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Educational Differences in the Prevalence of Mobility Disability in Old Age: The Dynamics of Incidence, Mortality, and Recovery

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Objectives. Older people with less education have substantially higher prevalence rates of mobility disability. This study aimed to establish the relative contributions of incidence, recovery rates, and death to prevalence differences in mobility disability associated with educational status.

Methods. Data were from 3 sites of the Established Populations for Epidemiological Study of the Elderly, covering 8,871 people aged 65–84 years who were followed for up to 7 years. Participants were classified on years of education received and as disabled if they needed help or were unable to walk up or down stairs or walk half a mile. A Markov model computed relative risks, adjusting for the effects of repeated observations on the same individuals.

Results. Differences between education groups in person-years lived with disability were large. The relative risk of incident disability in men with 0–7 years of education (vs. those with 12 or more years) was 1.65 (95% CI = 1.37–1.97) and in women was 1.70 (95% CI = 1.15–2.53). Both recovery risks and risks of death in those with disability were not significantly different across education groups in either gender.

Discussion. Higher incidence of disability is the main contributor to the substantially higher prevalence of disability in older people of lower socioeconomic status. Efforts to reduce the disparity in disability rates by socioeconomic status in old age should focus mainly on preventing disability, because differences in the course of mobility disability after onset appear to play a limited role in the observed prevalence disparities.

DIFFERENCES in mortality and the prevalence of functional disability in old age across groups with different levels of education are well established, with higher rates reported in less educated subgroups in virtually every study (Guralnik, Fried, & Salive, 1996). Reducing such socioeconomic health disparities is one of the central goals of the Healthy People 2010 initiative (U.S. Department of Health and Human Services, 2000).

Epidemiological analyses of socioeconomic differences in health are broadly based on sociological notions that society is stratified into classes or groups, and these groups have different material circumstances; exposures; behaviors; and psychosocial, political, and other experiences (Lynch & Kaplan, 2000). The traditional individual measures of education, income, and occupation are seen as indicators of the social and economic factors that dominate the social structure. There is now a large body of evidence based on these markers showing clear trends of poorer health with each step down the hierarchy of social position (Marmot & Wilkinson, 1999).

The higher mortality and prevalence of most diseases in less privileged socioeconomic groups have been attributed to a variety of factors (Adler & Ostrove, 1999). Early life experiences (including maternal malnutrition) have been implicated in the risk of developing chronic disease in adulthood (Barker & Martyn, 1992). Social position may directly result in greater exposure to injury or toxic compounds. Adverse health behaviors, such as cigarette smoking, alcohol abuse, and sedentary lifestyle, may contribute a proportion of observed socioeconomic differences in mortality (Lantz et al., 1998). Psychosocial factors, including stress, appear important in explaining some of the risk not explained by traditional factors (Baum, Garofalo, & Yali, 1999; Landsbergis, Schnall, Warren, Pickering, & Schwartz, 1999). In addition, differences in access to health services by socioeconomic status have been well documented (Andrulis, 1998). Finally, reverse causation, with poorer health causing a fall in social position, may play a limited role (Bartley & Plewis, 1997).

Older people often suffer from more than one disease, and disability, usually defined as the inability to carry out the usual tasks of daily life, is established as a powerful measure of health status in old age (Guralnik et al., 1996). Physical disability is linked to acute illness, chronic disease, and injury. Single diseases making important contributions to disability include cardiovascular disease, diabetes, arthritis, and stroke, but comorbidity is also an important risk for disability. Underlying behavioral risks for disability include low levels of physical activity, few social contacts, and smoking (Stuck et al., 1999)

The numbers of prevalent cases of disability in a population during any chosen time period is the result of the dynamic balance between the numbers of new cases (disability incidence), the numbers recovering from disability, and the numbers of deaths in those with and without disability. Understanding the relative contribution of each of these factors

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to the observed socioeconomic disability prevalence differences could lead to better targeting of efforts to reduce disparities. If most of the excess disability in less privileged groups is attributable to greater incidence, then greater exposure to the underlying causes of disability, less resistance to disability, or less access to effective preventive services are the most important factors. On the other hand, if lower recovery rates are the main factor, then factors facilitating recovery, including curative and rehabilitation services, might be more important. Differences in death rates offer complex potential explanations. The higher prevalence of disability in older people with less education would arise if death rates in less educated disabled elderly persons were lower than in more educated groups. Conversely, higher prevalence in less educated groups would also occur if there were substantially increased death rates in less educated elders without disability.

