

# Rural/Urban Variation in Mortality in China

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# Introduction

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Economic development in China is accompanied by a widening of the urban/rural gap

# Current Study

Studies show an urban advantage in mortality in China  
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- **Individuals**
- **Communities**



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- ```
graph LR; A["- higher socioeconomic status  
- superior access to health service"] --> B[Individuals]; C["- better endowed communities  
- greater availability of service"] --> D[Communities];
```

## Questions:

1. Is there an urban mortality advantage among the 50 and older population in China?
2. To what extent can this be accounted for by socioeconomic and health service characteristics that differentiate people and communities?

# China Health and Nutrition Survey (CHNS)

- \* Multi-wave survey (1989, 1991, 1993, 1997, 2000)
- \* 9 Provinces: Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning, Shandong
- \* Household survey: Collects information on individuals
- \* Community survey: Collects information about the community

# CHNS Episodes

| Interval     | N             | Survived     | Moved      | Died       | Unknown      |
|--------------|---------------|--------------|------------|------------|--------------|
| 1989 → 1991  | 2,799         | 2,435        | 105        | 109        | 150          |
| 1991 → 1993  | 2,742         | 2,351        | 52         | 131        | 208          |
| 1993 → 1997  | 2,708         | 1,826        | 104        | 185        | 593          |
