

Changes in Active Life Expectancy by Race and Education between 1984-2000



Aaron Hagedorn
May 15, 2007

Reves 19

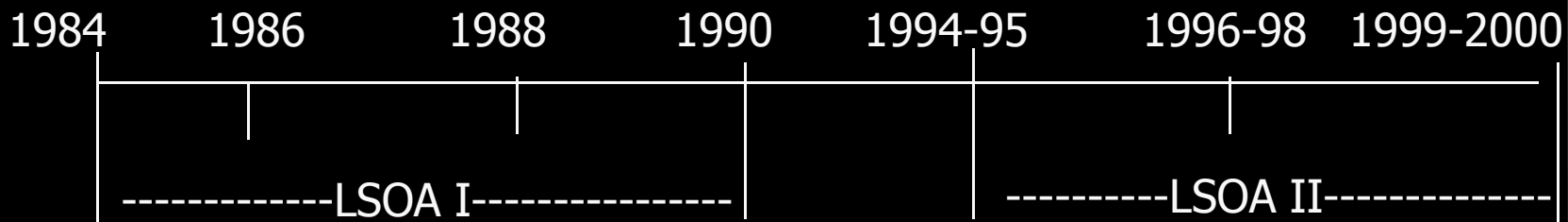
Is longer life expectancy accompanied by improvements in health, or extensions of life spent with morbidity ?

- **an expansion of morbidity (Gruenberg, 1977, 1980; Kramer, 1980),**
- **compression of morbidity (Fries, 1980; Fries & Crapo, 1981),**
- **dynamic equilibrium theory (Manton, 1982) predicting parallel changes in morbidity and mortality.**

Data

U.S. Longitudinal Study of Aging I & II

- Conducted by the U.S. National Center for Health Statistics
- LSOA I - 4 waves - 1984-1990; centered at 1987
- LSOA II - 3 waves - 1994-2000; centered at 1997
- Nationally representative population 70+
- Cases known alive at final interval given full exposure time



Dependent Measure

Disability: being unable to perform any one or more of 10 indicators of disability

▶ **Activities of Daily Living (ADLs)**

-- bathing, dressing, eating, getting in and out of bed, and toileting

▶ **Instrumental Activities of Daily Living (IADLs)**

--preparing meals, managing money, performing light housework, shopping, and using the telephone

Disability Measurement

Based on response to two questions:

- “Because of a health or physical problem, do you have **ANY** difficulty with specific ADL or IADLs?”
- And when asked how much difficulty, the respondent chose “unable” from the options some, a lot, or unable.

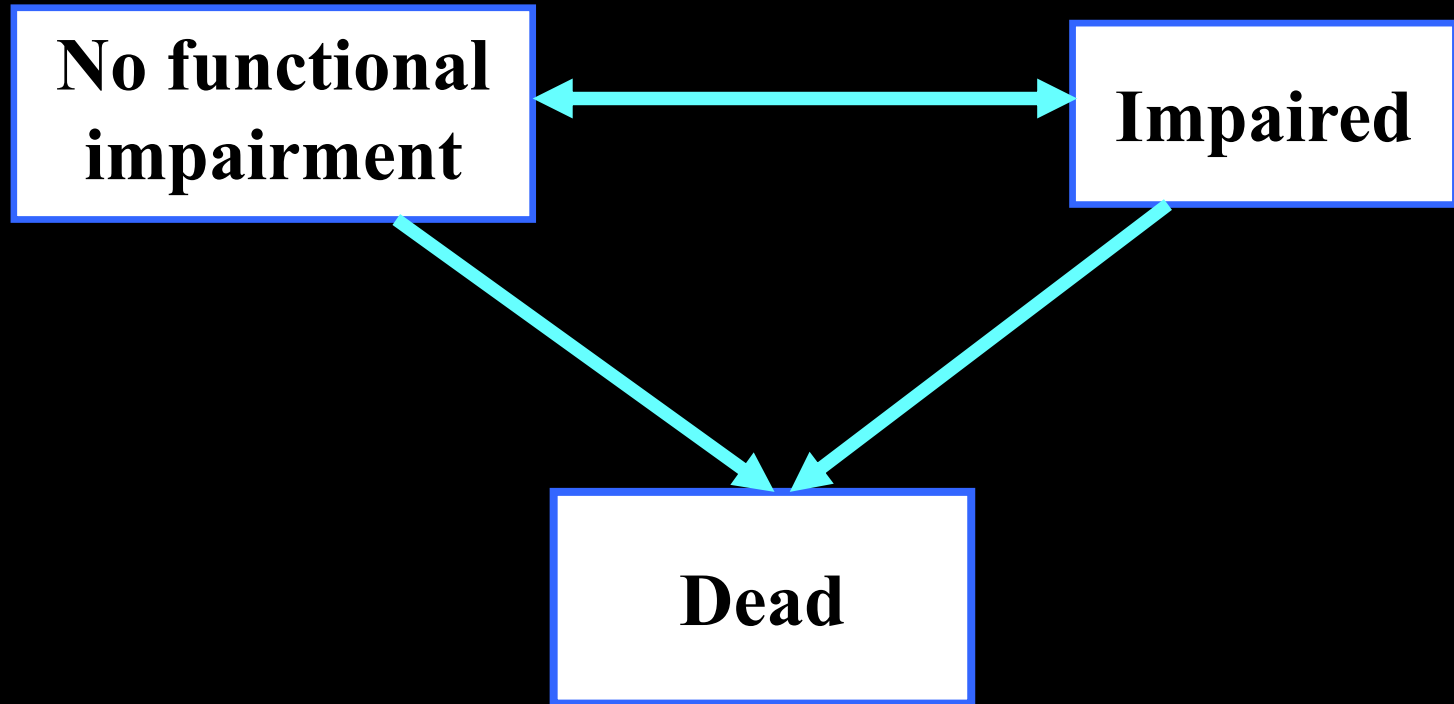
Measures: Independent Variables

- **Age**
- **Sex**
- **Race (black or not-black)**
- **Education**
(**<12 years vs. 12 or more years**)

