**China Dementia Status 1997~2000**

A Huge Burden of Dementia

**Prevalence Study**

5 million patients with dementia in China, 1997-1998

- 71 urban and 99 rural communities
- 36,807 residence aged 55+ with 94% of respondents
- At least 6 months follow-up to confirm diagnosis after Screening and Preliminary Assessment

**Age-specific Prevalence of All Dementia in Four Regions of China compared with International Studies**
Age- and Sex-Specific Prevalence of AD in Four regions of China compared with Japan & Western Studies

Prevalence of AD, VaD and All D (per 100), for aged 65+ years in four regions of China, 1997

<table>
<thead>
<tr>
<th></th>
<th>AD</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># cases</td>
<td>%</td>
<td># cases</td>
<td>%</td>
<td># cases</td>
<td>%</td>
<td># cases</td>
<td>%</td>
</tr>
<tr>
<td>Men</td>
<td>Crude</td>
<td>210</td>
<td>2.2</td>
<td>118</td>
<td>1.2</td>
<td>377</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age-stand.</td>
<td>210</td>
<td>2.9</td>
<td>-</td>
<td>1.2</td>
<td>-</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SN Adj.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>Crude</td>
<td>493</td>
<td>4.6</td>
<td>118</td>
<td>1.1</td>
<td>651</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age-stand.</td>
<td>493</td>
<td>7.7</td>
<td>118</td>
<td>1.2</td>
<td>651</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SN Adj.</td>
<td>-</td>
<td>6.6</td>
<td>-</td>
<td>1.1</td>
<td>-</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Both sexes</td>
<td>Crude</td>
<td>703</td>
<td>3.5</td>
<td>236</td>
<td>1.1</td>
<td>1028</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age-stand.</td>
<td>703</td>
<td>8.9</td>
<td>236</td>
<td>1.3</td>
<td>1028</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SN Adj.</td>
<td>-</td>
<td>4.8</td>
<td>-</td>
<td>1.1</td>
<td>-</td>
<td>6.8</td>
<td></td>
</tr>
</tbody>
</table>

*Crude weighted for the sampling design; age-standardized to the 2000 US population; SN adj. (Screening negative) Correction for CMMSE sensitivity rates
**Worldwide Increase in Number of Dementia in WHO Region**

<table>
<thead>
<tr>
<th>Region</th>
<th>Pop(mil) Aged 60+</th>
<th>PR (%) Aged 60+</th>
<th>IR/1000 cases</th>
<th>No of New D cases (mil) 2001</th>
<th>No of D (mil) Aged 60+ 2001</th>
<th>% increase in N of D 2001-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>W Europe</td>
<td>89.6</td>
<td>5.4</td>
<td>8.8</td>
<td>0.79</td>
<td>4.9</td>
<td>43</td>
</tr>
<tr>
<td>E Europe(LM)</td>
<td>27.4</td>
<td>3.8</td>
<td>7.7</td>
<td>0.21</td>
<td>1.0</td>
<td>51</td>
</tr>
<tr>
<td>E Europe(HM)</td>
<td>44.6</td>
<td>3.9</td>
<td>8.1</td>
<td>0.36</td>
<td>1.8</td>
<td>31</td>
</tr>
<tr>
<td>N AM</td>
<td>53.1</td>
<td>6.4</td>
<td>10.5</td>
<td>0.56</td>
<td>3.4</td>
<td>49</td>
</tr>
<tr>
<td>China &amp; WP</td>
<td>151.1</td>
<td>4.0</td>
<td>8.0</td>
<td>1.21</td>
<td>6.0</td>
<td>96</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>616.2</strong></td>
<td><strong>3.9</strong></td>
<td><strong>7.5</strong></td>
<td><strong>4.6</strong></td>
<td><strong>24.3</strong></td>
<td><strong>74</strong></td>
</tr>
</tbody>
</table>

Lancet 2005, 366:2112-17

**Prevalence of Dementia, Stroke & PD**

Rocca, 2000 - EURODEM

**Estimates of Global Disease Burden for the 2003 World Health Report**

Contributed % of years lived with disability in people aged ≥ 60 years

- **Dementia** 11.2%
- Stroke 9.5%
- Musculoskeletal Disorders 8.9%
- Cardio-vascular Disease 5.0%
- All Forms of Cancer 2.4%

**Potential Impact of Interventions to Delay Onset of Alzheimer's Disease**

Prevalence of Parkinson’s Disease
for aged 55+ or 65+ in three regions of China, 1997