Previous work provides some evidence for higher rates of incidence of disability in less privileged subpopulations (Fried & Guralnik, 1997; Stuck et al., 1999). Overall mortality rates have been shown to be elevated in those with less education (Feldman, Malone, Kleinman, & Cornoni-Huntley, 1989; Lew & Garfinkel, 2000), although an Italian study has suggested that mortality in disabled older people with less education is not raised (Amaducci et al., 1998), and disability may be the mediator between education and mortality, perhaps because of higher severity level of diseases. On the key issue of possible differences in recovery rates in older people by socioeconomic status, little is known.

A further problem in exploring the dynamics of socioeconomic status differences in disability prevalence is the variety of definitions of disability. Definitions based on an inability to perform basic activities of daily living identify a severe form of disability, which is often the end result of a progressive disablement process (Ferrucci et al., 1996). Lower extremity disability is often a precursor to more severe disability (Dunlop, Hughes, & Manheim, 1997), and because of its relatively high prevalence and the large differences in prevalence across educational groups, it provides an important focus for exploring socioeconomic differences.

The measurement of socioeconomic differences in older people is also complicated by a number of factors. Most older people have no current occupation, and the former occupations, particularly of many older women, are a poor indicator of their social position. Current incomes may also not reflect older people's long-term material circumstances, even when these data are obtainable. In addition, both income and occupation may have been adversely affected by poor health in adult life, rather than the other way around. Years of education was used in our study as a marker of socioeconomic status, because it is closely related to long-term economic position (Smith & Kington, 1997) and is less susceptible to the effects of later health status on employment and income.

In this analysis, we aimed to measure incidence rates of mobility disability together with recovery and death rates in data from a large population-based longitudinal study of older people—the Established Populations for Epidemiological Studies of the Elderly (EPESE). We used Markov model–based analysis to estimate relative risks, so that we could take account of the repeated observations of the same study respondents over the follow-up periods.

Methods

The original three EPESE study populations were included in these analyses: East Boston, Massachusetts; New Haven, Connecticut; and Washington and Iowa counties, Iowa. In East Boston and Iowa, the entire populations aged 65 years and older in the identified local communities were eligible, and response rates were 85% and 80%, respectively. In New Haven, a stratified random sample was selected on the basis of gender and residence in private or public housing: The response rate was 82% of eligible participants.

Details of the study methods have been published previously (Cornoni-Huntley et al., 1993). In-home baseline interviews were conducted between 1981 and 1983 followed by seven annual interviews in New Haven and Iowa and six in Boston. Proxy informants were interviewed when participants were unable to answer interview questions. Mortality was ascertained from obituaries and notification of death by friends and relatives. Death certificates were also obtained for decedents.

Assessment of mobility status was based on responses to the following questions: "Are you able to walk up and down stairs to the second floor without help?" and "Are you able to walk half a mile without help (about 8 blocks)?" Persons who responded "no" to either question were classified as having mobility disability. This classification of mobility has been shown to have predictive validity for mortality (Corti, Salive, & Guralnik, 1996). We used responses to questions on the number of completed years of education to classify people into three groups: 0–7 years, 8–11 years, or 12 or more years.

Clear trends in the prevalence of mobility disability by years of education were present at baseline in people aged 65–84 but not in older persons, and hence the older group was excluded from the analyses. A total of 3,690 men and 5,618 women aged 65–84 were eligible for this analysis; data on education and mobility status at baseline and death or mobility status on at least one follow-up interview were available for 3,554 men (96%) and 5,317 women (95%).

Transitions in functional status were analyzed in two ways. First, a descriptive analysis treated each full year of follow-up as a "person-year" of observation. For example, if data on disability were available on a respondent at baseline and 7 follow-up years, then this respondent contributed 7 separate person-years of observations to the analysis. Where disability or vital status data were missing for the beginning or end of a study year, that year was excluded from the descriptive person-years analysis.

