Health Expectancy: Software Overview

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Methods of Computing Health Expectancy

- Prevalence-Based (Sullivan) Method (1971)
- Double Decrement Life Table Method (1983)

  Multistate Life Table Method (1989)

  Grade of Membership (GoM) Approach (1991)

  The Global Burden of Disease Approach (1992)
  - DALY, DALE, HALE

  Microsimulation Method (1995)

  Bayesian Approach (around 2000)

Prevalence-Based (Sullivan) Method

Daniel F. Sullivan

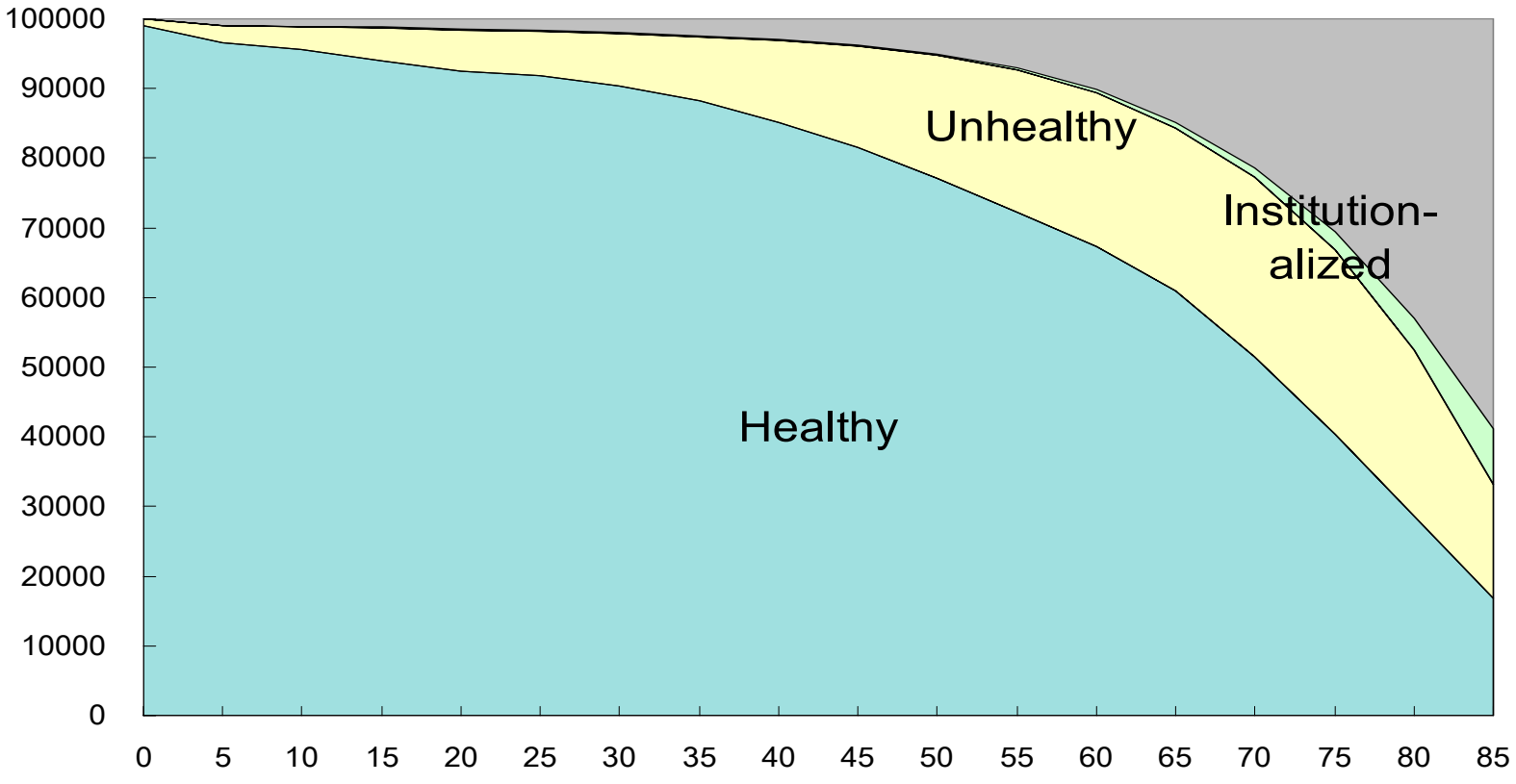
1966: "Conceptual Problems in Developing an Index of Health"