| 1997 → 2001  | 3,190         | 2,464        | 129        | 153        | 444          |
| <b>Total</b> | <b>11,439</b> | <b>9,076</b> | <b>390</b> | <b>578</b> | <b>1,395</b> |

# Methods

1. Calculate Age-Specific Mortality Rates by residence

2. Cox Proportional Hazards Models

(survival time = months)

i. Base (U/R residence + Age + Sex)

ii. Single covariates (Base + 1 covariate)

iii. All covariates (Base + all covariates)

iv. Parsimonious model

(Base + statistically important covariates)

# Covariates

## Individual level

Education

Occupation

Cadre status

Has health insurance

# Covariates

## Individual level

## Community level

Education

# amenities\*

Occupation

Average wage

Cadre status

Number health facilities

Has health insurance

Distance from center of  
community to nearest facility

# Covariates

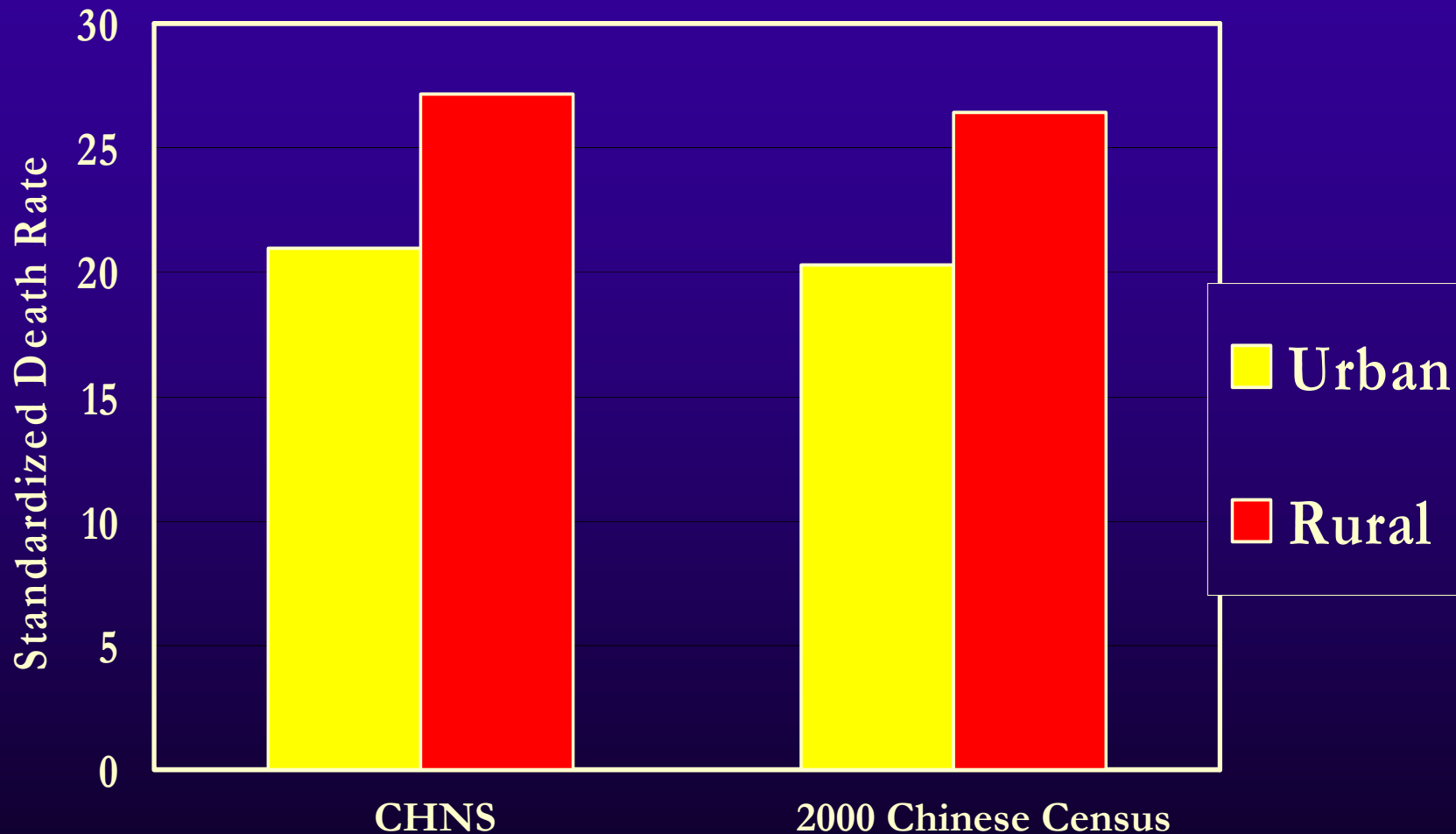
## Individual level

## Community level

|                      |                                                       |
|----------------------|-------------------------------------------------------|
| Education            | # amenities*                                          |
| Occupation           | Average wage                                          |
| Cadre status         | Number health facilities                              |
| Has health insurance | Distance from center of community to nearest facility |

\* Telegraph, Telephone, Post office, Electricity,  
Paved roads, Movie theatre, Newspaper

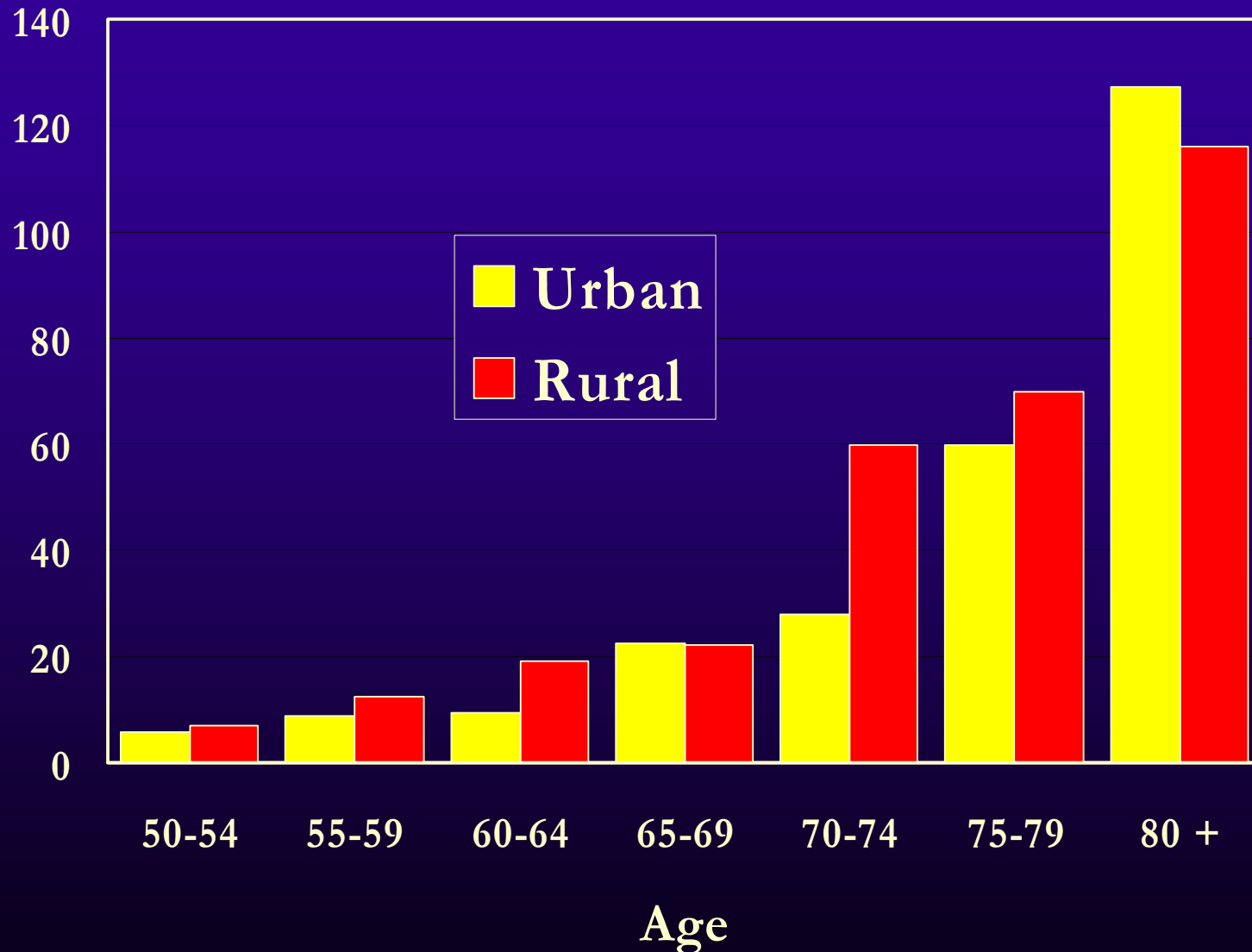
# Standardized Death Rates Per 1,000 Persons\*



\* Standardized for age and sex distribution of the 2000 Chinese Census