In age and sex-specific analyses, four transitions were studied: incidence of mobility disability, recovery from mobility disability, death in those who had disability at the start of the person-year of observation, and death in those who were not disabled at the start of the person-year. Prevalence of disability was measured as the proportion of observations in which disability was present. Incidence was measured as the proportion of those who were nondisabled at the start of

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each 1-year interval (Time 1) who reported being disabled at the follow-up interview (Time 2). The recovery rate was the proportion of disabled persons at Time 1 who reported being not disabled at Time 2.

We conducted analyses to measure education group differences in each component of prevalence according to mobility status at baseline. Among the nondisabled, risk of incident disablement, death, or no change in 1 year was estimated for men and women with 0–7 years and 8–11 years of education, each compared with those with 12 or more years, and data are presented within four 5-year age groups. Similarly, in the disabled, likelihood of death, recovery, or remaining disabled was estimated in the sex and education subgroups.

We drew inferences regarding differences in these transition rates using a Markov chain model developed for this purpose. Details of this method and examples of its use in disability research have been published elsewhere (Beckett et al., 1996; Mendes de Leon et al., 1995; Muenz & Rubenstein, 1985). Briefly, we assumed that each person's likelihood for his or her given series of functional states could be expressed in terms of annual transition probabilities. Transition probabilities were estimated for each group identified by chosen baseline characteristics, but within these groups the estimated likelihood of change in functional status between two interviews was assumed to depend upon the functional state at the most recent interview, independent of the history of preceding functional states.

We modeled transition probabilities using logistic link functions for each of the four dichotomous outcomes: death versus survival from the nondisabled state; death versus survival from the disabled state; and, conditional upon survival to the next interview, incident disability and recovery. All participants with disability and mortality information from at least two of the eight interviews were included in the model-based analyses. We treated interviews with missing disability status flanked by interviews with nonmissing data by averaging (under the model) the predicted transition probabilities for all possible paths in between. We accounted for within-person correlation by using a robust variance estimator that treated each person's data as a cluster, or primary sampling unit. We made an adjustment for the stratified sampling from the New Haven site by treating the combined sample using a separate stratum for each of the other two sites. All analyses were done separately by sex and included main effects of continuous age and education (0–7 years or 8–11 years vs 12 or more years), as well as separate intercepts for EPESE site. We tested the Age × Education interaction but found that it did not significantly influence incident disability or mortality.

Results

A total of 8,871 people aged 65–84 were included in these analyses, of which 5,317 were women and 3,554 were men (40%). Overall, 21% (1,853) of the sample had received 0–7 years of education, 43% (3,820) had 8–11 years, and 36% (3,198) had 12 or more years (see Table 1).

Figure 1 presents the percentage of person-years lived with mobility disability in each age group, including those already disabled at baseline. The figure shows the familiar picture of higher rates of disability in those who had fewer years of education. For example, in men aged 70–74 with 0–7 years of education, 20.8% of person-years were lived with disability, compared with 12.8% in those with 12 or more years of education. Disability rates in women overall were higher, but differences between the education groups in women were similar: The same comparison at age 70–74 was 38.2% and 19.2%.

Figure 2 shows incidence rates (as the percentage of observed person-years starting free of disability in which mobility disability was reported at 1-year follow-up) by gender, age group, and years of education. This figure again shows differences by years of education within gender, especially in the younger age groups. For example, at age 70–74, women with less than 8 years of education had an incidence rate of 19.2 per 100 person-years, compared with 8.0 in those with 12 or more years of education.

In contrast to incidence rates, rates of recovery showed little consistent difference by years of education (Figure 2) across the age range. Using the same examples again, in the age group 70–74, women with less than 8 years of education had a recovery rate of 21.9 cases per 100 person-years, with a similar rate in those with 12 or more years of education (19.9%). In the same age group in men, however, recovery rates in those with least education appeared slightly higher, although in the older age groups there was no evident difference in rates.