1971: "A Single Index of Mortality and Morbidity"

Data: Life Table, Prevalence Rates, Institutionalization Rates

- easy to calculate and collect data
- applied by many countries to compute health expectancy

Depiction of Method



Prevalence-Based (Sullivan) Method

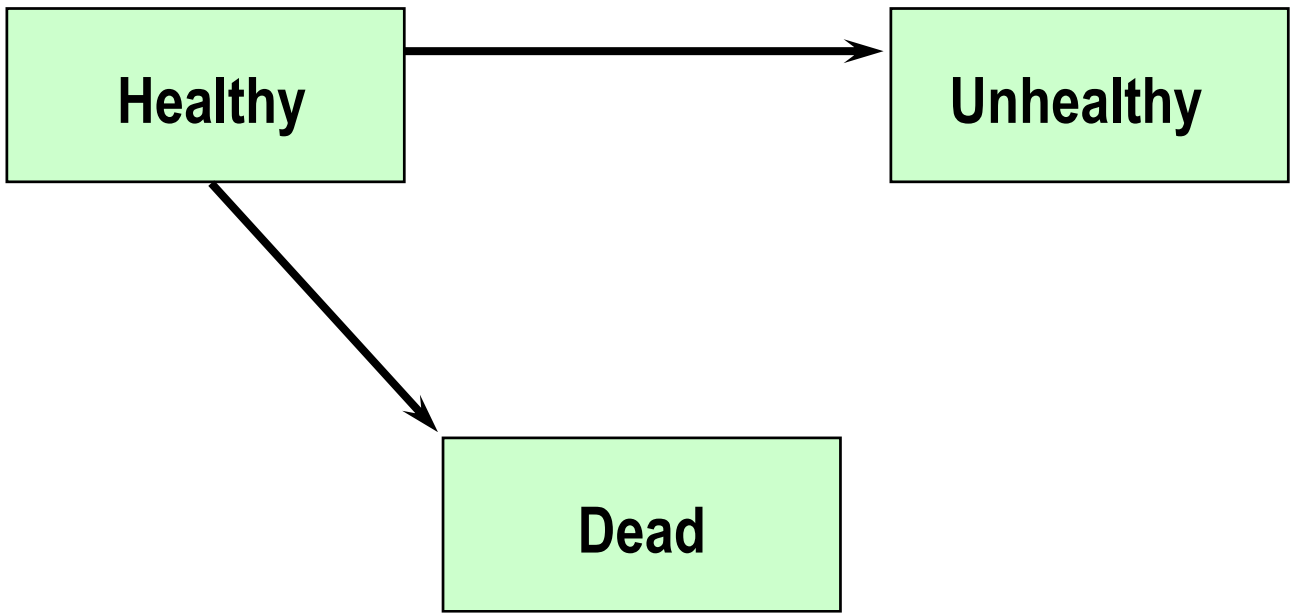
- www.reves.net

↰ Manual for computing health expectancy and **confidence interval** (Carol Jagger)

- Decomposition
  - *Demographic Research* 2002.7.14. 499-522
  - Wilma Nusselder (by request)