<table>
<thead>
<tr>
<th></th>
<th>Prevalence (55+)</th>
<th></th>
<th>Prevalence (65+)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#Cases  %</td>
<td>95%CI</td>
<td>#Cases  %</td>
<td>95%CI</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude Weighted</td>
<td>130  1.15</td>
<td>0.98 - 1.35</td>
<td>116  1.70</td>
<td>1.44 - 2.02</td>
</tr>
<tr>
<td>Age-stand. To China</td>
<td>1.04  0.87</td>
<td>1.23</td>
<td>1.74  1.46</td>
<td>2.04</td>
</tr>
<tr>
<td>Age-stand. To US</td>
<td>1.41  1.22</td>
<td>1.63</td>
<td>2.12  1.82</td>
<td>2.46</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude Weighted</td>
<td>147  1.00</td>
<td>0.86 - 1.17</td>
<td>137  1.64</td>
<td>1.40 - 1.92</td>
</tr>
<tr>
<td>Age-stand. To China</td>
<td>0.89  1.11</td>
<td>1.46</td>
<td>1.59  1.35</td>
<td>1.86</td>
</tr>
<tr>
<td>Age-stand. To US</td>
<td>1.27  0.75</td>
<td>1.05</td>
<td>1.98  1.71</td>
<td>2.23</td>
</tr>
<tr>
<td><strong>Both sexes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude Weighted</td>
<td>277  1.07</td>
<td>0.96 - 1.19</td>
<td>253  1.67</td>
<td>1.49 - 1.87</td>
</tr>
<tr>
<td>Age-stand. To China</td>
<td>0.96  0.85</td>
<td>1.08</td>
<td>1.66  1.48</td>
<td>1.86</td>
</tr>
<tr>
<td>Age-stand. To US</td>
<td>1.34  1.21</td>
<td>1.48</td>
<td>2.05  1.85</td>
<td>2.27</td>
</tr>
</tbody>
</table>

*age-standardized to the 2000 US population; age-standardized to the 1999 China population

Prevalence of PD in China with Comparison of community based survey in Europe

The number of people with PD for 15 most populous nations in the next 25 years (millions)

2005 (4.1 million) 2020 (8.7 million)

Europe 0.82 1.2
Russia 0.34 0.61
USA 0.95 1.23
Brazil & Nigeria 1.99 4.94
South & East Asia 0.58 1.23
China 0.17 0.34

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Russia 0.34 0.61
USA 0.95 1.23
Brazil & Nigeria 1.99 4.94
South & East Asia 0.58 1.23
China 0.17 0.34

China Dementia Status
1997~2000
A Great deal of Ignorance of Dementia

Lower Awareness, China 1998-99
key public health problem

Lower Diagnosis
Proportion of Seeing Doctor
by Severity of Dementia, 1998-1999

Of 93 to See Doctor, 25 cases (26.9%) were diagnosed as dementia
**Lower Treatment**

*Western Medicine Taken by patients, 1999*

- There is no standard treatment established
- AChEIs has only 2% patients share

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>31.6%</td>
</tr>
<tr>
<td>AChEIs</td>
<td>43.9%</td>
</tr>
<tr>
<td>Vitamin</td>
<td>6%</td>
</tr>
<tr>
<td>Antipsychotic</td>
<td>54.5%</td>
</tr>
<tr>
<td>Estrogens</td>
<td>64.9%</td>
</tr>
<tr>
<td>Neuroprotectants</td>
<td></td>
</tr>
<tr>
<td>Related to stroke</td>
<td></td>
</tr>
</tbody>
</table>

Reason: Not necessary 72%, Not efficacy 17.9%, Short of memory 12.3%, Refused 10.8%

**Low Awareness and Treatment for PD in 1997**

- 48% of the patients in the prevalence study were unaware they had the disease
- Unaware was more extreme in rural (68%) than in urban (37%)
- For urban, it was more extreme in developing area (Xian 71.4%) than in developed area (Shanghai 25.4%, Beijing 54%)
- 63% patients had not received treatment with L-dopa before the study


**National Mobilization To Face Challenge of China Alzheimer’s Disease 2001~2007**

Multidisciplinary, multi-strategy, and multilevel intervention for improvement of lower awareness, diagnosis and treatment

Action in China, 2001~2007

Clinician-centered

- To increase knowledge of clinicians
  - National training course, workshop, seminar, case-report
  - with pathological discussion...
  - International communication:
    - Harvard University, UCLA, UCSF, Lundbeck Institute
    - Cummings JL, Miliar BL, Doody RS, Roman GC, Emre M, Whitehorse LJ, Auriacombe S, Dubois B, Buitiek R, Auchus AP...