Table 1. Numbers of Respondents and Numbers of Person-Years of Observation Available for Analysis, by Age Group, Sex, and Years of Education

	Age Group (years)				
Years of Education	65–69	70–74	75–79	80–84	Total
Respondents					
Women					
0–7 years	260	280	281	231	1,052
8–11 years	693	734	522	350	2,299
12+ years	729	605	405	227	1,966
Total	1,682	1,619	1,208	808	5,317
Men					
0–7 years	223	230	205	143	801
8–11 years	517	476	353	175	1,521
12+ years	552	380	203	97	1,232
Total	1,292	1,086	761	415	3,554
All	2,974	2,705	1,969	1,223	8,871
Person-Years of Observation					
Women					
0–7 years	610	1,680	1,733	1,484	5,507
8–11 years	1,850	4,575	3,897	2,688	13,010
12+ years	2,051	4,276	3,223	1,943	11,493
Total	4,511	10,531	8,853	6,115	30,010
Men					
0–7 years	580	1,327	1,195	881	3,983
8–11 years	1,316	2,983	2,301	1,415	8,015
12+ years	1,545	2,906	1,688	783	6,922
Total	3,441	7,216	5,184	3,079	18,920
All	7,952	17,747	14,037	9,194	48,930

Note: Data are from Boston, New Haven, and Iowa sites of the Established Populations for Epidemiological Studies of the Elderly (Cornoni-Huntley et al., 1993).

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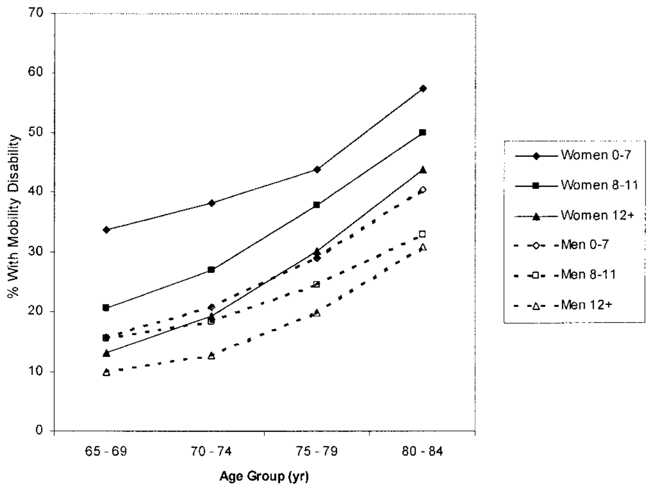

Figure 1. Percentage of person-years lived with mobility disability by gender, age group, and years of education (n = 9,615 years commencing with disability in 29,500 years observed for women and 3,899 years with disability in 18,681 years observed for men). Data are from Boston, New Haven, and Iowa sites of the Established Populations for Epidemiological Studies of the Elderly (Cornoni-Huntley et al., 1993).

The well-established pattern of higher overall mortality in those with less education was also evident, although absolute numbers of deaths were relatively small, especially for women. For example, deaths occurred in 6.5% (n = 336) of follow-up years in men with 0–7 years of education, compared with 4.8% (412) of men with 12 or more years of education. For women, these rates were 4.2% (310) in those with 0–7 years of education, compared with 3.3% (452) for those with 12 or more years of education. Person-year death rates by disability status at the start of the year (Figure 3) varied, but showed little systematic difference across education groups in either those who were disabled at the start of the studied years or those who were nondisabled.

One limitation of the person-years–based analysis presented previously is that it treats each person-year of observation as independent, ignoring the fact that the same individual may contribute to up to seven different observations. Figure 4 presents the overall results of the Markov models for the four main factors influencing disability prevalence: incidence, recovery, and death in those with disability and those without.

The comparison group for all relative risk calculations was the relevant age and gender subgroup with 12 or more years of education. In terms of incidence of mobility disability, risks were significantly raised in both sexes for the two lower education groups: Men with 0–7 years of education were 1.65 times (95% CI = 1.37–1.97) more likely to develop mobility disability than those with 12 or more years of education. This relative risk for incident disability in women was virtually identical: 1.70 (95% CI = 1.15–2.53). In both sexes relative risks of recovery were not significantly different by years of education.