Double Decrement Life Table Method

Katz et al. (1983) -- Active Life using ADL



Multistate Life Table Method

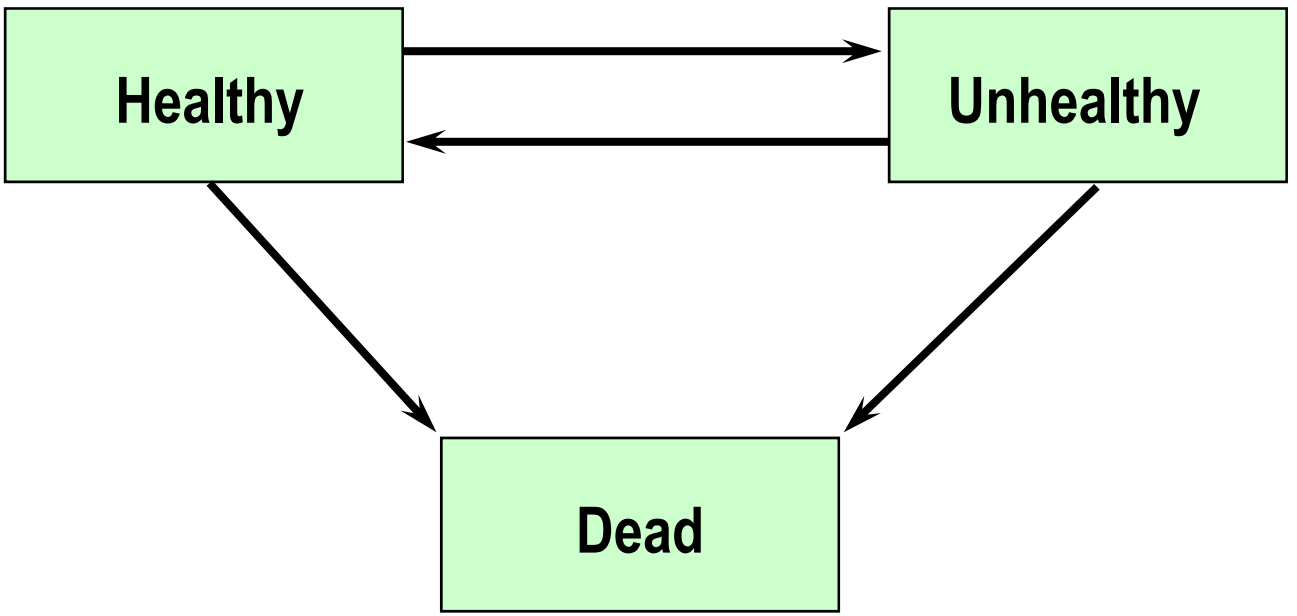
Method existed but applied to Health Expectancy Research by

Rogers A., Rogers R., Branch (1989)

Rogers R., Rogers A., Belanger (1989)

Rogers A., Rogers R., Belanger (1990)

Multistate Life Table Method



Multistate Life Table Method

- Population-Based Method
  - only age is a variable
  - only one radix but need to distribute it by health states at the beginning of the age range
- Status-Based Method
  - age and health status are variables
  - can compute life table as many as the number of health states employed

Available Programs to Compute Multistate Life Table

- IMaCh by Nicolas Bruard and Agnes Lievre at INED
- STATA Program by Margaret M. Weden
- SAS-based SPACE (Stochastic Population Analysis for Complex Events) program by Cai and colleagues
- By R

IMaCh

- Input: q
- Available at (Version 0.98i for PC): reves.site.ined.fr/en/resources/computation_online/imach/
- IMaCh computes most of statistics we want.
- Estimation method of transition probabilities is based on the work by Laditka and Wolf presented in 1995 REVES meeting and published in 1998
- Mac version 0.98j is now available
- CDC Vital and Health Statistics: series 2 no. 146

STATA Program

- Input: q
- Available at: www.ssc.wisc.edu/~mweden/
- 3 programs
  - Create data set for analyses
  - Estimate transition probability based on multinomial logistic regression model
  - Construct multi-state life tables
- Status-based

SPACE

- Input: m or q
- Available by request but will be available through internet soon from Nihon Univ. web site

By R

- Fiona Matthews
- SURVEYLIFE
  - Exploratory transition data analysis with R by Frans Willekens at NIDI

GoM Method

Grade of Membership (fuzzy reasoning)

K. G. Manton and E. Stallard (1991)

K. G. Manton, E. Stallard, and K. Liu (1993)

DSISOFT.Com (DSIGOM Beta Version 1.01)

Global Burden of Disease Approach

Global Burden of Disease Study: 1992

World Bank and World Health Organization

Christopher J.L. Murray and Alan D. Lopez

- ***Bull WHO***. 72. 1994
- ***Science***. 274. 1996
- ***The Global Burden of Disease****: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. 1996

