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# **A Multi-Level Analysis of Urban Versus Rural Differences in Functional Status Transition Among Older Chinese**

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**Presentation at the annual meeting of REVES**

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# Socioeconomic characteristics and health

- ◆ Socioeconomic characteristics have turned out to be important for understanding health inequalities
- ◆ Mechanisms are complex and include: access to health service, behaviors, psycho-social characteristics, support mechanisms
- ◆ A growing literature is examining socioeconomic features of a community (Pickett and Pearl, 2001)
- ◆ Better 'endowed' communities thought to provide better resources, support mechanisms and healthier environments

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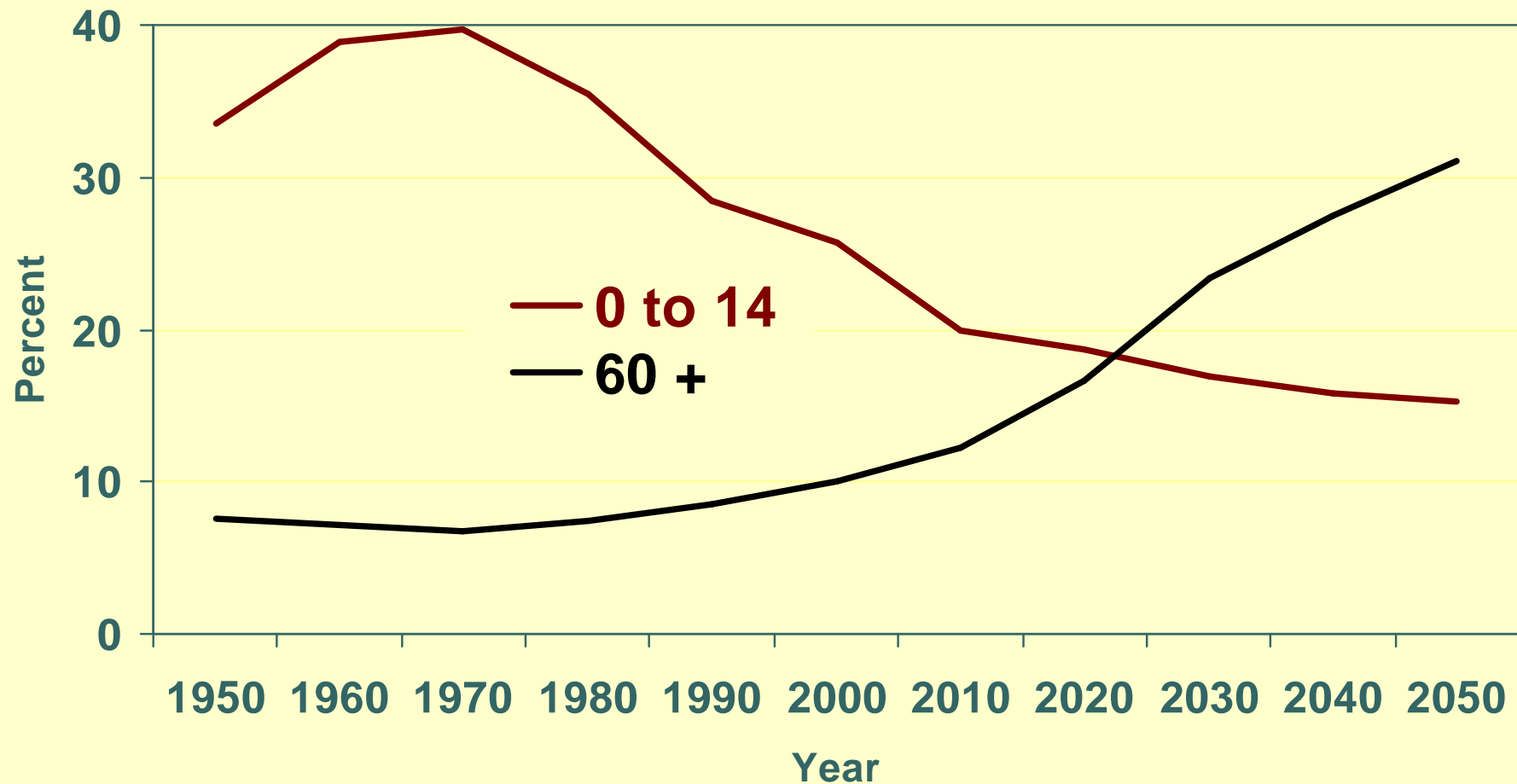
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# Chinese context (1)

◆ China's rapidly aging population generates needs for examining health determinants among the elderly

% aged 0 to 14 and 60+ in China, 1950-2050



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## Chinese context (2)

◆ At the same time, China's growing market economy is leading to widening inequalities across individuals and rural and urban areas (England 2005)

◆ Small amount of literature exists on individual SES characteristics and elderly health in China - almost nothing on community-level effects (Zimmer, Kaneda and Spess 2007).