Scientific cutoff point for MMSE

Neuropsychological tests in diagnosis of dementia

The first step towards early detection

The Chinese medical journals and text books

Publications/Journals, Library, Internet resources

Scientific cutoff point for MMSE

Neuropsychological tests in diagnosis of dementia

The Chinese medical journals and text books

Publications/Journals, Library, Internet resources
**Probable AD**: A plus one or more supportive features B, C, D or E

A. **Presence of an early and significant episodic impairment**
   1. Gradual and progressive in memory impairment reported over 6 months
   2. Objective evidence of significantly impaired episodic memory on testing
   3. Be isolated with other cognitive changes at the onset of AD or as AD advances

B. **Presence of medial temporal lobe atrophy**
   - Volume loss of Hippocampus, entorhinal cortex, amygdala evidenced on MRI

C. **Abnormal cerebrospinal fluid biomarker**
   - Low Aβ1-42, increase total tau (t-tau), or phospho-tau (p-tau), or combination of the three
   - Other well validated markers to be discovered in the future

D. **Specific pattern on functional neuro-imaging with PET**
   - Reduced glucose metabolism in bilateral temporal parietal regions
   - Other well validated ligands, including those that foreseeably will emerge such as Pittsburgh compound B or FDDNP

E. **Proven AD autosomal dominant mutation within the immediate family**

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**Action in China, 2001~2007**

**Health Care and Education**

**Access to the health care professionals**
- 8 Centers of Dementia Clinic in China
- 40 Memory-special Outpatient Clinic
- Several medical and health-care organizations found
- Web site

**Health education to raise public awareness**
- ‘World AD Day’ annual activity since 2001
  - National mobilization (Policy makers, Experts) to face challenge
  - To set up open clinics in parks and communities to offer advice about dementia
  - To generate generic leaflet on dementia

**Multi media**
- TV, Radio, Newspaper
  - To publish guidelines and periodical for patient and care-giver

**List Dementia as a priority of disease prevention and treatment in mental health in 10-year government plan announce in 2002**

**Researches** supported by government and CMB
- The 9th 5-year national project, the 10th and 11th Projects
- The national 863 project for clinical and 973 project for basic
- Local government and other resources

**To plan policy and allocate health & welfare resources**
- Medical insurance: to cover more pharmacological treatments of dementia

**Government**

**Action in China, 2001~2007**

**Multicenter, Clinical Trial of Alzheimer’s Disease**

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Design</th>
<th>Sample</th>
<th>Indexes</th>
<th>Publication</th>
</tr>
</thead>
</table>
Parkinson Disease: Face to Greatest Burden

Neurologists and Government

Viewed as a major public health problem
- Chinese PD society fund in 2003
- Training programs: International and national
  - Conferences, Teaching courses, Lectures
  - Workshops, Case presentations and discussions, Video sessions
- Researches supported by grants from Chinese government
  - The 5th 5-year national project, the 10th and 11th Projects
  - The national 863 project for clinical and 973 project for basic
  - Local government and other resources
- Chinese medical journals and text books
  - Publications, Journals, Library, Internet resources

Health care and health education

Access to the health care professionals
- 37 Centers of PD in China
- 55 PD-special Outpatient Clinic
- 4 PD web site

Public health education
- PD Club for patients
- “World PD Day” activity since 2002
  - Policy makers, Experts
  - Mass media: TV, Radio, Newspaper
  - Periodical and handbook for patient and care-giver

Progress with China Dementia and Parkinson Disease Status 2001~2007

Improving public understanding
Early diagnosis and Intervention
Quality support: System, Service delivery, Medical insurance
% of Treated for AD Patients in China
by Seven Urban Areas From 2001 to 2007

Calendar Year: Mean % of Treated in Seven Regions (Total Number of AD Patients)
13.9% in 2001 and 20.6% in the year 2007

Of treated, 66.3% for Huperzine A
Estimates were Based on IMS DATA and AD Prevalence for ages 65+

PD: Status of Drug Therapies in Beijing in 2006 as compared with in 1999, by IMS report

PD Club
PD: Status of Drug Therapies in 7 cities of China in 2007

A hospital based 3-month clinical survey of PD was conducted in 42 hospitals randomized selected from 7 cities of China in early 2007.