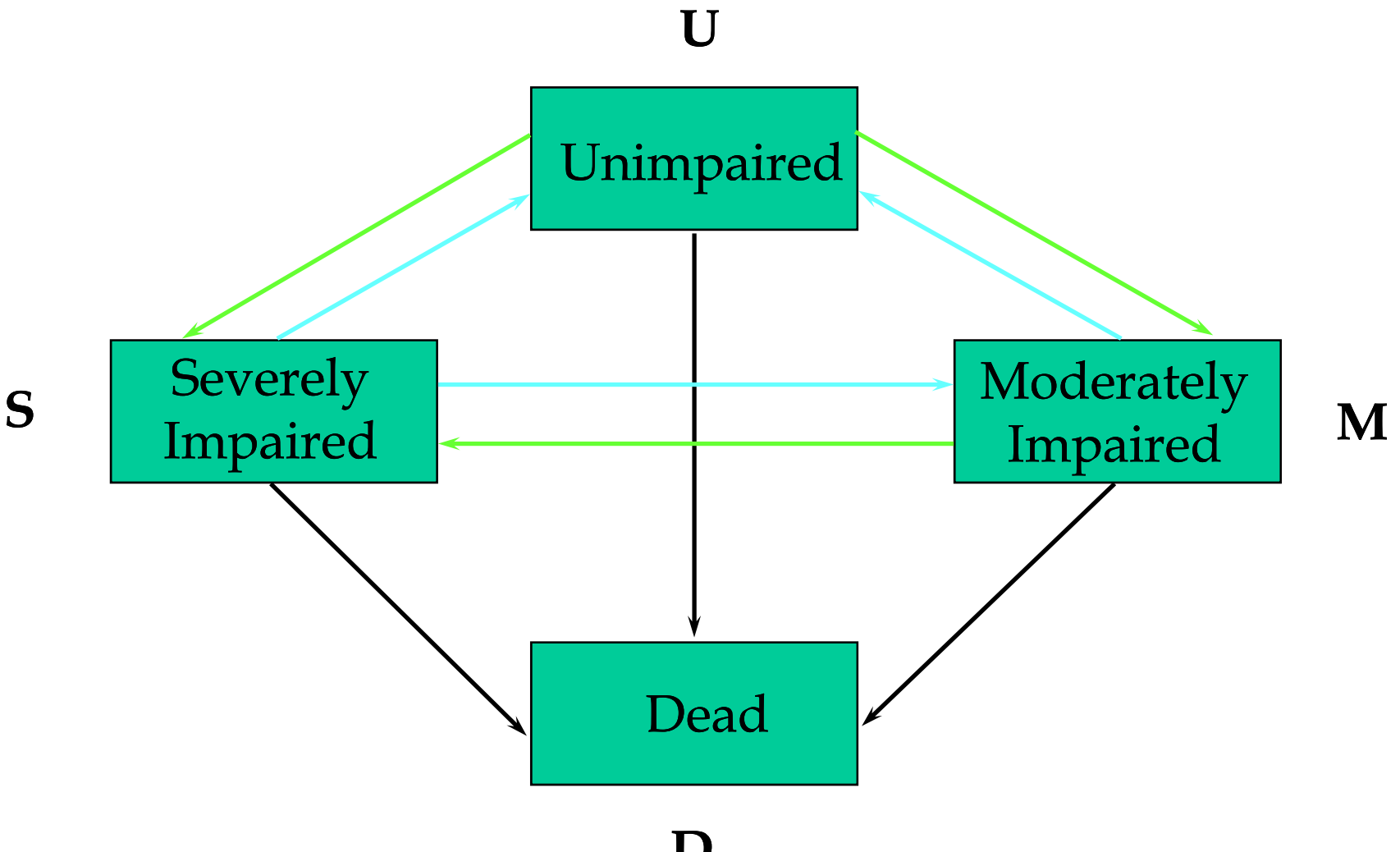
Microsimulation Method

Laditka and Wolf (1995)

Wolf and Laditka (1996)

- 4 levels of health status by ADL
- estimate monthly transition probabilities among health states
- simulate life of 100,000 70 years or older by sex until they die