# CHNS: Age-Specific Death Rates



# Cox Model Hazard Ratios for Dying

|                 | Base     |
|-----------------|----------|
| Rural residence | 1.30**   |
| Age             |          |
| 55-59           | 1.40*    |
| 60-64           | 1.77***  |
| 65-69           | 3.69***  |
| 70-74           | 5.49***  |
| 75-79           | 9.40***  |
| 80 +            | 17.55*** |
| Male            | 1.46***  |

# Single Covariate Significance

## Individual Level

|             |             |
|-------------|-------------|
| Occupation  | <b>-ve</b>  |
| Cadre Stats | <b>-ve</b>  |
| Insurance   | <b>-ve</b>  |
| Education   | <b>n.s.</b> |

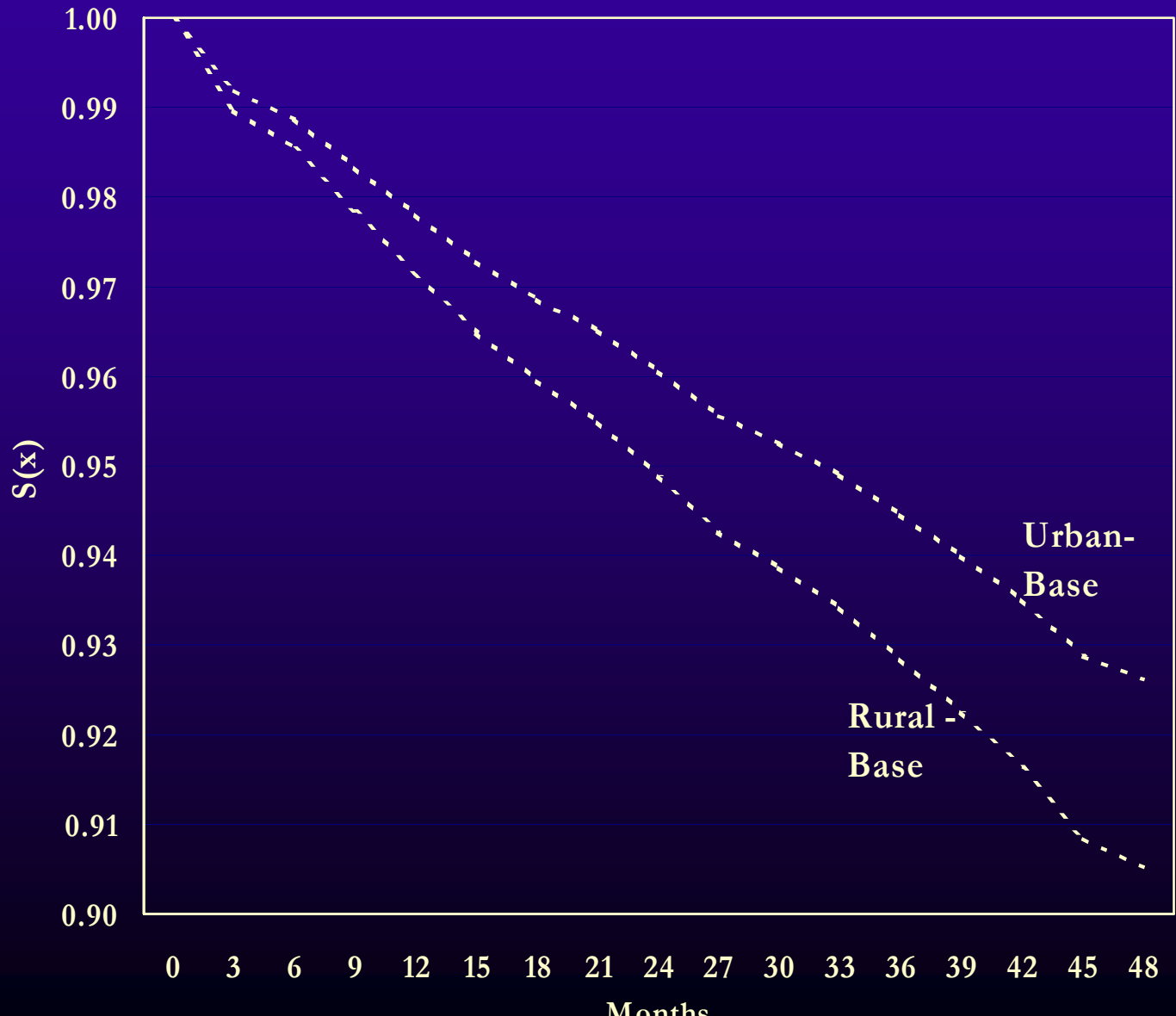
## Community Level

|                     |             |
|---------------------|-------------|
| Number amenities    | <b>-ve</b>  |