Risk Factors of AD in China
Socio-demographic factor

Full-covariate adjustment: Age, Region (north/south), Gender, Residence (Urban/Rural)

Risk factors of AD in China
Chinese lifestyle and AD
- Smoke, Alcohol and Tea drinking
  - Regular tea drinking 1-3/mon Vs. <1/mon, (OR= 0.76)
  - Regular tea drinking 1/day Vs. <1/mon (OR= 0.43, p=0.001)
  - Smoking might reduce the risk of AD by itself (OR=0.51, p=0.005), and increase the risk of AD through the effect of vascular events (OR=1.27)

Genetics
- Candidate susceptibility genes and new mutation were reported in Chinese population


Against or Increase Risk of AD
Over the course of a lifetime
Peri-natal, Childhood Adolescence, and Adulthood
Socio-demographic, environment, lifestyle, co-morbidity and genetic
Fetal and life-course influences on Late-life Lower Cognition: Peking Union Medical College Hospital 1921-1954 Birth Cohort

- Abstracted 11,692 PUMC Hospital birth records for 1921-1954
- Traced and Followed-up 2,062 infants through ages 50-82, in 2003 to 2005
- Standardized examinations for health, cognition, and socio-environmental factors
- Brain CT/MRI, ECG, FPG, PBG, and measures of height and waist was used to assist diagnosis for all Participants

Late-life Lower Cognition and Perinatal Factors
1921-1954 PUMCH Birth Cohort (n = 1956)

<table>
<thead>
<tr>
<th>Non-Adjusted</th>
<th>Adj. Perinatal</th>
<th>Adj. Perinatal and Childhood</th>
<th>Adj. Full-life</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>OR (95%CI)</td>
<td>P</td>
<td>OR (95%CI)</td>
</tr>
<tr>
<td>Read Size</td>
<td>.001</td>
<td>.001</td>
<td>.002</td>
</tr>
<tr>
<td>Average (Ref.)</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Small &lt;1SD</td>
<td>1.4 (1.1-1.8)</td>
<td>1.4 (1.1-1.8)</td>
<td>1.3 (1.0-1.6)</td>
</tr>
<tr>
<td>Large ≥1SD</td>
<td>0.7 (0.5-0.9)</td>
<td>0.7 (0.5-0.9)</td>
<td>0.7 (0.5-0.9)</td>
</tr>
<tr>
<td>Gestational Age</td>
<td>.02</td>
<td>.02</td>
<td>.01</td>
</tr>
<tr>
<td>Average (Ref.)</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Small &lt;36</td>
<td>1.5 (1.1-2.1)</td>
<td>1.4 (1.0-1.8)</td>
<td>1.2 (0.9-1.6)</td>
</tr>
<tr>
<td>Large ≥42</td>
<td>0.7 (0.5-0.9)</td>
<td>0.7 (0.5-0.9)</td>
<td>0.7 (0.5-0.9)</td>
</tr>
</tbody>
</table>

* Cumulative logit model: Adjusted for sex, HC, Parity, PI, PW, MA, GA, father’s occupation and milk-drink daily in childhood.

Late-life Lower Cognition and Childhood Factors
1921-1954 PUMCH Birth Cohort (n = 1956)

Late-life Lower Cognition and Adulthood Factors
1921-1954 PUMCH Birth Cohort (n = 1956)
### Interaction Model for Impact of Low Cognition in late Life:
Father’s Occupation and Age
Education and Age

<table>
<thead>
<tr>
<th>Variables (N=1956)</th>
<th>$P$</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age$_{62-82}$ × Father’s Occupation</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Age$_{62-82}$ × Father’s Occupation (delay)</td>
<td>0.001</td>
<td>2.91 (1.53-5.53)</td>
</tr>
<tr>
<td>Education × age$_{62-82}$</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>Education$<em>{≥13}$ × age$</em>{62-82}$</td>
<td>0.007</td>
<td>0.43 (0.23-0.79)</td>
</tr>
<tr>
<td>Education$<em>{≥13}$ × age$</em>{62-82}$</td>
<td>0.02</td>
<td>0.55 (0.33-0.92)</td>
</tr>
</tbody>
</table>

### Conclusion
- A Huge Burden of Dementia and Parkinson Disease in China
- National mobilization to face challenge of China AD/PD, 2001–2007
  - Multidisciplinary, multi-strategy, and multilevel intervention
  - for improvement of lower awareness, diagnosis and treatment
- Success and insufficient intervention on China AD/PD
- Against or increase risk of AD
  - Cognition in mid-to late life is influenced by multi-factorial environmental factors over the lifespan, covered Peri-natal, Childhood, Adolescence, and Adulthood.
  - Socio-demographic, environment, lifestyle, co-morbidity and genetic
  - Nutrition and environmental factors during childhood and adolescence, such as milk-drinking and education, may have long-term cognitive impact in addition to illnesses more common in later life.