Patterns of Elderly Life Expectancy in Three Chinese Cities: Hong Kong, Shanghai and Taipei

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Background

• Cardiovascular revolution resulted in the epidemiology transition from the third stage to the fourth stage
• Epidemiologic transition in some developing countries has occurred more rapidly
• To date, improvement in life expectancy has to rely almost on mortality decline at old age
Why study on Hong Kong, Shanghai, and Taipei?

• Enjoyed almost longest life expectancies
• Experienced a rapid economic development
• Under similar culture but different history and social and political institutions
Aims of the study

• Gain more understanding of mortality changes from major causes of death and their impacts on the improvement of life expectancy
• Discuss the effect of economic growth, and institutional factors especially health service systems on mortality changes
History, political structure, and evolution of health care institutions- Hong Kong

• Became a colony of the British Empire in 1842
• Has Different political system as mainland China
• Followed the British health care system, relatively equitable since 1970s (The Harvard Team 1999)
• Large subsidies in public sector institutions
• Was criticized for long waiting time
History, political structure, and evolution of health care institutions- Shanghai

• The largest and most prosperous city in the Far East during the 1930s
• Economy developed relatively slowly since 1949
• Started the massive development with privatization after Deng Xiaoping’s Southern Inspection in 1992
History, political structure, and evolution of health care institutions- Shanghai (con’t 1)

• The changes in health service system accompanied China’s economic reform shifting from planned to market economy. (Liu et al. 1999)
• Before 1980s, health insurance coverage was above 90% in urban China, almost obtained through employment. (Akin et al. 2004)
• From 1980s, a large portion of enterprises was unable to reimburse large medical bills for their employees and retirees, which created even greater financial hardships for the elderly with chronic diseases. (Hu et al. 1999; Liu et al. 2002)
• The proportion of the population covered by health insurance schemes significantly declined. (Gao et al. 2001)
• The poor who reported illness became less likely to obtain treatments. (Gao et al. 2001).
History, political structure, and evolution of health care institutions- Shanghai (con’t 2)

• Since 1996, hospital fees have been progressively supported by government social health programs instead of by employers in Shanghai.

• In 2001, the social health insurance system further covered outpatient expenditure.

• There is no compulsory referral system and patients can visit the specialist directly.
Annual number of hospital visits per person: Shanghai

Data Source: LGSS& SMBSPES 2009
History, political structure, and evolution of health care institutions - Taipei

• Taipei was colonized by Japan from 1895 to 1945, and then was assumed to control by KMT (Chinese Nationalist Party).

• KMT sought to expand health coverage and the scope of social welfare in order to prevent any potential political crisis since 1970s. (Chiang 1997; Ku 1997)

• The number of hospital beds almost doubled from 1970 to 1994 in Taiwan. (Chiang 1997)

• Health insurance coverage expanded since 1980s, particularly after the implementation of National Health Insurance Program (NHI) in 1995.
EXHIBIT 1
Insurance Coverage Expansion In Taiwan, Insured People As Percentage Of Population, 1950–2000

Percent

100

80

60

40

20

0

Labor Insurance (LI), 1950
Government Employee Insurance (GEI), 1958
Farmers Insurance (FI) Demonstration, 1985
FI, 1989
Before NHI implementation, 1995


NOTE: Taiwan’s National Health Insurance (NHI) was implemented in 1995.

Source: Lu and Hsiao (2003)
Economic growth, medical technologies, institutional factors and mortality decline

• Preston (1975): life expectancy has increased in most countries in 20th century, independently of changes in income. He credited education, better medical technology, vaccinations, improved provision of public health services, oral rehydration therapy and better nutrition with these exogenous improvements in health.

• Mckeown (1976): economic growth, especially, improved nutrition were responsible for the observed reduction in mortality from the mid-nineteenth century onward.
Economic growth, medical technologies, institutional factors and mortality decline (con’t 1)

- Easterlin (1999): without valid knowledge and technologies of the “health production function” relating life expectancy to real GDP per capital, resources allocated to the prevention or cure of disease were almost ineffective.

- In the era prevailing infectious diseases, institutional requirement is a public health network; the capital requirements mainly involved new public expenditures, and the labor requirements are medical personnel and homemakers educated in personal hygiene and household sanitation. (Easterlin 1999).

- What about the route of mortality changes in developing society with rapid economic growth when chronic diseases have become major cause-of-death in the areas?
Data and Methods

Date:
• Official mortality data and population denominator in Hong Kong (1976 -2007), Taipei and Shanghai (1974 -2007)

Methods:
• Arriaga’s decomposition method
Increase in life expectancy at age 65 (LE65)
Contributions of age and cause of death to changes in male LE65 (the mid-1970s~1996)
Contributions of age and cause of death to changes in female LE65 (the mid-1970s~1996)
Contributions of age and cause of death to changes in male LE65 (1996-2007)
Contributions of age and cause of death to changes in female LE65 (1996-2007)

- **Hong Kong**: (0.23 per year)
- **Shanghai**: (0.30 per year)
- **Taipei**: (0.19 per year)
Role of CVD in longevity using multiple cause of death in Shanghai (1996-2007)

Gain or losses (in years)

