Prediabetes and Diabetes in China

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Diabetes

- A chronic disease affecting about 300 million people worldwide;
- Significantly increases mortality and contributes to the global disease burden;
- Controlling diabetes can reduce macro- and micro-vascular complications of the disease.
- China has a large number of the population living with diabetes.
This Study

Use nationally representative survey data from China to estimate

- Prevalence, diagnosis, and management of diabetes;
- Prevalence of prediabetes.
Data

China Health and Retirement Longitudinal Study (CHARLS)

- 2011-2012 national baseline;
- Nationally representative of the 45+;
- Household survey + Venous blood collection.
Sample

- 45 years and older;
- Completed questions regarding their medical history related to diabetes;
- Provided valid fasting plasma glucose;
- Provided whole blood for HbA1c levels.

N=10,008
Measures

Prediabetes

• No self-report of diagnosis
• Fasting plasma glucose level 100mg/dL - 125mg/dL (5.6mmol/L - 6.9mmol/L)
• HbA1c concentration 5.7% - 6.4%

Diabetes

• Self-report of diagnosis
• Fasting plasma glucose level $\geq 126$mg/dL ($\geq 7.0$mmol/L)
• HbA1c concentration $\geq 6.5\%$
Prevalence of Prediabetes and Diabetes
**Prevalence (%)**

- Normal: 40.7%
- Prediabetes: 41.9%
- Diabetes: 17.4%
- Undiagnosis: 10.3%

59.3% among diabetes

~ 60%

264.8m
Factors associated with being diabetic

Weighted logit regression model:

Associations with:
- Sociodemographic characteristics;
- Hukou and residency;
- Health indicators:
  - BMI, waist circumference, and total cholesterol.
Increases with Age

(Ref = 45-59)

Odds Ratios

- 60-69: 1.49
- 70-79: 1.51
- 80+: 1.89

Odds Ratios
Higher among Men
(Ref = Male)
Urban-Rural: Hukou/Residency

Hukou
Agricultural
Non-Agricultural

Residency
Rural/Rural
Rural/Urban
Urban/NC
Urban/C

Non-Coastal
Coastal
Higher for Urban Hukou
(Ref=Rural/Rural)

- Rural hukou/Urban residence
- Urban hukou/Non-coastal: 1.41
- Urban hukou/Coastal: 1.78

Odds Ratios: 1.00, 1.20, 1.40, 1.60, 1.80
Health Indicators

- BMI: 23.0-24.9
  - Odds Ratio: 1.44

- BMI: 25.0-29.9
  - Odds Ratio: 1.72

- BMI >= 30
  - Odds Ratio: 2.23

- Total Cholesterol >=240mg/dL
  - Odds Ratio: 1.78

- Waist circumference (M>=102cm, F>=88cm)
  - Odds Ratio: 1.77
Diagnosis, Management, and Education
Diabetes Diagnosis

The success of the recent efforts to improve health system in China.
Diabetes Treatment

No treatment: 24.4%
Chinese med without insulin: 8.7%
Western med without insulin: 59.2%
Insulin: 11.1%

3.4%
2.2%
Tests for Diabetes

<table>
<thead>
<tr>
<th>Test</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>15.9</td>
</tr>
<tr>
<td>Blood/Urine Glucose Test</td>
<td>82.3</td>
</tr>
<tr>
<td>Fundus Examination</td>
<td>21.0</td>
</tr>
<tr>
<td>Micro-albuminuria Test</td>
<td>19.2</td>
</tr>
</tbody>
</table>
Differentials in Diagnosis and Management
Among diabetics: Differentials in Diagnosis

- Age: 60-69: 1.52
- Age: 70-79
- Age: 80+: 0.08
- Female
- Illiterate
- Literate without schooling
- Primary school
- Log PCE: 2nd tertile
- Log PCE: Top tertile: 1.44
- Rural hukou/Urban residence
- Urban hukou/coastal: 2.41
- Urban hukou/non-coastal: 2.19
- Region: Coastal: 1.56
Diagnosis is more likely among individuals

- With urban hukou;
- In the top tertile of household per capita expenditure;
- Living in better-off coastal regions.
# Among diagnosed diabetics

## Recent Diagnosis

<table>
<thead>
<tr>
<th>Age (45-59)</th>
<th>Previous 5 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-69</td>
<td></td>
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<tr>
<td>70+</td>
<td>-</td>
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</table>

<table>
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<tr>
<th>Female</th>
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</table>

## Education (Junior school+)

- Illiterate
- Literate without schooling
- Primary school

## Log PCE (Bottom tertile)

- 2nd tertile
- Top tertile

## Urban-Rural (Rural/rural)

- Rural hukou/urban residence
- Urban hukou/non-coastal
- Urban hukou/coastal

## Coastal (Non-coastal)

- Targets people who were less likely to have been previous diagnosed:
  - -- low economic resource
  - -- rural households
# Among diagnosed diabetics

## Treatment

<table>
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<tr>
<th>Western Med/Insulin</th>
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<td>2nd tertile</td>
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<tr>
<td>Top tertile</td>
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| Coastal (Non-coastal)    |  |

**Top tertile:**
- Greater economic resource

**Urban, Coastal:**
- Better access to health care
### Among diagnosed diabetics

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<thead>
<tr>
<th>Test Blood/Urine Glucose Test</th>
<th>Health Info Weight Control, Exercise, Diet</th>
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<td>Urban, Coastal:</td>
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<tr>
<td>Illiterate</td>
<td>Better access to health care</td>
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<tr>
<td>Literate without schooling</td>
<td>Higher quality health care</td>
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Future Work

Since CHARLS is a longitudinal study, we can track changes over time.
Acknowledgements

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