In those who were disabled, relative risks of death were also not significantly different by education. Death rates in those with less education who were not disabled showed complex differences, with odds in the least educated women being significantly lowered and those in the less educated men being higher than in those with 12 or more years of education.

To understand the influence of age on the transition risks, age-specific relative risks (Table 2) are presented for 5-year age bands. The incidence and mortality risks that were sig-

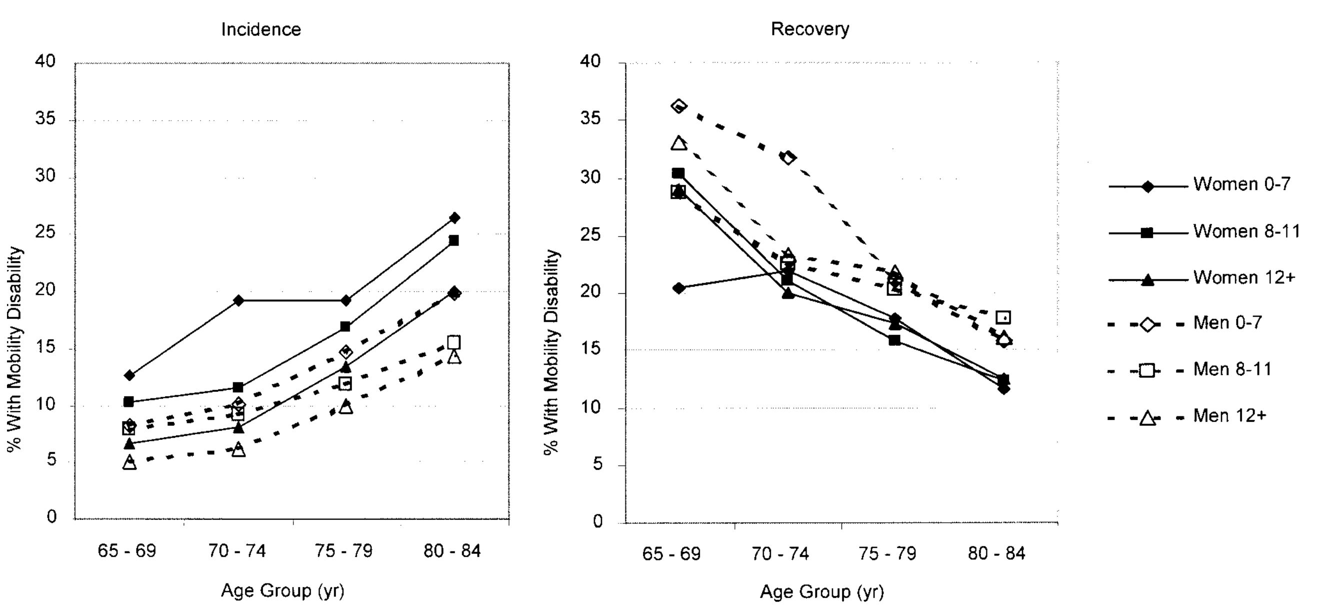

Figure 2. Incidence and recovery rates (percentage of person-years) of mobility disability, by gender, age group, and years of education (n = 2,736 incident during 19,885 years observed for women and 1,455 incident during 14,782 years in men; n = 1,675 recoveries from disability in 9,615 years observed in women and 867 recoveries during 3,899 years in men). Data are from Boston, New Haven, and Iowa sites of the Established Populations for Epidemiological Studies of the Elderly (Cornoni-Huntley et al., 1993).

