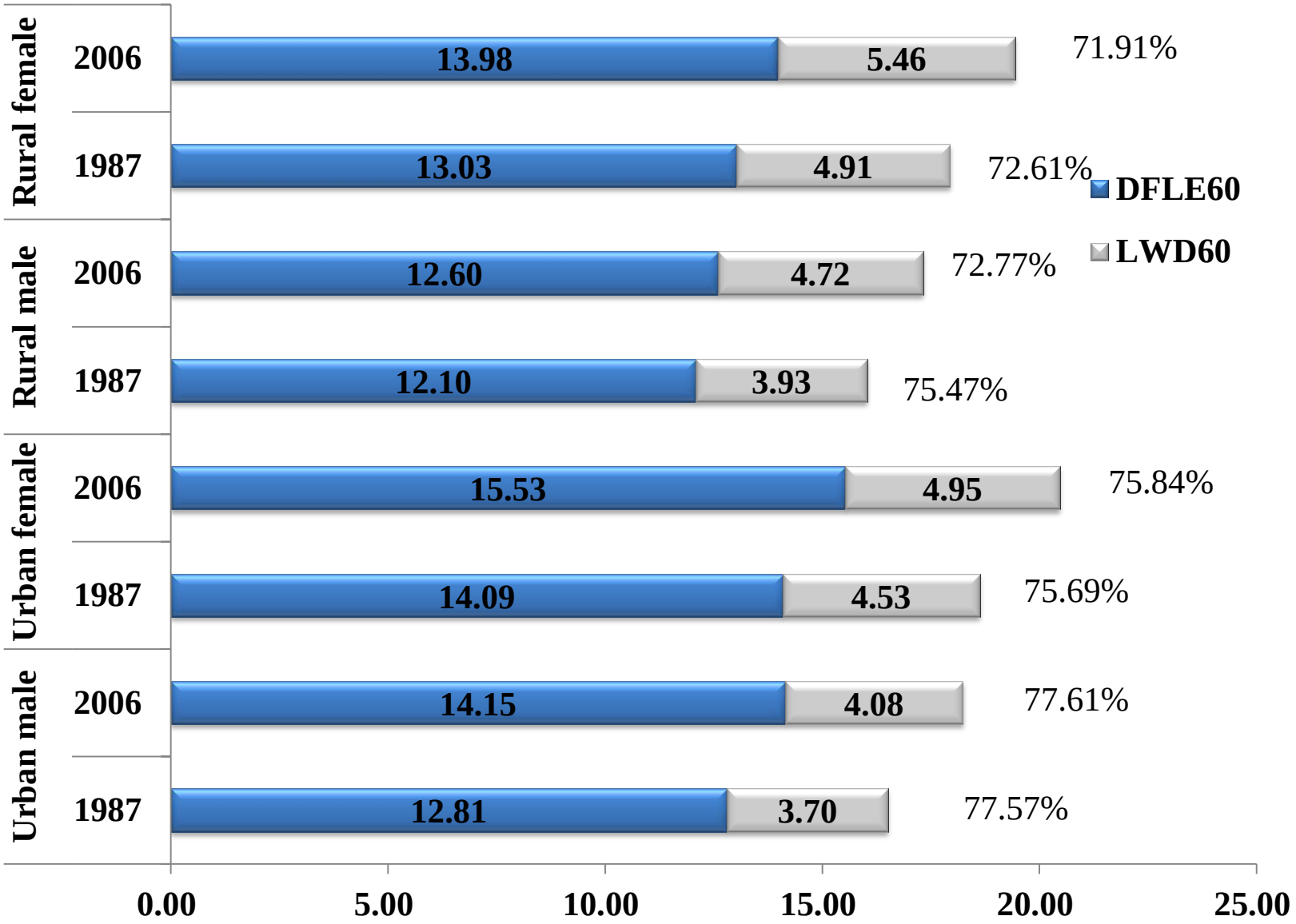


Figure 5. The change of $DFLE_{60}$, LWD_{60} and LE_{60} during 1987~2006

3.2 The contribution of mortality and disability effect

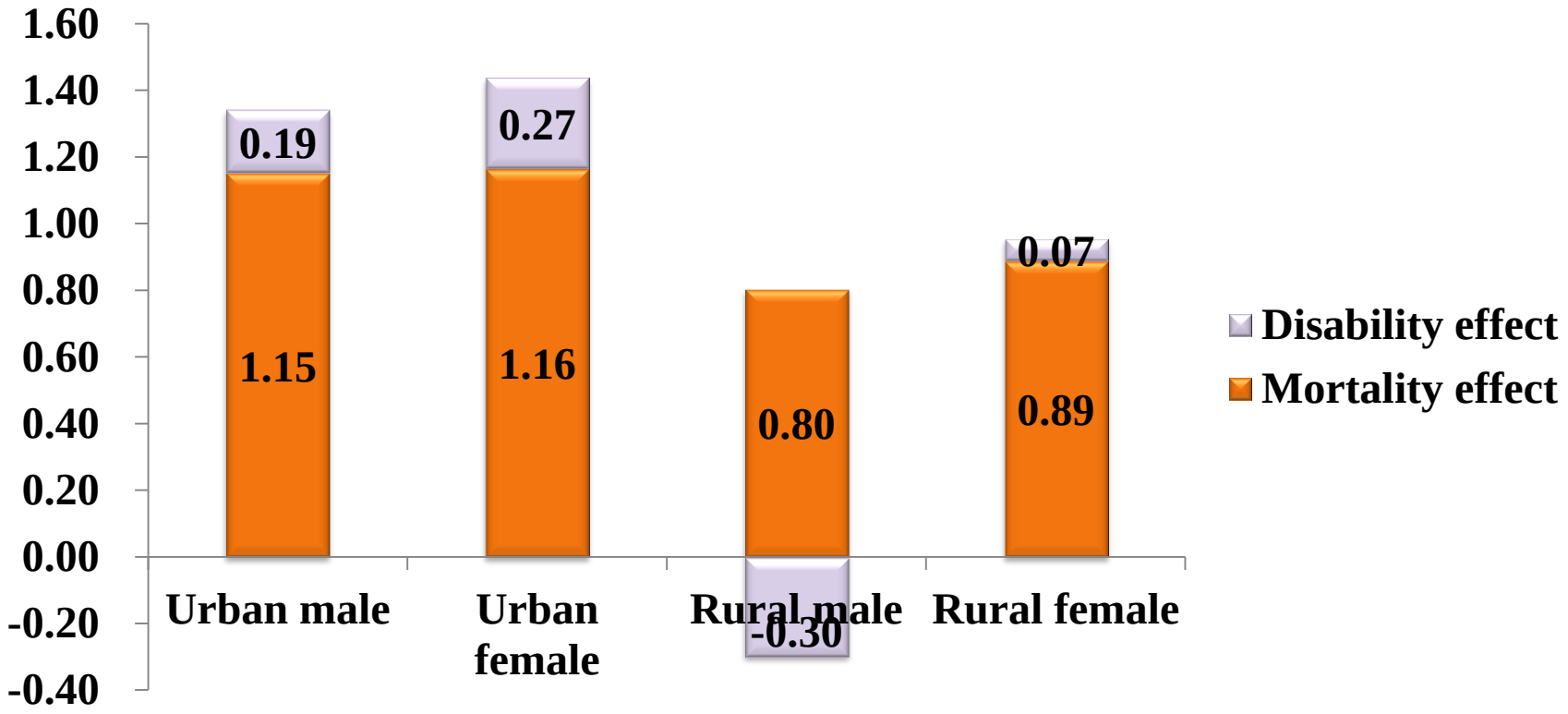


Figure 6. The decomposition of change of $DFLE_{60}$ changes during 1987~2006 into disability and mortality effect

3.3 Table 1. The mortality effect, disability effect and total effect of diseases on $DFLE_{60}$ changes during 1987~2006