Basic Sample Characteristics

	1984 LSOA I	N	1994 LSOA II	N
Mean Age (with age capped at 95)	76.8 (SD 5.5)	7477	76.3 (SD 5.7)	9382
Percent Female	62.0		60.3	
High School Education or more	43.8		59.0	
Percent Black	7.4		10.6	
Disabled Time 1	12.2		13.3	
Disabled Time 2	22.8	4114	16.8	6854
Disabled Time 3	22.1	4969	17.5	6990
Disabled Time 4	24.9	4193		
Dead after 6 years	32.4	2427	24.9	2340

Multistate model



Methodology

● IMaCH

– Developed by **Nicolas Brouard** and **Agnès Lièvre** – INED

Computed results:

- **Multistate life table based on estimated transition probabilities by age**
- **Life expectancies and health expectancies by health status**
- **Confidence intervals**

Equation used in Maximum Likelihood Estimation

$$\ln \frac{P_{ij}(\text{age}, t)}{P_{ia}(\text{age}, t)} = B_{ij0} + B_{ij1} \text{Age} + B_{ij2} * \text{covariate} + B_{ij3} * \text{covariate}^2$$

Lièvre, A., N. Brouard, and C. Heathcote. (2003). "The Estimation of Health Expectancies from Cross-Longitudinal Surveys." *Mathematical Population Studies* 10:211-48. 18

P(age, t)=

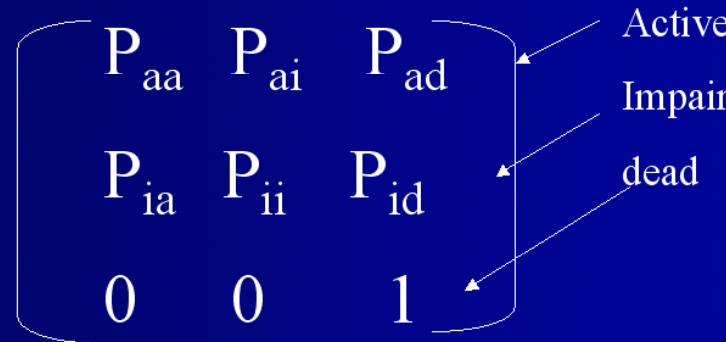
Legend:

P=probability

A=active

I=impaired

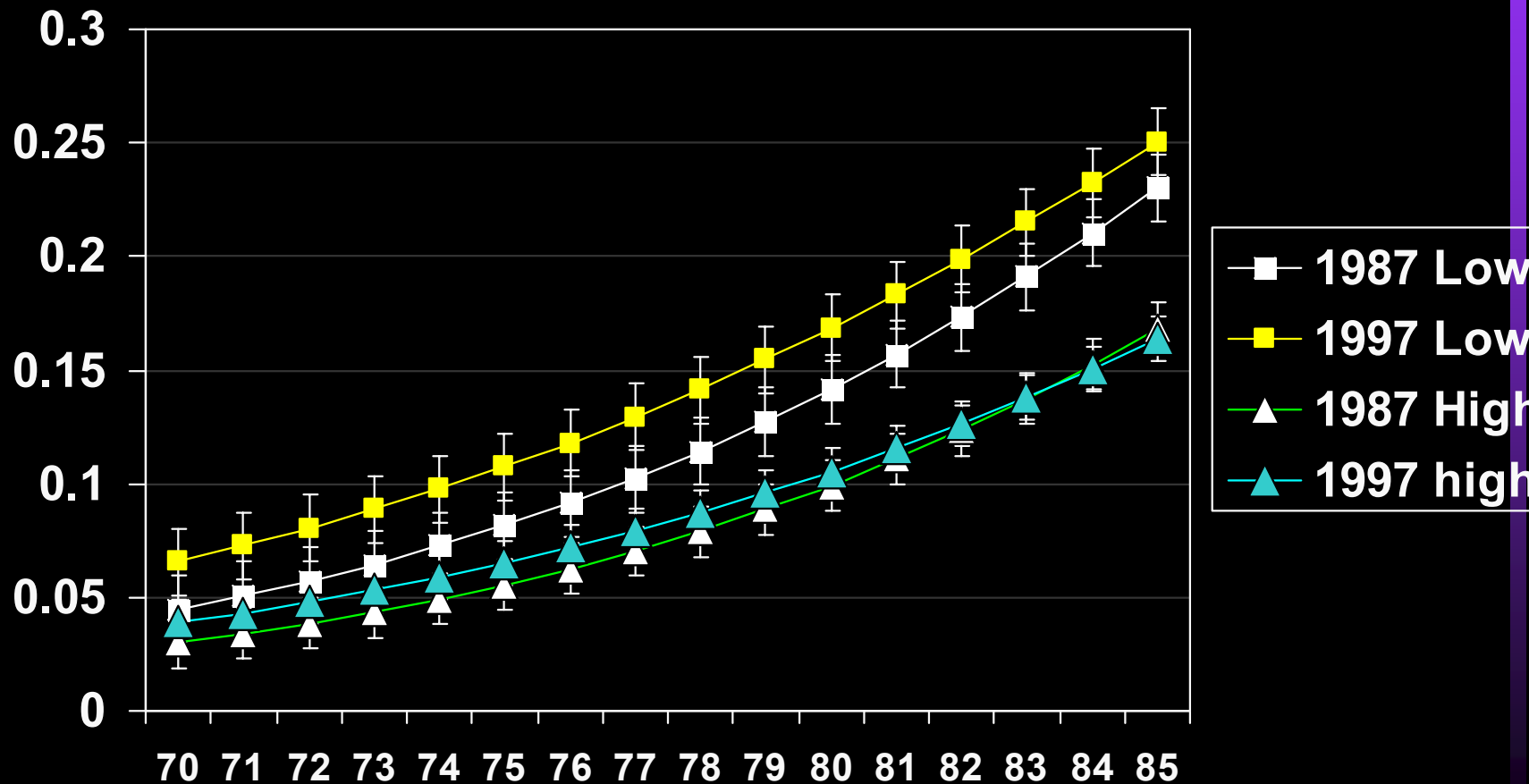
D=Death



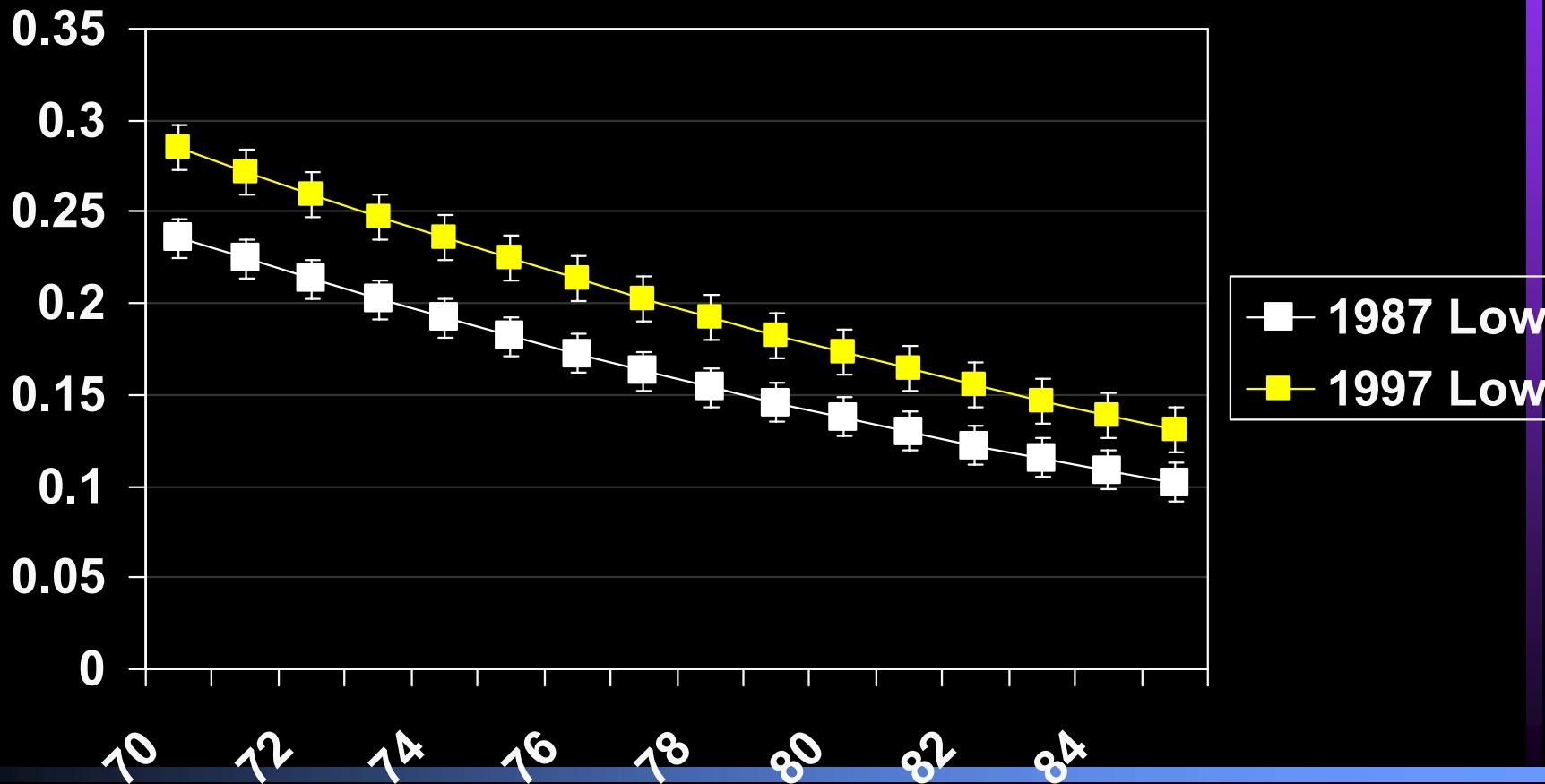
Number of Health Transitions for Adults Aged 70 and Older

Sample States	1984 LSOA I		1994 LSOA II	
	N	%	N	%
Remained Active	9838	62.5%	10695	66.9%
Became Disabled	1618	10.3%	1454	9.1%
Died From Active State	1454	9.2%	1477	9.2%
Recovered from Disability	362	2.3%	692	4.3%
Remained Disabled	1478	9.4%	840	5.3%
Died From Disabled State	990	6.3%	822	5.1%