| Log average wage    | <b>n.s.</b> |
| Number facilities   | <b>n.s.</b> |
| Distance facilities | <b>n.s.</b> |

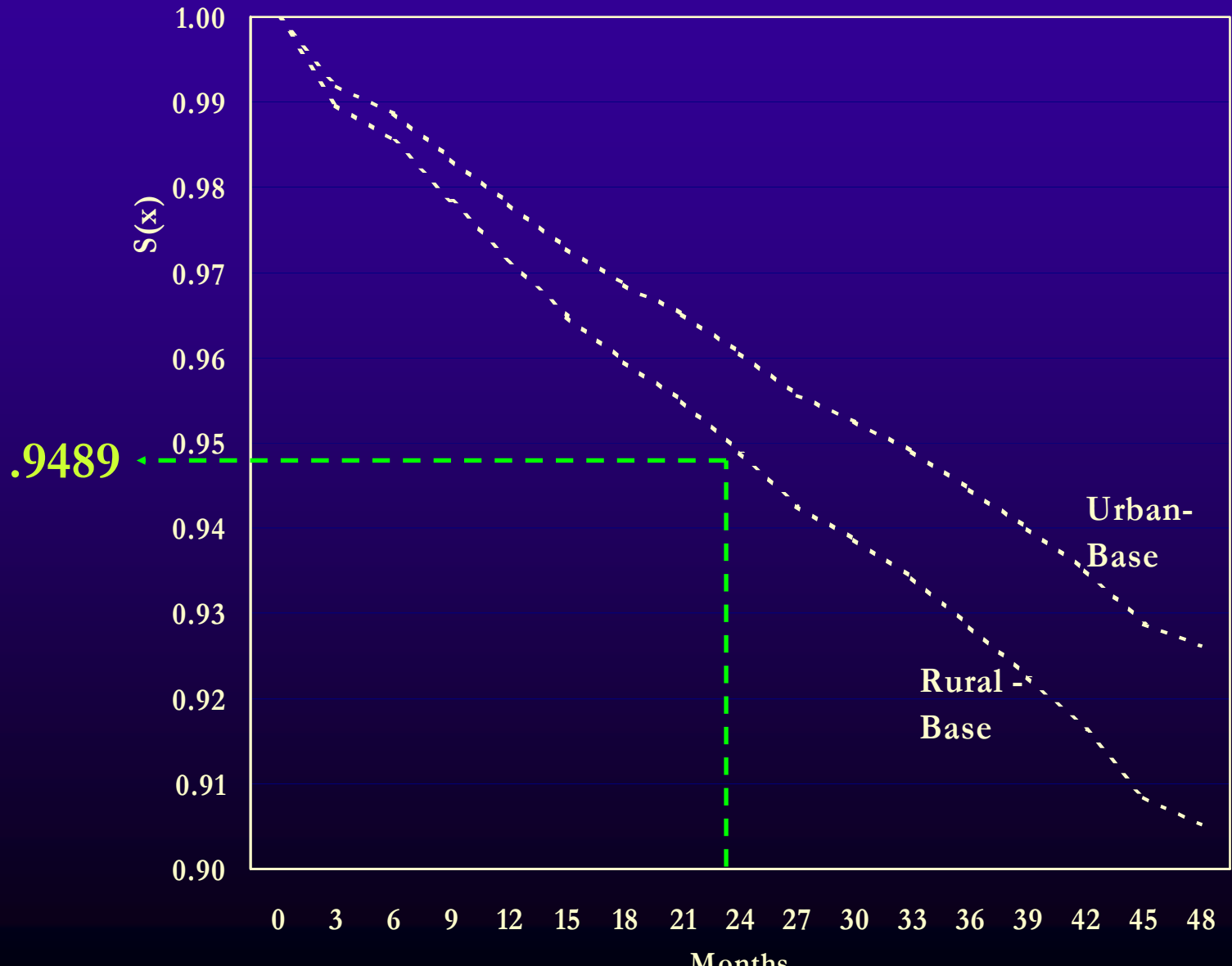
# Cox Model Hazard Ratios for Dying

|                           | Base     | Parsimonious |
|---------------------------|----------|--------------|
| Rural residence           | 1.30**   | 1.18*        |
| Age                       |          |              |
| 55-59                     | 1.40*    | 1.41*        |
| 60-64                     | 1.77***  | 1.79***      |
| 65-69                     | 3.69***  | 3.72***      |
| 70-74                     | 5.49***  | 5.45***      |
| 75-79                     | 9.40***  | 9.26***      |
| 80 +                      | 17.55*** | 17.24***     |
| Male                      | 1.46***  | 1.50***      |
| Is a cadre                |          | 0.41**       |