	Urban male			Urban female			Rural male			Rural female		
	ME	DE	Total	ME	DE	Total	ME	DE	Total	ME	DE	Total
Infectious	0.08	0.05	0.13	0.04	0.11	0.14	0.17	0.10	0.27	0.15	0.21	0.36
Neoplasm	-0.11	0.00	-0.10	-0.22	-0.01	-0.22	-0.49	0.00	-0.49	-0.32	0.00	-0.32
Endocrine	-0.04	0.00	-0.04	-0.08	0.00	-0.08	-0.03	0.00	-0.03	-0.04	0.00	-0.04
Mental	0.02	-0.04	-0.02	0.02	-0.07	-0.04	0.00	-0.05	-0.05	0.00	-0.10	-0.10
Nervous	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.02	0.00	0.00	0.00
Eye	0.00	0.21	0.21	0.00	0.35	0.35	0.01	0.04	0.05	0.02	0.11	0.13
Ear	0.00	0.53	0.53	0.00	0.67	0.67	0.00	0.57	0.57	0.00	0.85	0.85
Circulatory	0.12	-0.20	-0.08	0.07	-0.18	-0.10	-0.32	-0.22	-0.54	-0.36	-0.19	-0.55
Respiratory	0.36	0.00	0.36	0.43	0.00	0.43	0.75	0.00	0.75	0.75	0.00	0.75
Digestive	0.02	0.00	0.02	0.05	0.00	0.05	0.09	0.00	0.09	0.05	0.00	0.05
Genitourinary	0.04	0.00	0.04	-0.01	0.00	-0.01	0.02	0.00	0.02	0.02	0.00	0.02
Maternal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Skin	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Musculoskeletal	0.01	0.02	0.02	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
Congenital	0.00	-0.01	-0.01	0.00	-0.02	-0.02	0.00	-0.03	-0.03	0.01	-0.03	-0.02
Perinatal	0.00	-0.10	-0.10	0.00	-0.11	-0.11	0.00	-0.08	-0.07	0.00	-0.09	-0.08
Injury	0.57	-0.17	0.39	0.64	-0.11	0.52	0.51	-0.23	0.28	0.51	-0.17	0.34
Other	0.08	-0.09	-0.01	0.21	-0.37	-0.16	0.09	-0.41	-0.31	0.07	-0.53	-0.45
Total	1.15	0.19	1.34	1.16	0.27	1.44	0.80	-0.30	0.51	0.89	0.07	0.95

Table 2. During 1987~2006, whose changes increased $DFLE_{60}$?

	Urban male		Urban female		Rural male		Rural female	
	Change	Rank	Change	Rank	Change	Rank	Change	Rank
Ear	0.53	1	0.67	1	0.57	2	0.85	1
Injury & poisoning	0.39	2	0.52	2	0.28	3	0.34	4
Respiratory	0.36	3	0.43	3	0.75	1	0.75	2
Eye	0.21	4	0.35	4	0.05	6	0.13	5
Infectious & parasitic	0.13	5	0.14	5	0.27	4	0.36	3

The negative impact of disease related to public health and living standard went down

-Public health projects (such as vaccine and sanitary water) improve living environment (Sinton et al., 2004; MOH, 2009);

-Social and economic development provide better living conditions (NBS, 2009)

-Progress in medical technology to better cure diseases (Zheng et al., 2011; Wang & Li, 2009);

Table 3. During 1987~2006, whose changes decreased $DFLE_{60}$?

	Urban male		Urban female		Rural male		Rural female	
	Change	Rank	Change	Rank	Change	Rank	Change	Rank
Neoplasm	-0.10	17	-0.22	18	-0.49	17	-0.32	16
Circulatory	-0.08	16	-0.10	15	-0.54	18	-0.55	18
Endocrine and blood	-0.04	15	-0.08	14	-0.03	12	-0.04	13
Mental	-0.02	14	-0.04	13	-0.05	14	-0.10	15

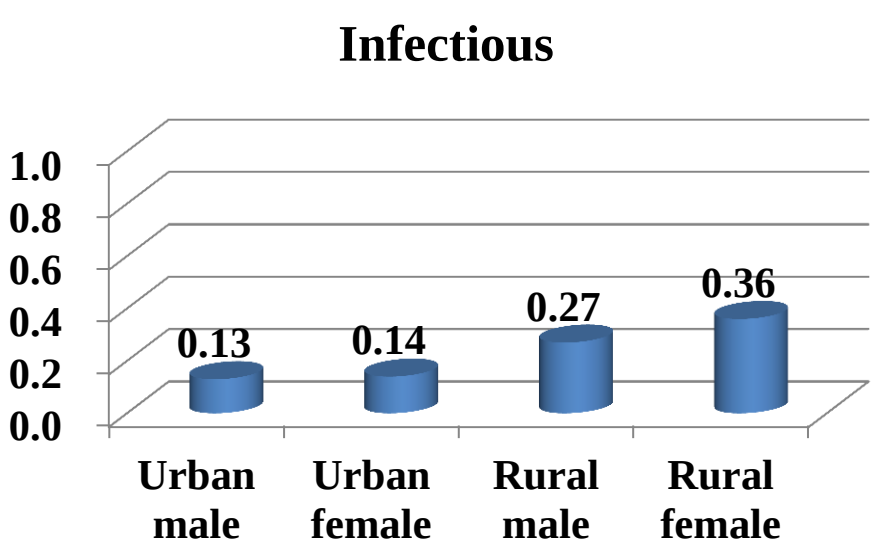
The negative impact of diseases related to life style and health behaviour increased.