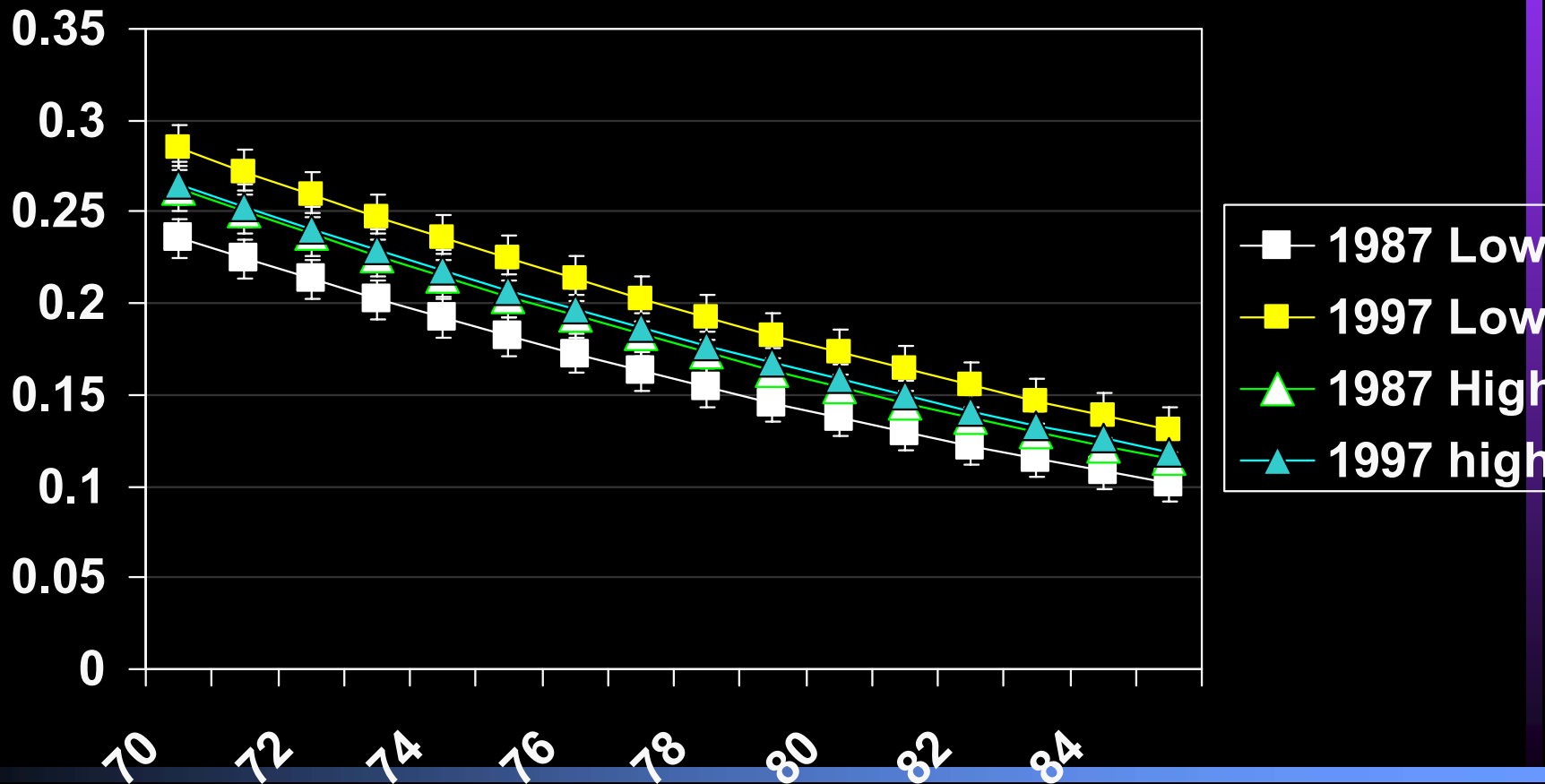
Onset transitions by education (<12 vs. 12+years of education)