| Number medical facilities |          | 0.95***      |
| $\Delta$ -2LL from base   |          | 14.3***      |

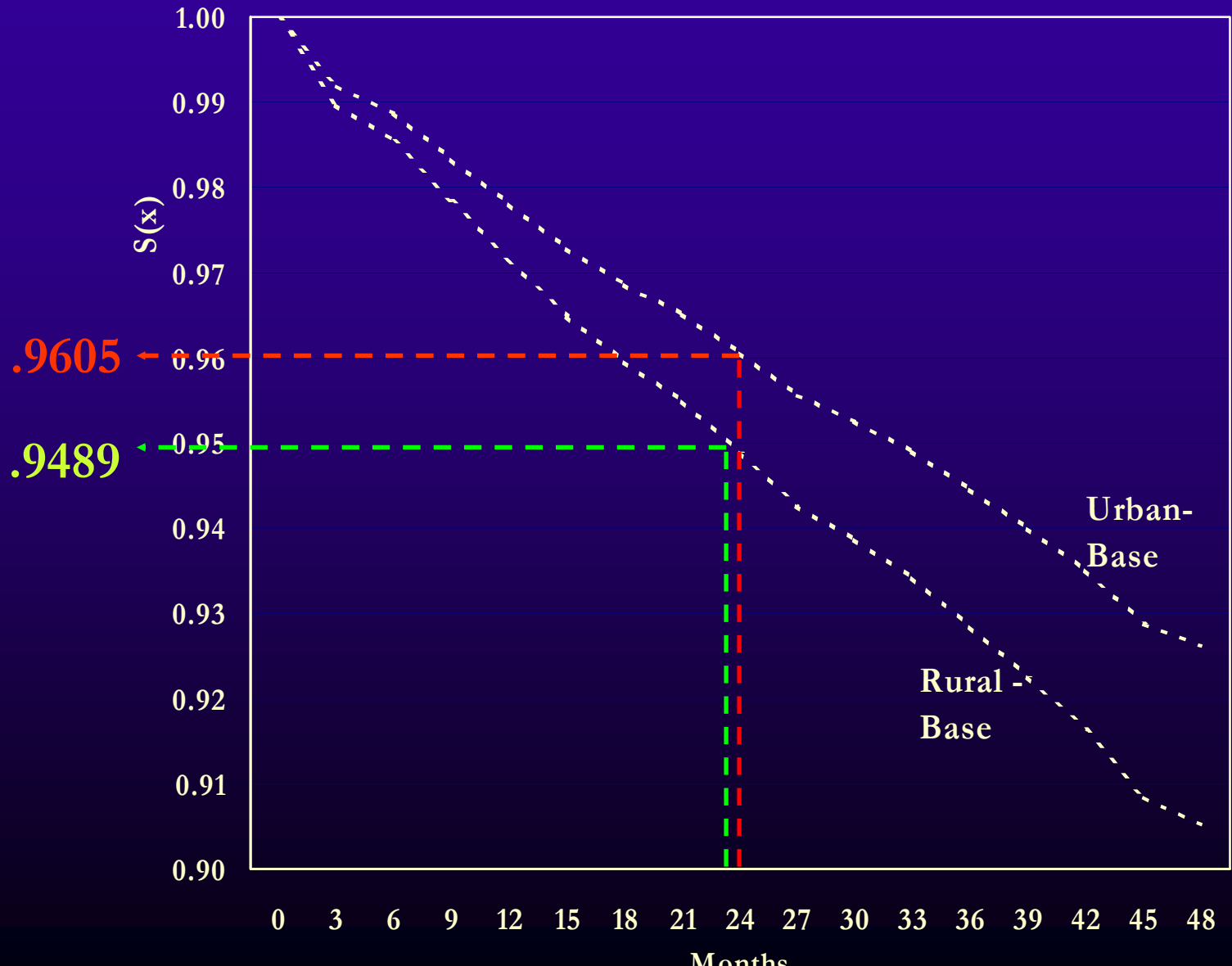
# Underlying Survival Curve for 65-69 Year Old Woman



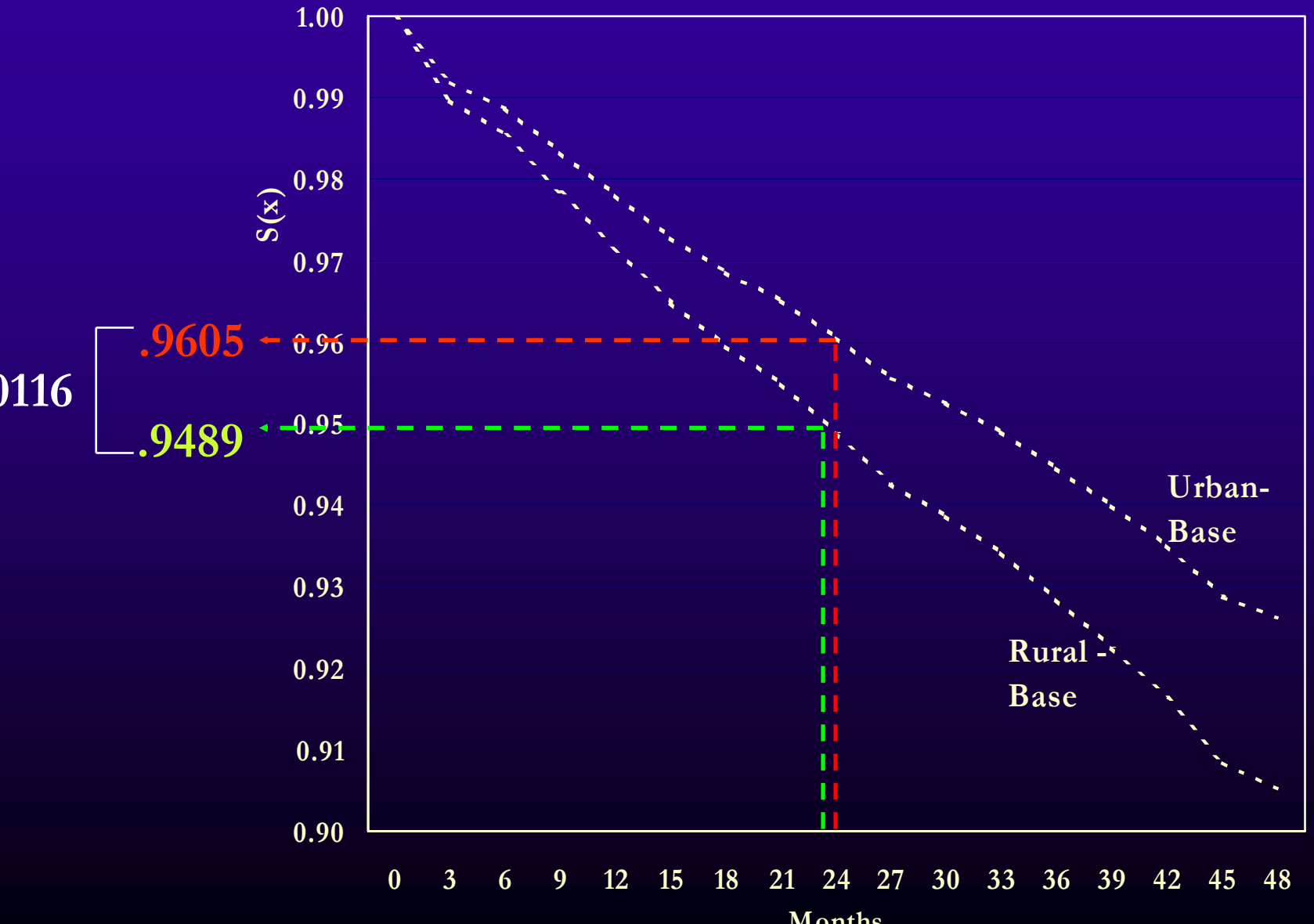
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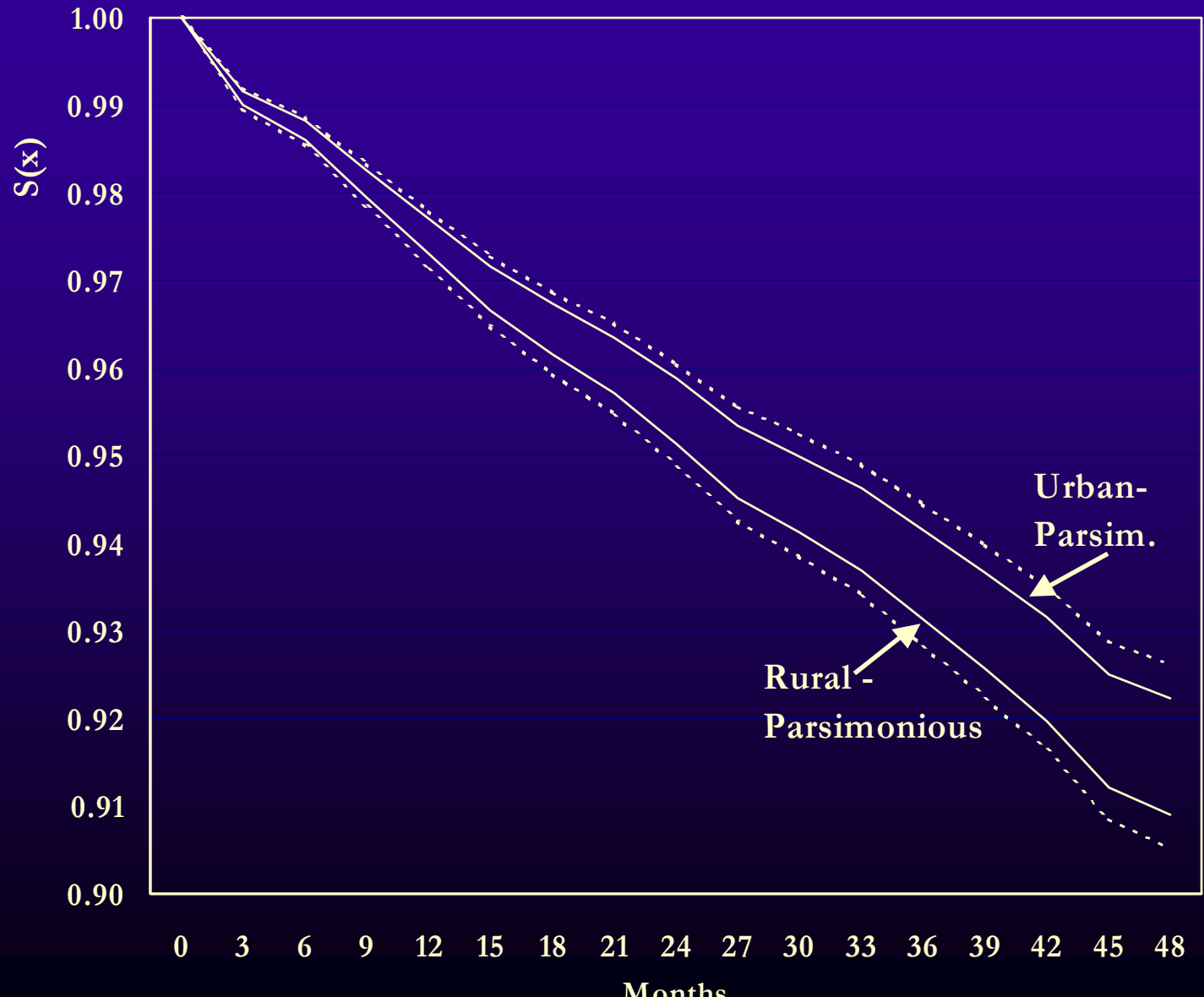


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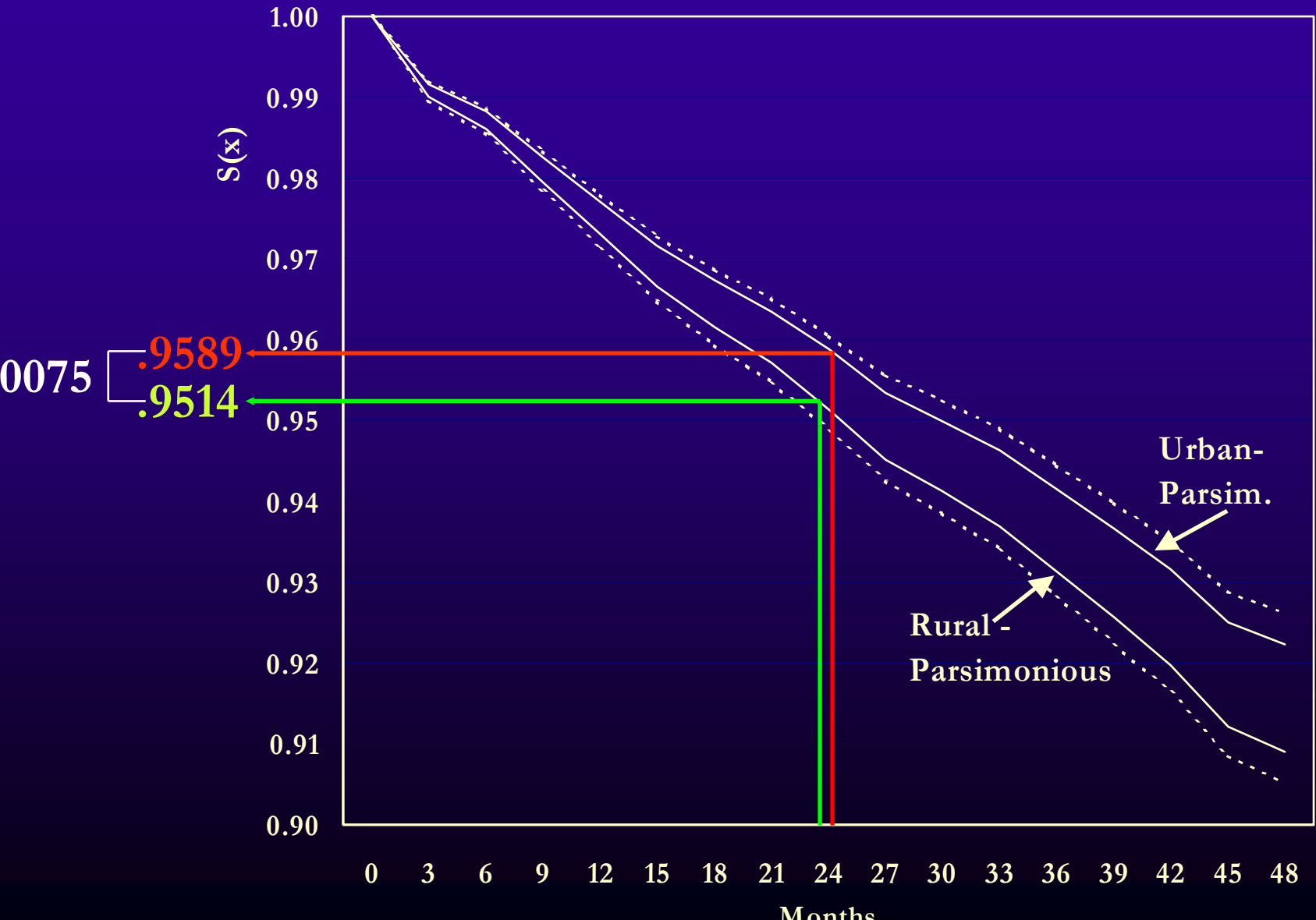




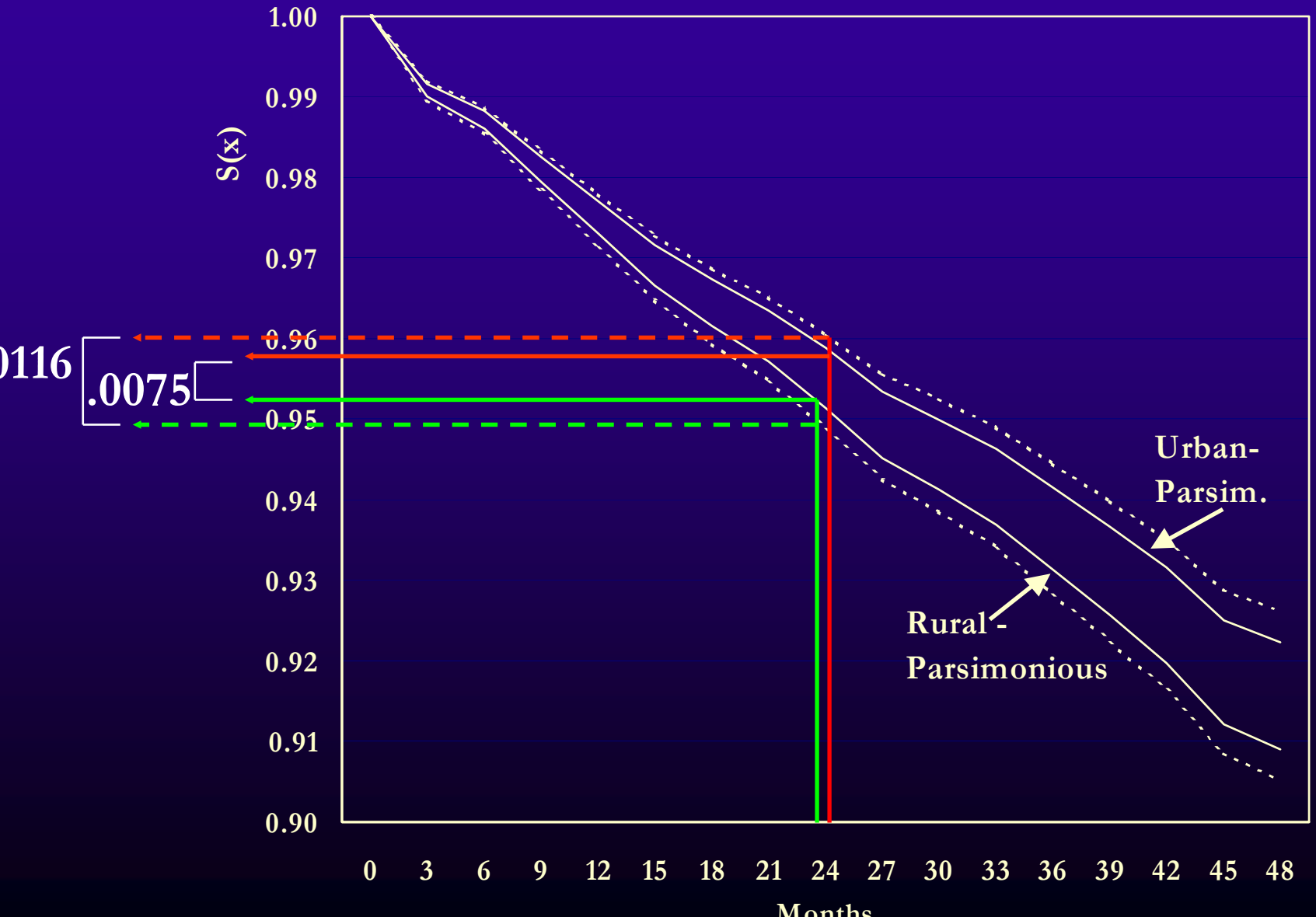
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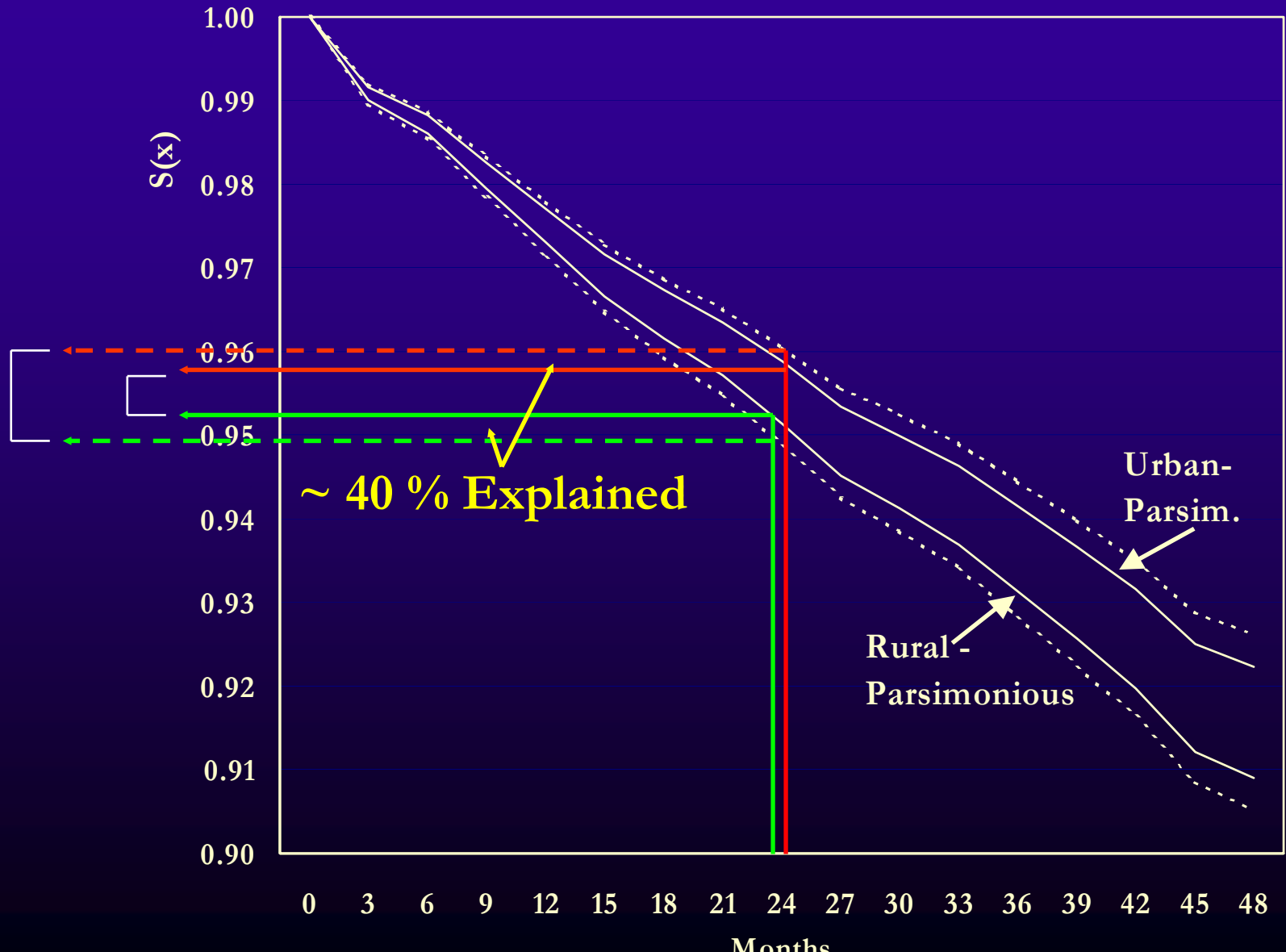
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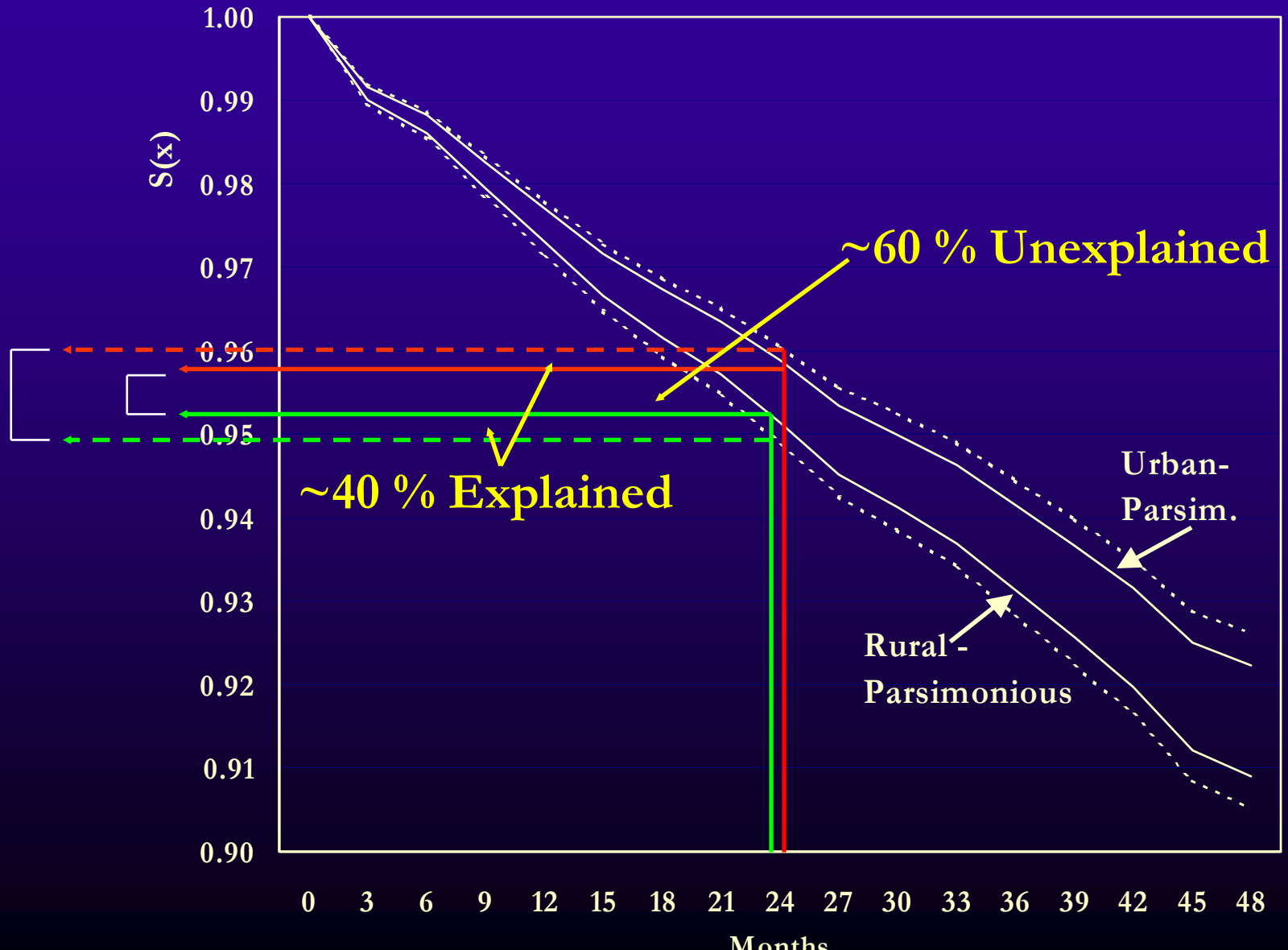
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# Hazard Ratios for Single Amenities\*

| <u>Amenity</u> | <u>Hazard Ratio</u> |
|----------------|---------------------|
| Telegraph      | 0.82                |
| Electricity    | 0.84                |
| Telephone      | 0.85                |
| Paved roads    | 0.89                |
| Post office    | 0.95                |
| Movie theatre  | 0.96                |
| Newspaper      | 1.00                |

\* Adjusting for age and sex

# Conclusion

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We find a baseline 30% higher mortality in rural China



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Two characteristics explain ~40% of the advantage:

1. Cadre status

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Two characteristics explain almost 40% of the advantage:

1. Cadre status
2. Community amenities (infrastructure)

↳ Telegraph, Telephone, Electricity, Paved roads

**Thank-you**

**Dank u**

**谢谢**