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# Current study

- ◆ **Examine rural/urban differences in functional status transitions among elderly in China**
- ◆ **Assess whether individual and community level SES characteristics influence these differences**
- ◆ **Compare impacts of high individual SES versus high community SES on health outcomes**

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# China Health and Nutrition Survey\*

- ◆ Ongoing collaborative project between CPC at UNC, NINFS and CCDCP
- ◆ Household level survey
- ◆ Covers nine Chinese provinces
- ◆ Current study uses two most recent waves:  
Baseline: 2004 Follow-up: 2006
- ◆ Current study limited to individuals aged 55+

\* <http://www.cpc.unc.edu/projects/china>

# Current subsample

\* 71 Urban communities, N= 1,094

\* 144 Rural communities, N= 1,931

Baseline (2004)

Follow-up (2006)

N = 3,025

2581 Reinterviews

86 Deaths

358 Loss to follow-ups

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# Measuring functional status at baseline

Has at least one of the following difficulties:

- ◆ Walking 200 meters
- ◆ Standing up after sitting
- ◆ Climbing a few steps without pause
- ◆ Lifting a 5 k.g. bag
- ◆ Squatting, kneeling or bending

# Percent with specific functional limitations at baseline by residence

Limitation	Rural	Urban
Walking 200 meters	12.2	12.8
Standing up after sitting	26.5	22.5**
Climbing a few steps without pause	29.5	25.6**
Lifting a 5 k.g. bag	32.4	30.9
Squatting, kneeling or bending	35.2	30.9**
At least one limitation	42.1	40.5

\*\*\* p < .01 \*\* p < .05 \* p < .10

Note: Significance indicates urban significantly different from rural

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# ● Measuring functional status transitions

● Baseline

● Follow-up

● No limitation

● No limitation

● Has limitation

● Has limitation

● Does not survive

# Follow-up distribution for those without limitation at baseline by residence

<u>Baseline</u>	<u>Follow-up</u>	Rural <u>(N=1017)</u>	Urban <u>(N=572)</u>
No limitation	No limitation	65.6	72.7
	Has limitation	33.0	26.0
	Does not survive	1.4	1.2

$X^2 = 8.66^{***}$



# Follow-up distribution for those with limitation at baseline by residence

<u>Baseline</u>	<u>Follow-up</u>	Rural <u>(N=708)</u>	Urban <u>(N=361)</u>
Has limitation	No limitation →	27.4	33.5
	Has limitation →	66.1	61.5
	Does not survive →	6.5	5.0

$X^2 = 4.73^*$

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# Urban elders have different socioeconomic characteristics than rural elders

Individual characteristics	Rural	Urban
% more than primary education	21.9	39.1***
% with health insurance	4.7	19.9**
% with cadre status	1.7	6.9***
Mean wealth score	-1.72	+2.77***

\*\*\* p < .01   \*\* p < .05   \* p < .10

# Urban communities have different socioeconomic and demographic characteristics than rural communities

Community characteristics	Rural	Urban
Amenities (range from 0 to 12)	6.37	9.07***
Number doctors (logged)	3.34	5.09***
Number health facilities	2.03	2.83***
Average wage (normal worker in Yuan)	23.6	24.5
Population (in 1,000)	4.14	6.74*