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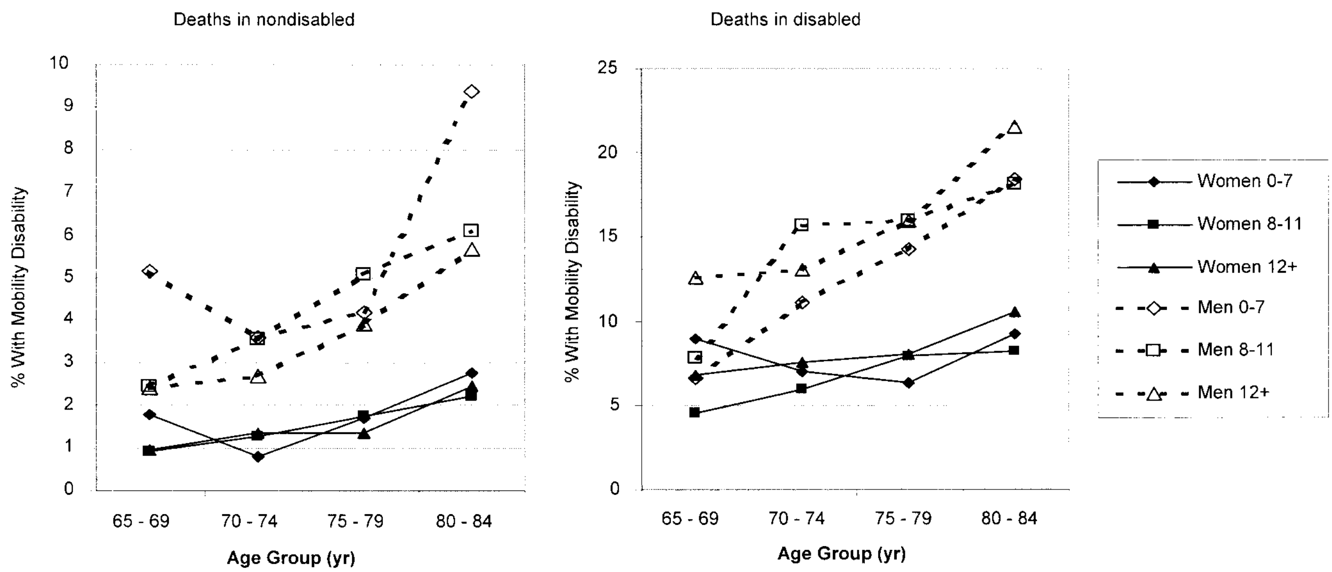

Figure 3. Deaths in nondisabled and disabled (percentage of person-years observed) by gender, age group, and years of education (n = 291 deaths in 19,885 years commencing without disability observed in women and 583 deaths in 14,782 nondisabled years in men; n = 738 deaths in years commencing with disability in women of 9,615 years observed and 593 deaths of 3,899 disabled years in men). Data are from Boston, New Haven, and Iowa sites of the Established Populations for Epidemiological Studies of the Elderly (Cornoni-Huntley et al., 1993).

nificant are evident, although they tended not to be statistically significant at the older ages. Relative risks for recovery were not significant at any age in men, and for women, recovery rates were significantly lower only in the youngest and least educated group. Within age groups, among those disabled, relative risks for death with lower education were not raised in women or men.

In women, higher incidence of mobility disability was the only significant factor available to explain the elevated disability prevalence in less educated groups across the studied age range, because lower death rates in the nondisabled (the only other generally significant difference) would tend to reduce rate differences, rather than increase them.

We explored the relative importance of the elevated incidence and elevated death rates in the nondisabled least educated men in a multistate life table model, using methods of Crimmins, Hayward, and Saito (1994) and Leveille, Penninx, Melzer, Izmirlian, and Guralnik (2000). These life table models used the four studied transition probabilities applied to a theoretical cohort to estimate prevalence of disability at each age. In a model of 1,000 men with 0–7 years of education entering the life table at age 65 with a 15% prevalence of disability, only 338 would survive to the age of 75, for example, of whom 92 (27%) would have disability. During their 75th year, there would be 33 incident cases of disability, 12 would recover from disability, 27 disabled men would die, and 13 nondisabled men would die.

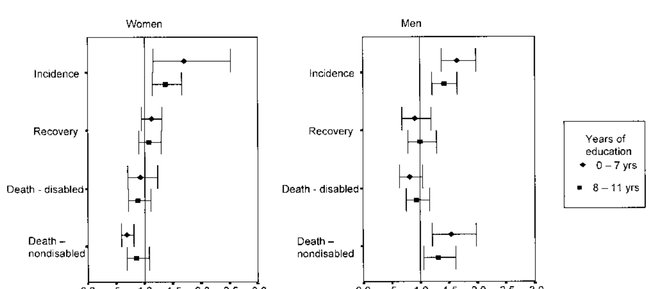

Figure 4. Relative risks (with 95% confidence intervals) for transitions in those with 0–7 and 8–11 versus 12 or more years of education (reference line) by gender, based on Markov model. Data are from Boston, New Haven, and Iowa sites of the Established Populations for Epidemiological Studies of the Elderly (Cornoni-Huntley et al., 1993).