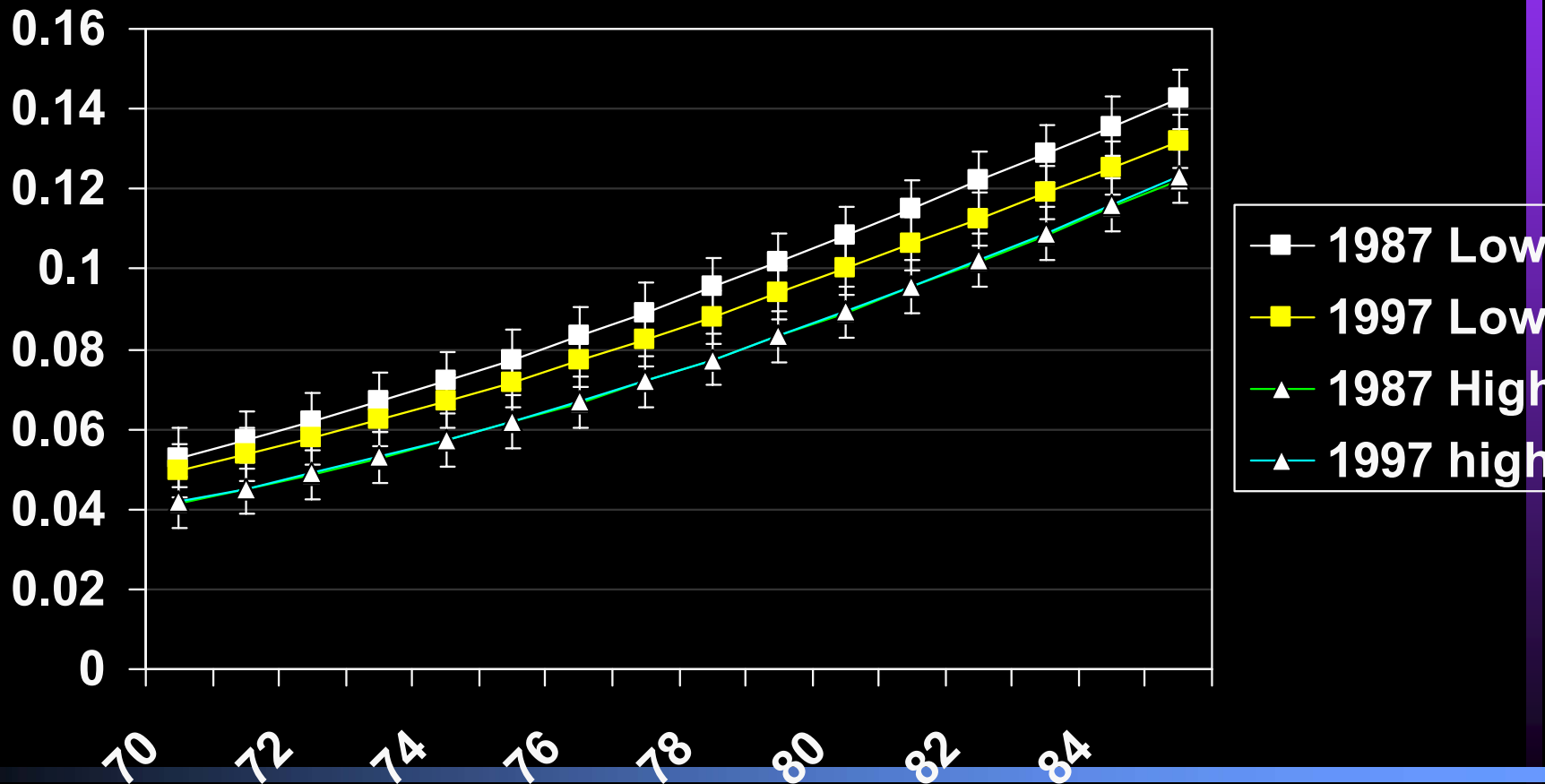
Recovery transitions by education (<12 vs. 12+ years of education)



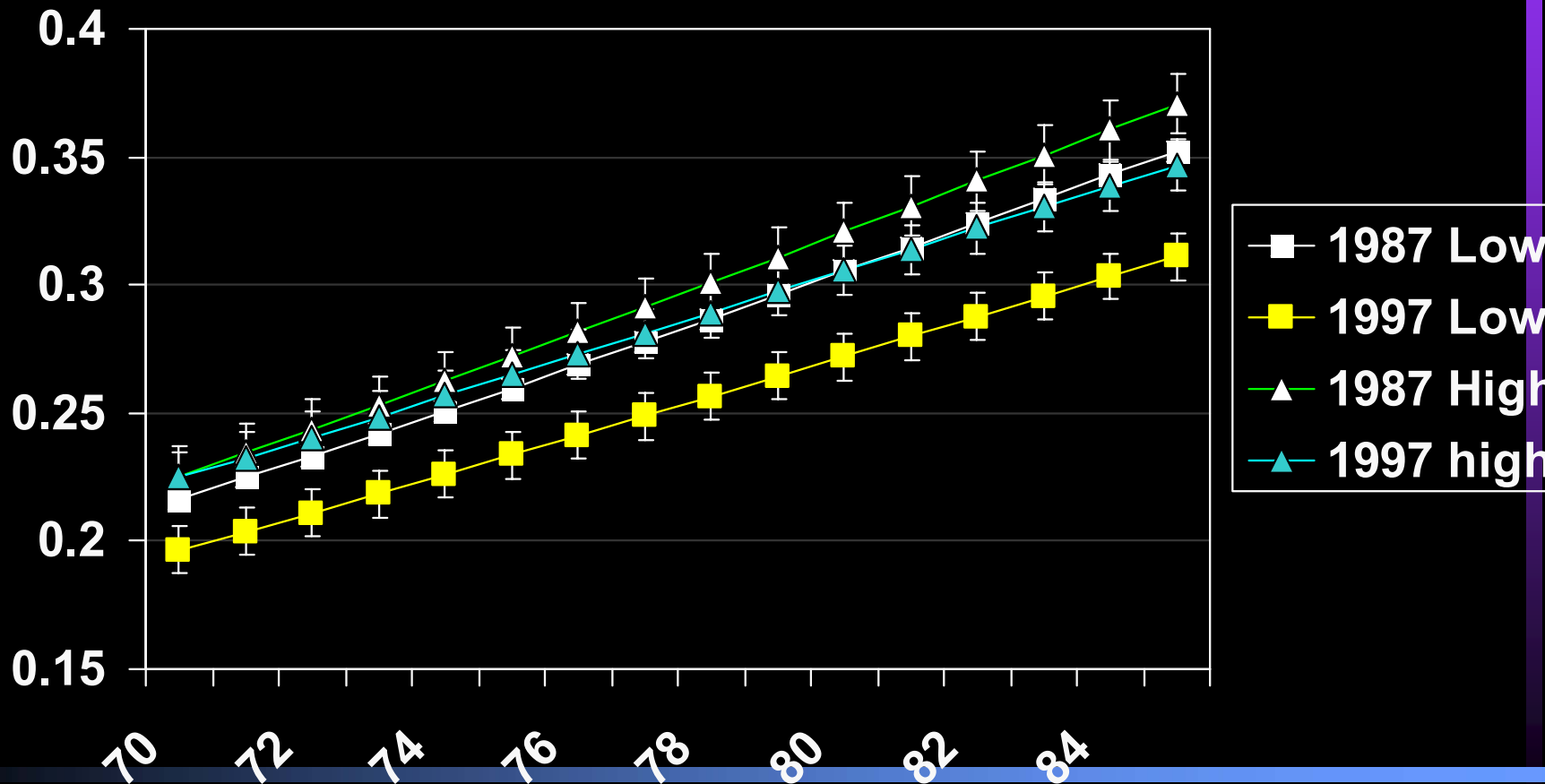
Recovery transitions by education (<12 vs. 12+ years of education)