\*\*\* p < .01 \*\* p < .05 \* p < .10

# Hierarchical linear modeling: HLM 6.02



**Rural/urban**



**Baseline characteristics**



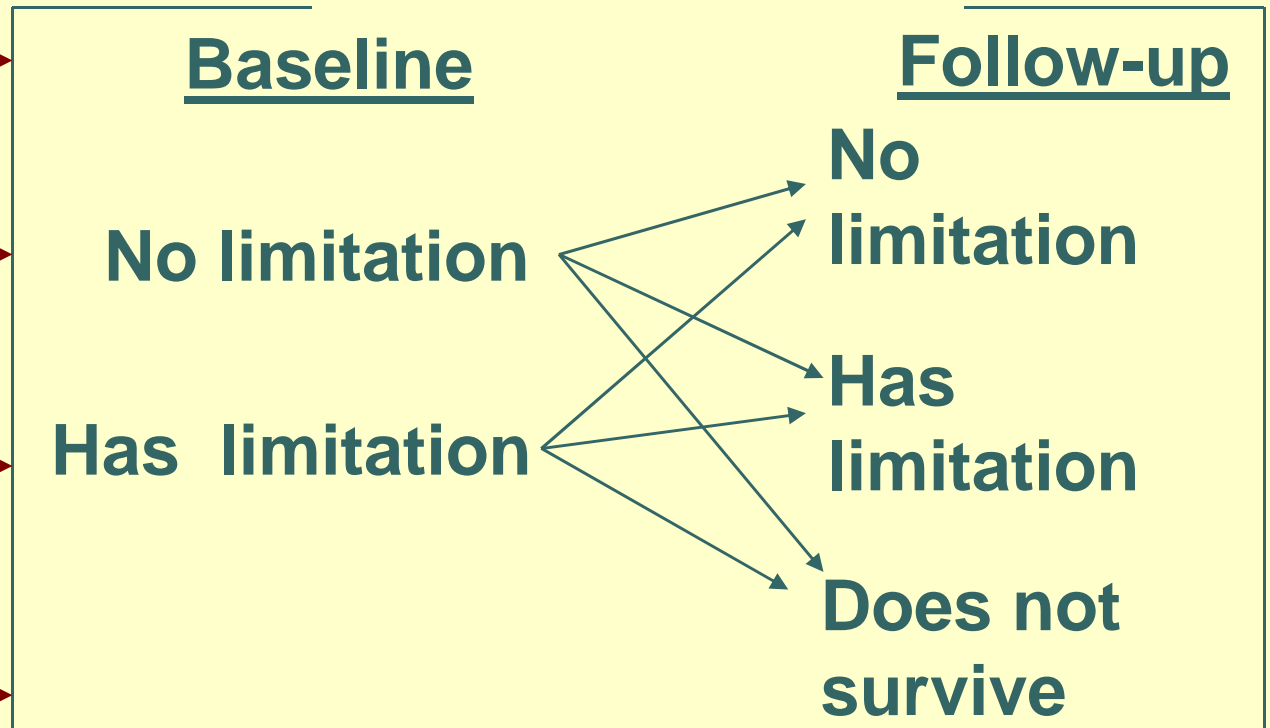
**Individual SES**



**Other community characteristics,**



**characteristics,**



# HLM Results: Rural residence coefficients across models

Model	Controls	Limitation at follow-up <sup>1</sup>	Did not survive to follow up <sup>1</sup>
1	Age, sex, married, baseline functional status	<b>+.437***</b>	<b>+.489**</b>
2	Model 1 + individual characteristics	<b>+.307**</b>	<b>+.412</b>
3	Model 1 + community characteristics	<b>+.412***</b>	<b>+.383</b>
4	Model 1 + individual + community characteristics	<b>+.317***</b>	<b>+.358</b>

\*\*\* p < .01   \*\* p < .05   \* p < .10

1 In contrast to not having a limitation at follow up. Missing response at follow-up considered as a fourth outcome.

# HLM Results: Individual-level coefficients (model 4)

Variable	Limitation at follow-up <sup>1</sup>	Did not survive to follow up <sup>1</sup>
Wealth index	<b>-.157**</b>	<b>+.206</b>
Primary education (vs. none)	<b>.039</b>	<b>-.239</b>
More than primary education (vs. none)	<b>.063</b>	<b>-.507</b>
Has insurance (vs. not)	<b>.043</b>	<b>-.568**</b>
Is a cadre (vs. not)	<b>-.190</b>	<b>-.714</b>

\*\*\* p < .01 \*\* p < .05 \* p < .10

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# HLM Results: Community-level coefficients (model 4)

Variable	Limitation at follow-up <sup>1</sup>	Did not survive to follow up <sup>1</sup>
Number amenities	<b>+.022</b>	<b>+.003</b>
Number doctors (logged)	<b>+.023</b>	<b>-.020</b>
Number health facilities	<b>-.052</b>	<b>-.037</b>
Average wage	<b>+.244</b>	<b>-.395</b>
Population size	<b>-.017***</b>	<b>-.023</b>