Substituting the death rates only of men with 12 or more years of education into the life table for men with 0–7 years of education reduced the excess prevalence by a mean of only 10% of the difference between the least and most educated male groups, across the years of age in the studied range. On the other hand, substitution of the lower incidence rates only of the most educated men removed the elevation of disability rates in the least educated (with a mean change of 107% of the difference in prevalence across the age range).

Discussion

Patterns of disability in old age are of considerable importance, not only because of their impact on the quality of life of people who find difficulty or need help in doing everyday tasks, but also because disability is closely related to the need for health and long-term institutional care (Guralnik et al., 1996). Markers of socioeconomic status, whether measured by occupation, income, or years of education, have been repeatedly shown to be associated with disability prevalence (Guralnik, Land, Blazer, Fillenbaum, & Branch, 1993; House et al., 1994; LaCroix, Guralnik, Berkman, Wallace, & Satterfield, 1993; Stuck et al., 1999). In addition, some studies have also reported higher incidence of disability in less privileged subgroups (Stuck et al., 1999). However, in this study we go further in analyzing not only

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Table 2. Relative Risks and 95% Confidence Intervals for Transitions in Those With 0–7 and 8–11 versus 12 or more Years of Education by Gender for 5-Year Age Groups, Based on Markov Model

		Age 65–69		Age 70–74		Age 75–79		Age 80–84	
Transitions	Years of Education	Relative Risk	Confidence Interval	Relative Risk	Confidence Interval	Relative Risk	Confidence Interval	Relative Risk	Confidence Interval
Men									
Incidence of disability	0–7	1.91	1.18–3.07*	1.70	1.28–2.27*	1.64	1.21–2.22*	1.33	0.91–1.94
	8–11	1.82	1.26–2.61*	1.58	1.25–2.01*	1.25	0.97–1.62	1.13	0.80–1.59
Recovery from disability	0–7	1.26	0.63–2.52	1.47	0.93–2.31	1.07	0.68–1.68	0.75	0.42–1.36
	8–11	0.78	0.44–1.38	1.00	0.68–1.48	0.99	0.66–1.48	1.13	0.68–1.91
Death in disabled	0–7	0.39	0.14–1.13	0.78	0.47–1.30	0.87	0.56–1.36	0.86	0.57–1.28
	8–11	0.53	0.25–1.10	1.27	0.87–1.86	1.06	0.71–1.57	0.72	0.49–1.04
Death in nondisabled	0–7	2.12	1.22–3.69*	1.46	0.91–2.35	1.13	0.71–1.79	1.74	1.06–2.87*
	8–11	1.12	0.66–1.90	1.39	1.00–1.94*	1.39	0.96–2.02	1.15	0.72–1.85
Women									
Incidence of disability	0–7	1.91	1.29–2.85*	2.23	1.74–2.87*	1.45	1.12–1.87*	1.38	1.02–1.85*
	8–11	1.54	1.14–2.08*	1.39	1.14–1.69*	1.40	1.13–1.73*	1.21	0.96–1.53
Recovery from disability	0–7	0.45	0.26–0.75*	0.96	0.68–1.35	1.07	0.77–1.49	0.93	0.64–1.34
	8–11	0.84	0.53–1.33	0.91	0.68–1.21	0.96	0.71–1.30	0.96	0.69–1.33
Death in disabled	0–7	1.26	0.59–2.70	0.86	0.56–1.33	0.89	0.59–1.36	0.94	0.65–1.34
	8–11	0.81	0.38–1.76	0.84	0.57–1.22	0.97	0.70–1.34	0.87	0.63–1.22
Death in nondisabled	0–7	1.37	0.53–3.52	0.44	0.19–1.00	0.77	0.40–1.48	0.67	0.34–1.33
	8–11	0.60	0.28–1.27	0.94	0.58–1.50	1.09	0.66–1.80	0.69	0.39–1.24

Notes: Data are from Boston, New Haven, and Iowa sites of the Established Populations for Epidemiological Studies of the Elderly (Cornoni-Huntley et al., 1993). Sample size as in Table 1.