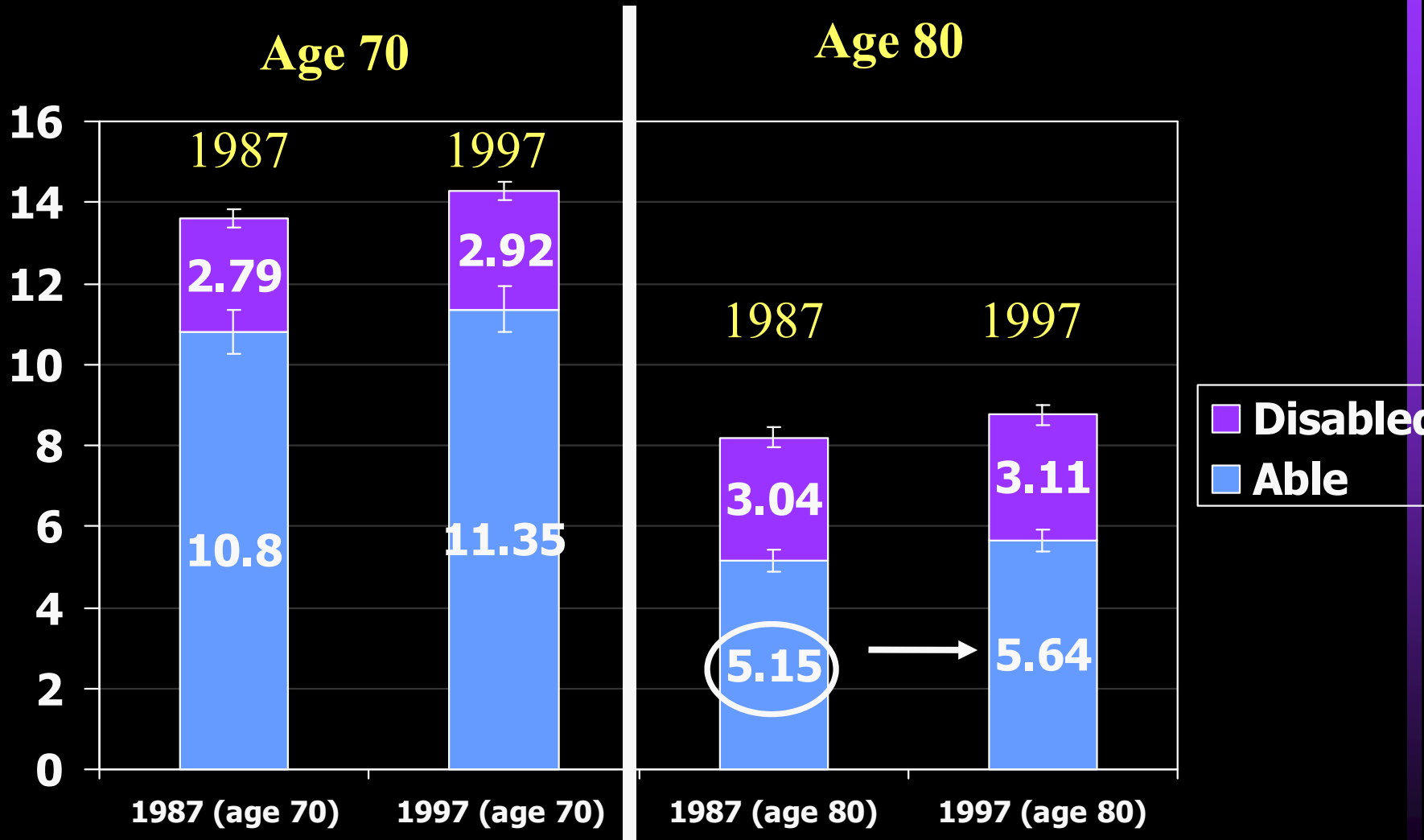
Death among Healthy education (<12 vs. 12+ years of education)