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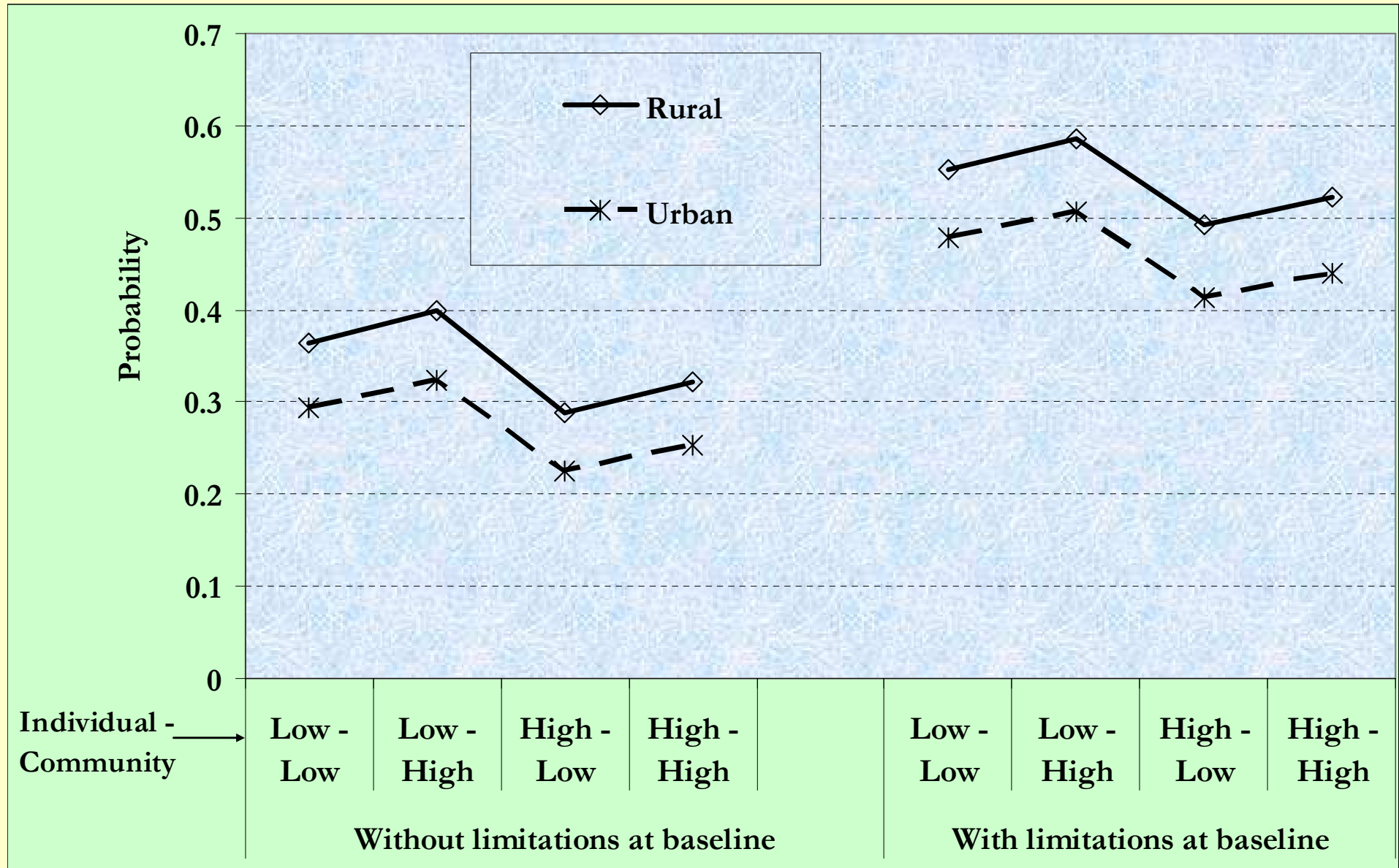
# Defining parameters for simulation

SES level	Individual characteristics	Community characteristics
Low	No education No insurance Not a cadre Wealth 1 s-unit below mean	All measures 1 s-unit below mean
High	More than primary education Has insurance Is a cadre Wealth 1 s-unit above mean	All measures 1 s-unit above mean