Age

U-CVD
U-diabetes with mention of CVD
Without mention of CVD

U-neoplasms with mention of CVD
U-others with mention of CVD

Gain or losses (in years)

<table>
<thead>
<tr>
<th>Age</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>-0.010</td>
<td>-0.020</td>
</tr>
<tr>
<td>70</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>75</td>
<td>0.010</td>
<td>0.020</td>
</tr>
<tr>
<td>80</td>
<td>0.020</td>
<td>0.030</td>
</tr>
<tr>
<td>85</td>
<td>0.030</td>
<td>0.040</td>
</tr>
</tbody>
</table>

U-CVD
U-diabetes with mention of CVD
U-neoplasms with mention of CVD
U-others with mention of CVD
Without mention of CVD
Discussion

• CVD was the principle contributor to increase in LE65 during the past three decades.
• But the remarkable decline in mortality from CVD in Shanghai began much later than in Hong Kong and Taipei.
• The decline in mortality from CVD was most impressive in Taipei.
• The journey of decline in mortality from CVD in these three cities was mainly driven by advancement of medical treatment and prevention
Discussion

• Major components of CVD: IHD (ischemic heart disease) and CBV (cerebrovascular disease).
• With economic development, the prevalence of IHD grew as the result of changes in diet and increase in obesity.
• CBV in Shanghai declined during mid-1970s to mid-1980s but stopped decline afterwards, coinciding with the deterioration of health care system and utilization in China. Thus, the annual medical office visit dropped. This led to increasing the risk of mortality from CBV because the control of hypertension as the primary risk factor of CBV and other preventive care decreased.
Discussion – is changes in life style a major contributor to mortality decline?

• Smoking
  – Low smoking rate among females
  – Smoking remained high among man in recent years in Shanghai and Taiwan (Wen et al. 2008; Xu et al. 2009)
  – Mortality from lung cancer increased in Taipei and Shanghai, though it at age 65-79 decreased in Hong Kong in recent years.

• Changes in diet
  – Increase in prevalence of obesity
• **Discoveries in the control of cardiovascular disease since 1950s**

• Technologies

• Hypertension treatments
  – Chlorothiazide 1958
  – Beta blockers 1962
  – Angiotensin converting enzyme (ACE) inhibitors 1977
  – Calcium channel blockers 1982

• Coronary revascularisation procedures
  – Coronary artery bypass grafts 1968
  – Coronary angioplasty 1977
  – Coronary stenting 1986
  – Drug eluting stents 2002

• Diagnosis of Cerebrovascular Disease
  – Computerised tomographic Scan 1971
Discussion – medical technologies

• CVD has been becoming a treatable disease since 1960s.
• The new technologies spread to cities few years later after invention, but the gap of “imported” timing of technologies was small across these three cities.
• The first coronary bypass grafts surgery was operated in 1977 in Hong Kong, in 1973 in Taipei, and in 1980 in Shanghai.
• The first Percutaneous Transluminal Coronary Angioplasty (PTCA) was performed in 1984 in Hong Kong, in 1983 in Taipei, and in 1984 in China (a bit later in Shanghai) respectively.
Discussion - economic growth

• Raised living standard and bettered living condition, contributing to save lives from CVD in extreme weather
• Increased health expenditure by both household and government
• However, the effect of health expenditure on the reduction of CVD mortality required both effective techniques and an effective and affordable health service system
Discussion – health service systems

- CVD needs long-term treatments.
- The poor are more vulnerable to mortality from CVD.
- Removing inequity of health care can save more life dying from CVD.
- In Hong Kong, equal access to essential health care but with long waiting time of public health system may deteriorate patients’ health status. However, CVD played the primary role to improve LE65 much early because of relatively equity health service since 1970s.
Discussion – health service systems (con’t 1)

• In Taiwan, after introducing NHI, life expectancy improved more for lower health ranking classes, and cardiovascular disease was the primary contributor to narrow health disparity (Wen et al. 2008).

• In Shanghai, the reform of health system in 1996 led to a significant increase in outpatient care utilizations among low socioeconomic groups; it also increased outpatient care utilizations but reduced the emergency care utilizations among the chronic patients (Liu et al. 2002).
Discussion – health service systems (con’t 2)

• Route of changes in health care systems in the three cities coincided with the decline in mortality from CVD in the three cities
  • Hong Kong: started earliest
  • Taipei: reduced largest
  • Shanghai: fell slowly before 1996, and even stagnated from the mid-1980s to 1996, and dropped dramatically after 1996
Discussion – competing risk from CVD and neoplasms

- Death from a given cause declined at some point in time, resulting in that at some ages the risk of dying from other causes will increase (Olshansky and Ault 1986).
- Mortality from neoplasms among the oldest-old produced the loss of LE65, coinciding with the remarkable decline in mortality from CVD.
- In Taipei, decline in mortality from CVD was most notable, and the increase in mortality from neoplasms was largest as well.
- The increase in mortality from neoplasms with CVD mentioned among rose in Taipei and Shanghai.
Concluding Remarks

• Increase in LE65 is independently correlated with rapid economic growth.

• Proper institutional requirements of health service systems will make resources allocated to the prevention or cure of disease more effective.

• Neoplasms has been replacing CVD as the primary cause of death.
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