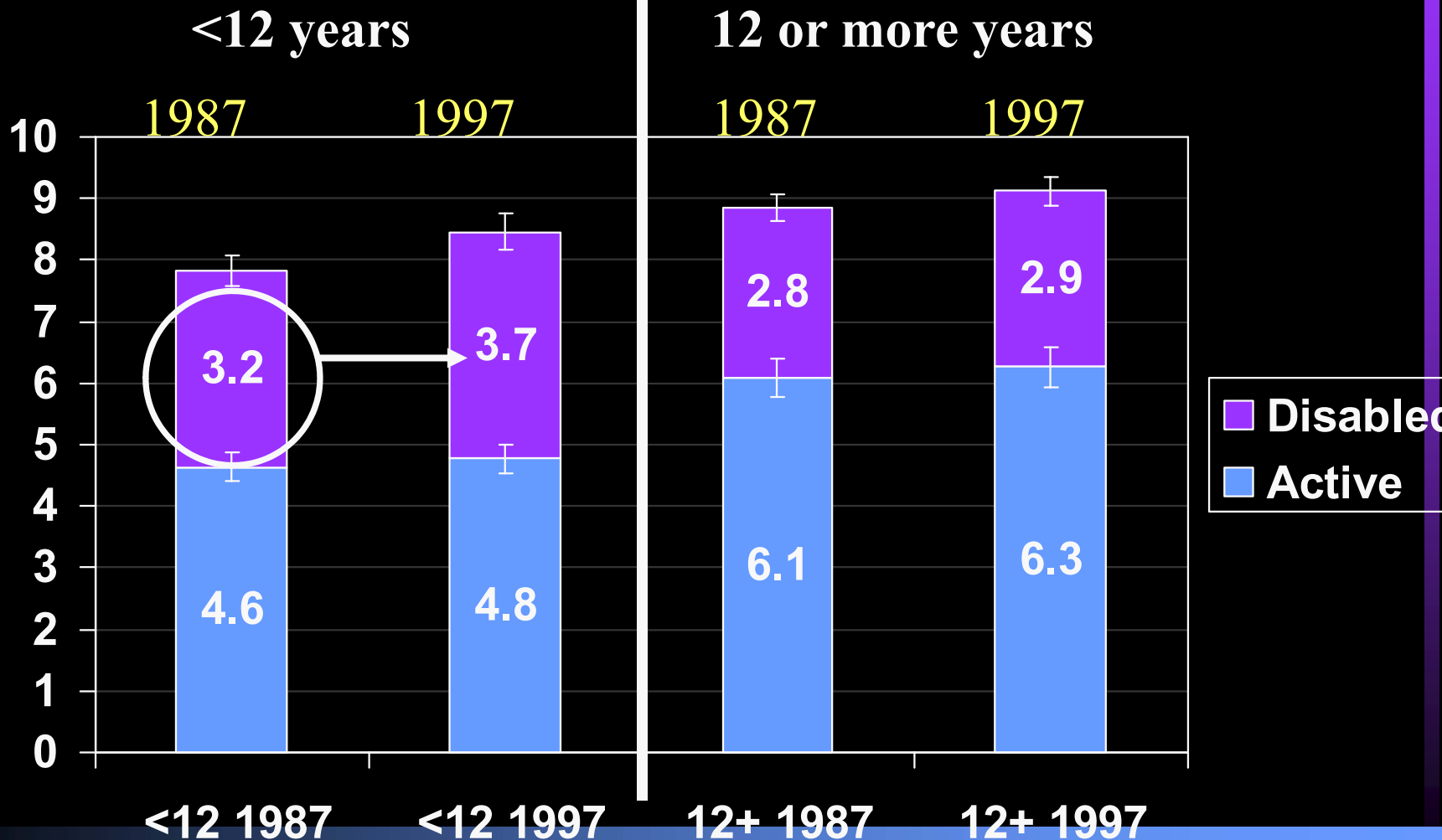
Death among disabled transitions by education (<12 vs. 12+ years of education)