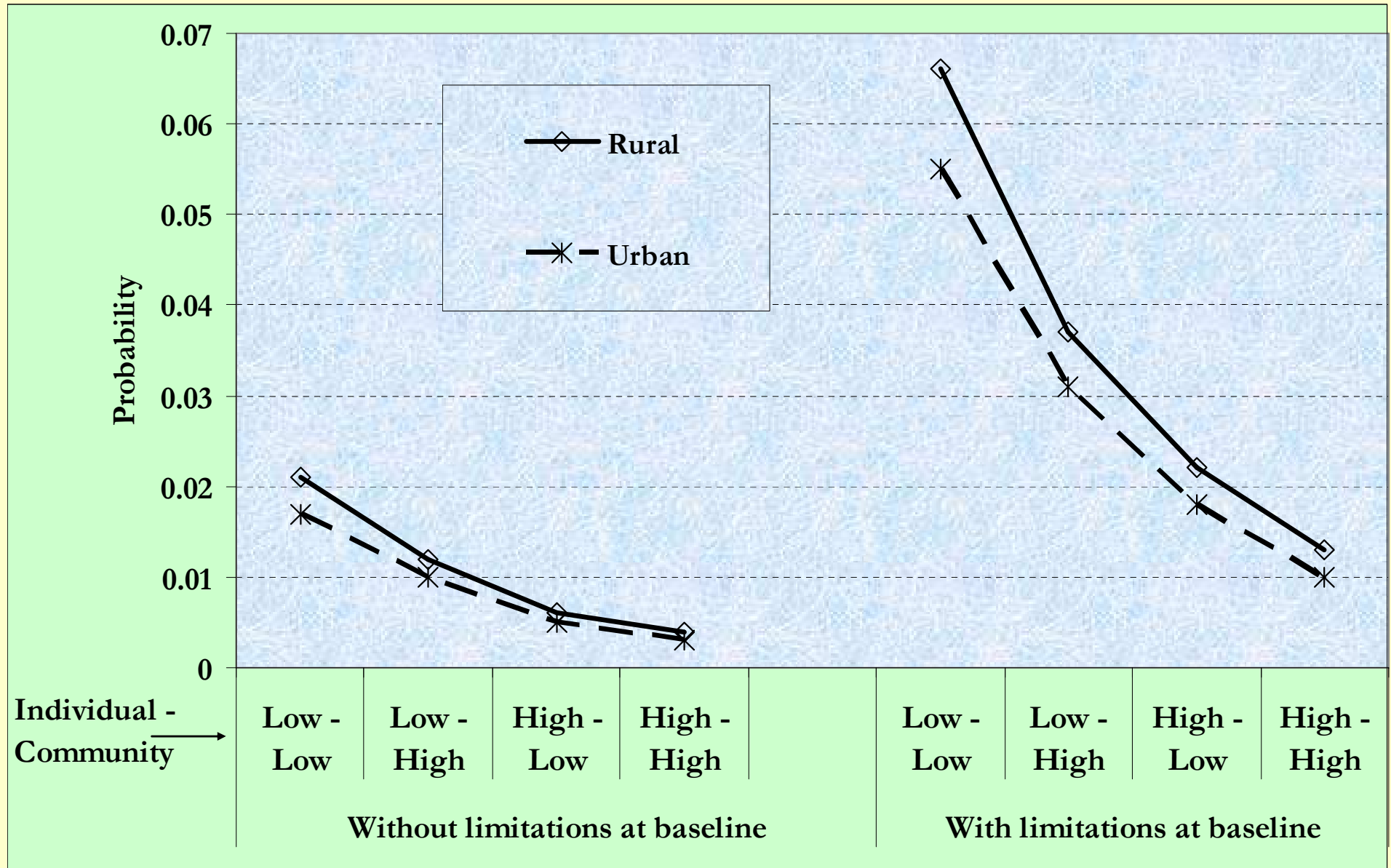
All other variables evaluated at their mean.



# Predicted probability of having a limitation at follow-up



# Predicted probability of not surviving to follow-up



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# Conclusion

- ◆ Rural residence has strong negative impact on health; effect does not go away with controls included in current study
- ◆ Mixed socioeconomic effects on transitions; effects on mortality more robust than on functional limitation
- ◆ Individual characteristics more important than community for limitations, but combination is important for survival
- ◆ It is better to live in a wealthy household and have health insurance than live in a rich community

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# Limitations and future analyses

- ◆ Relatively small N's (esp. mortality)
- ◆ Two years between observations
- ◆ Many community level characteristics are unmeasured, e.g., environmental, health care quality
- ◆ Study limited to functional limitations; ADLs and IADLs may lead to different results
- ◆ Intra-urban and intra-rural differences may be important
- ◆ Thus far, not easy to convert multi-level effects into healthy-life expectancies.

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Thank-you

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