- During 1992~2002, the prevalence of **overweight** increased by 38.6%;
- During 1991~2002, the prevalence of **hypertension** increased from 13.58% to 17.65% (aged 15 and over)

(Wang, 2005)

3.4 The urban-rural disparity

Compared with urban area, the negative impact of infectious and respiratory diseases on $DFLE_{60}$ decreased faster in rural area.



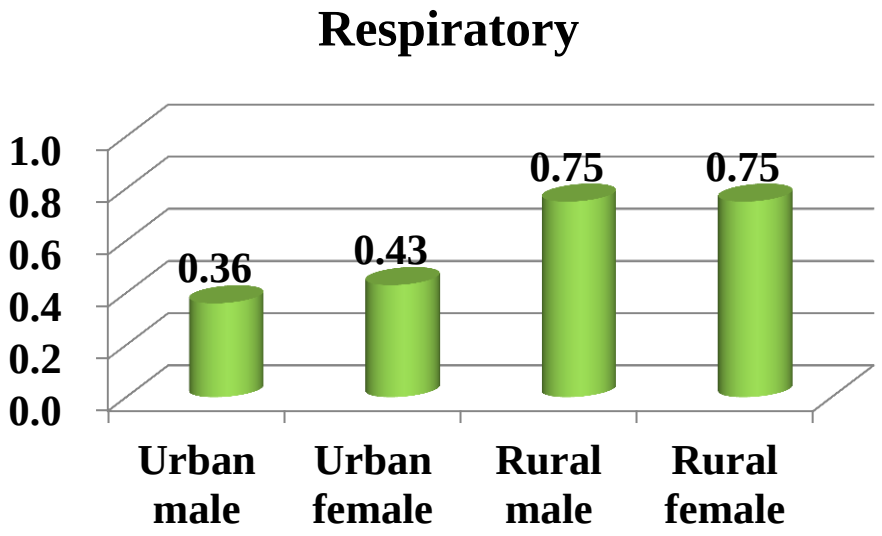


Figure 7. The contribution of infectious and respiratory diseases to the change of $DFLE_{60}$

3.4 The urban-rural disparity

Compared with urban area, the negative impact of infectious and respiratory diseases on $DFLE_{60}$ decreased faster in rural area.

- In 1987, their influences were higher in rural China

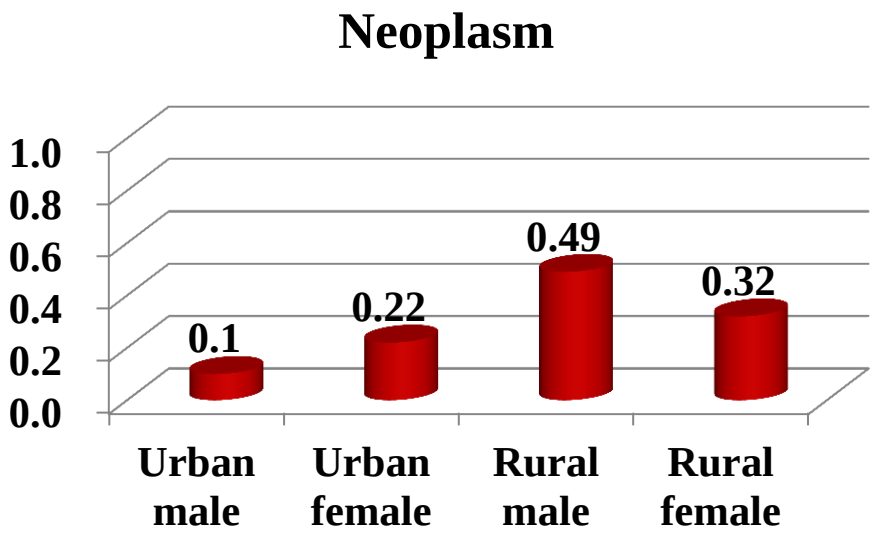
⇒ more space to improve in rural China

- Chinese government implemented projects to improve the living environment in rural area. (MOH, 2009)

  e.g. during 1993~2008, the prevalence of tap water increased by 20%, and the prevalence of unsanitary toilets decreased by 38%.