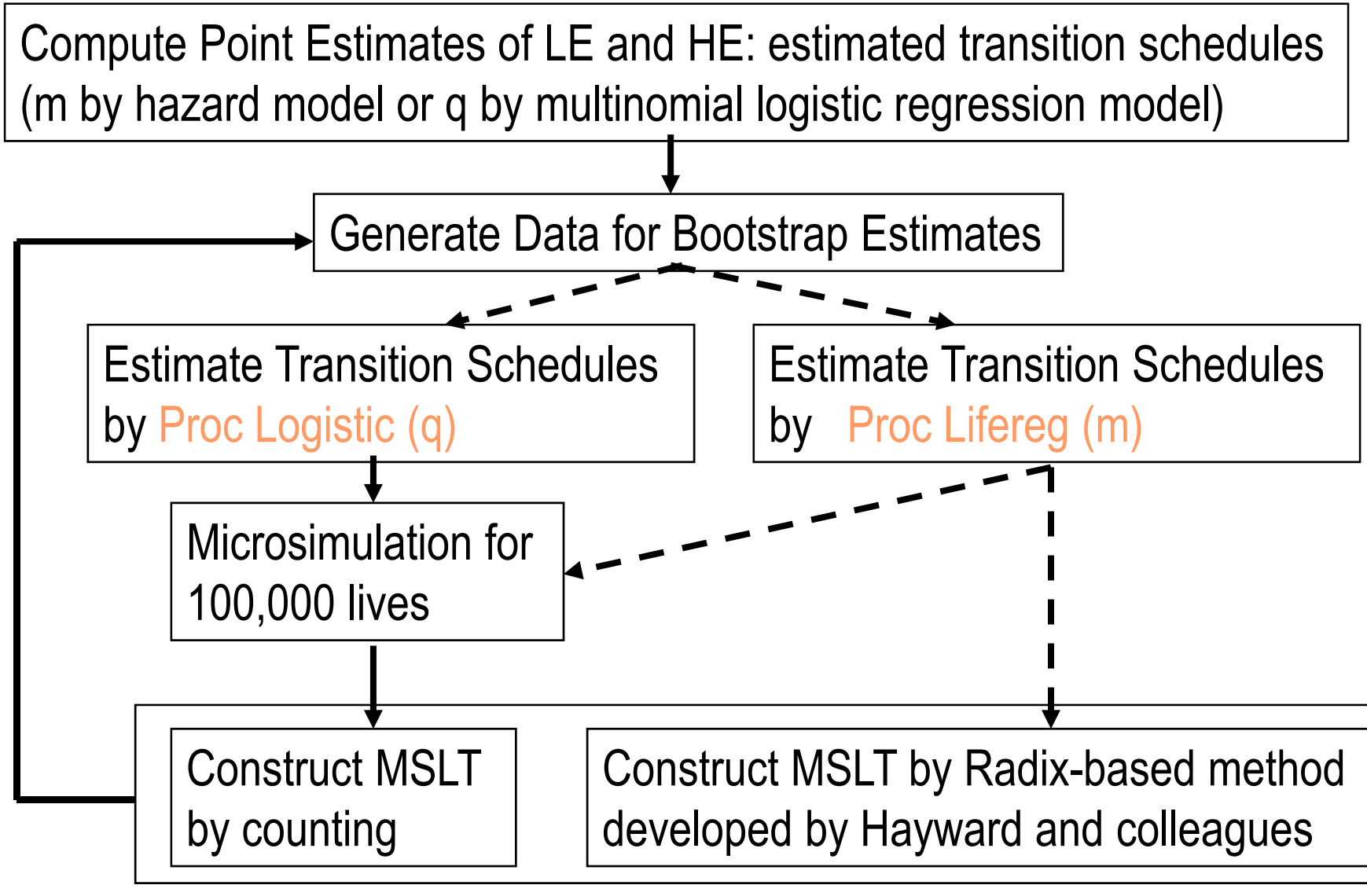
Microsimulation Method



Microsimulation Method

	70.0	70.1	70.2	70.3	---	---
1	U	U	U	U	U	U
2	U	U	U	M	M	S
3	S	S	S	D	-	-
4	M	M	M	M	U	S

SPACE


Compute Point Estimates of LE and HE: estimated transition schedules (m by hazard model or q by multinomial logistic regression model)
Generate Data for Bootstrap Estimates
Estimate Transition Schedules by Proc Logistic (q)
Estimate Transition Schedules by Proc Lifereg (m)
Microsimulation for 100,000 lives
Construct MSLT by counting
Construct MSLT by Radix-based method developed by Hayward and colleagues

Bayesian Approach

- Gibbs Sampler for Multistate Life Tables Software (GSMLT v.90): www.reves.net
  - Scott M. Lynch and J. Scott Brown (2005)
- Lynch, Scott M. and J. Scott Brown. “A New Approach to Estimating LifeTables with Covariates and Constructing Interval Estimates of Life Table Quantities.” *Sociological Methodology*.

Harmonization in Method

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