Overall changes in Active Life Expectancy



Active Life Expectancy by Education Groups at age 80



Active Life Expectancy by Race-Education Groups at age 80

<12 years

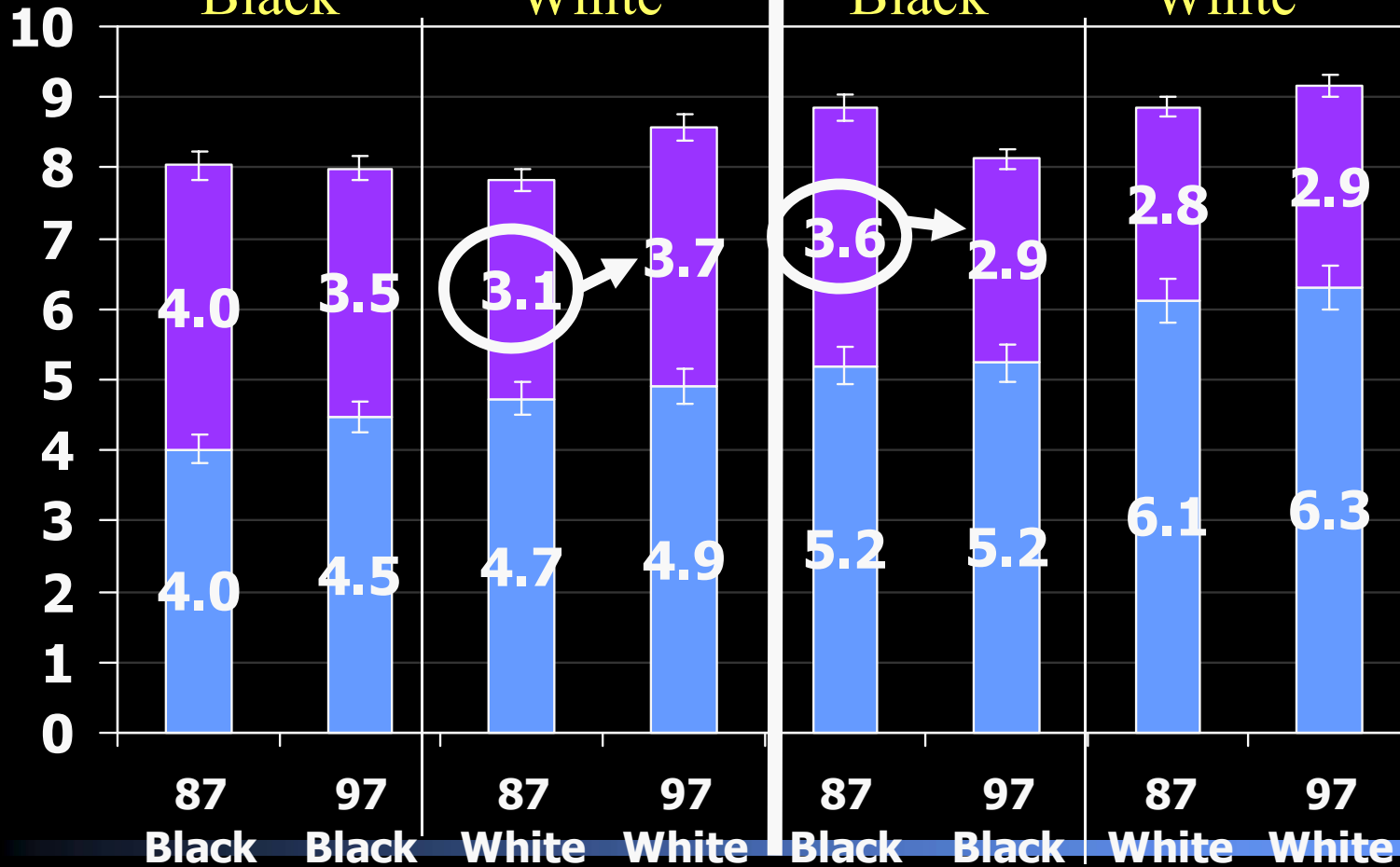
12 or more years

Black

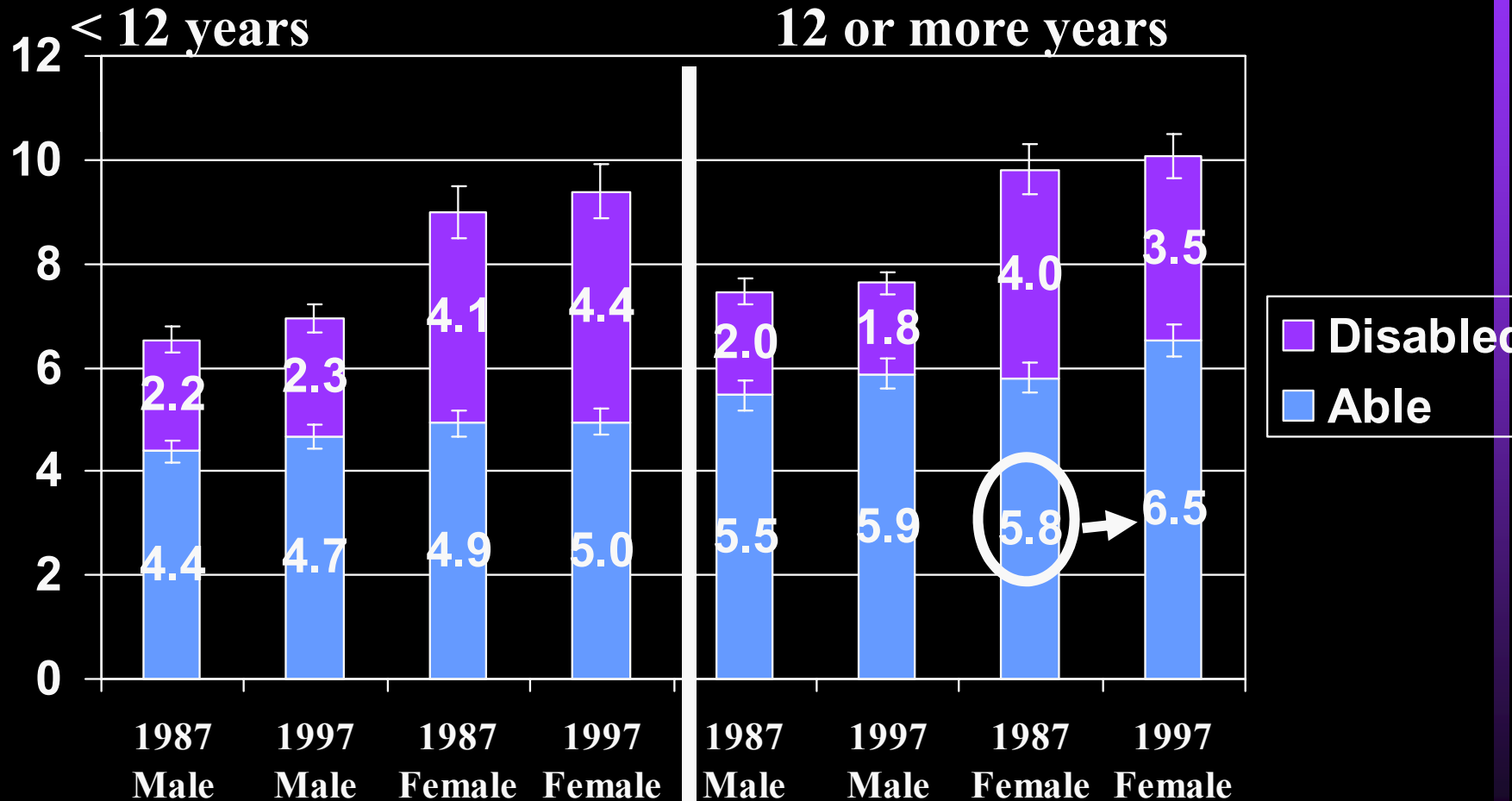
White

Black

White



Active Life Expectancy by Sex-Education Groups at age 80



Conclusions: Disability trends

Less than 12 years

- 71% of Life expectancy increase was in disabled years
- 75% of increase in life expectancy for lower education whites was in disabled years

12 or more year

- Decrease in disability-years (7/10^{ths} of a year) among blacks in the higher education group
- Increase in Active Life for Females in higher education group

Thank you