3.4 The urban-rural disparity

Compared with urban China, the negative impact of circulatory and neoplasm increased at a faster speed in rural China.



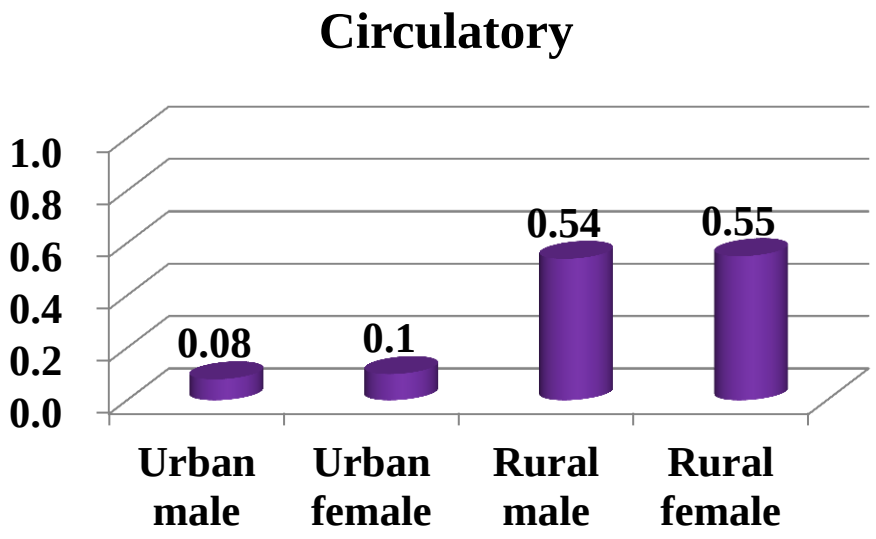


Figure 8. The contribution of neoplasm and circulatory diseases to the change of $DFLE_{60}$

3.4 The urban-rural disparity

Compared with urban area, the negative impact of circulatory and neoplasm increased at a faster speed in rural area.

-The rural residents also went through changes in life style.

-The health resource in rural China is relatively poor.

(Eggleston et al., 2008)

A pincer attack

3.4 The urban-rural disparity

Compared with urban area, t

neoplasm increased at a faste

the prevalence of hypertension increased by 3.4 times during 1993~2008, which is higher than that in urban area (1.6 times) (MOH, 2009)

-The rural residents also went through changes in life style.

-The health resource in rural China is relatively poor.

(Eggleston et al., 2008)

A pincer attack

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A pincer attack

Limitations

1. The measurement of disability

-Not measured with ADL/IADL, but primarily as impairments that caused difficulty in functioning (Jagger and Robine, 2011; Zheng et al., 2011)

-Consistent with the standard of Chinese disability certificate, one of the qualifying criteria for disability allowances (CDPF, 2008)

-Medical confirmation by physicians is more accurate than self-reported data.

2. The comparability of ICD-9 (1990) and ICD-10 (2006)

-Not only the way to group diseases, but also the rule to judge the cause of death (Anderson&Rosenberg, 2003; Janssen&Kunst, 2004)

-Analyses were carried out at the level of disease group---help to reduce the impact (Wang&Li, 2009)

3. The selection bias

-Some disabled persons may have died before the surveys.

-Old persons at1987 - birth before 1927; at 2006-birth before 1946

- Before 1949, wars, famines, and poor health conditions

Content

Conclusion

1. The $DFLE_{60}$ change is a combined influence of different diseases.

Push forward: the influence of diseases related to poor public health and living standard decreased

Pull back: the influence of diseases related to life style increased.

2. Health system needs to be adjusted to health transition in China.

e.g. health intervention to promote healthy life style

3. Health policy needs to be designed considering the different health pattern in urban and rural China.

Thanks!