*$p < .05$.

the inflow into the "pool" of prevalent disability in terms of incident cases, but also the outflow in terms of recovery and mortality. The results clearly show that relative risks of disability incidence are significantly higher in groups with fewer years of education compared with those with more education, but relative risks of recovery are not significantly different.

A number of factors need to be considered in evaluating these results. Years of education has been widely used as a marker of socioeconomic status (Smith & Kington, 1997), but it does have some drawbacks. Years of education is treated here as a personal variable, although it is possible that effects of education may be mediated at the household level: The effects of spouses' education may result in some misclassification of true socioeconomic status, especially in the study generation of older women (Williams & Collins, 1995). In the EPESE data analyzed, data on income were unavailable at baseline for 15.5% of cases in the studied age group, and those with missing income data were significantly more likely to have been disabled at baseline, suggesting potentially important biases in responses. By contrast, education data were missing in only 1.6% of cases. Years of education therefore provides the best available marker of socioeconomic status, not least because of its relative freedom from the effect of poor health on economic and employment status over most of the lifetime of the older people studied, because education is mostly completed early in life. A sex-specific secondary analysis indicated that the number of missing interviews was not correlated with the level of education, adjusting for number of interviews with or without disability and age, which adds some weight to the argument that missing data on education should not have introduced bias.

Mobility disability is measured here by self-report of being unable to walk or climb stairs without help. These measures are good markers of lower limb disability, which in turn are good predictors of progression of disability, nursing home admission, and mortality (Guralnik, Ferrucci, Simonsick, Salive, & Wallace, 1995). Mobility disability represents an early stage of disability, and for example, in the Women's Health and Aging study, more than 90% of disabled older people had mobility difficulties (Fried, Bandeen-Roche, Kasper, & Guralnik, 1999). Therefore, mobility disability is a key form of disability to study, but it is possible that other measures, for example of severe disability, could produce different results from those we report for mobility disability.

The Markov model presented has several advantages, including simultaneously taking account of all possible outcomes (incidence, recovery, or death); utilizing all the available data, even on those with some missing elements; and dealing with the effect of repeated observations on the same individuals. The model is also stratified for differences between study sites, but numbers are too small to yield significant results within each site. The Markov model does make the technical assumption that the transition probabilities are dependent only on the immediate state at the time of the interview, although this only operates in the model within the "risk factor" groups studied, defined by age, sex, and years of education, and should not introduce any obvious bias. Overall, the Markov model should provide the best possible estimate of the relative risks in which we are interested.

The Markov model results confirm the analysis of the person-year data in showing that the most significant factor influencing the prevalence differences in mobility disability by years of education is incidence of disability. Interestingly, using the same dataset and similar methods, Leveille and colleagues (2000) found that incidence was also the most important factor in sex differences in those aged less than 90. Rates of recovery from disability are not significantly different

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by years of education, and this may suggest that differences in care received after the onset of disability in different educational group are of limited importance in explaining the excess rates of mobility disability in less educated groups.

Overall mortality differences by years of education are well established (U.S. Department of Health and Human Services, 1998; Wilkinson & Marmot, 1998) and present in the study data. The results also suggest that the excess mortality rates are partly mediated through the higher rates of disability in less educated groups. Death rates in older people with disability did not vary significantly by years of education, supporting the suggestion that differences in course of illness after the onset of disability are not factors in mortality differences by socioeconomic status in old age. The excess risk of death in less educated men who were not disabled may reflect the effects of higher prevalence of cardiovascular and other conditions that can kill suddenly without prior disability. The multistate life table model for men, however, shows that differences in death rates between education groups make a small contribution to prevalence differences overall, compared with differences in incidence.

The chief importance of these findings is in targeting efforts to reduce disparities in health, of the sort envisaged in the Healthy People 2010 initiative (U.S. Department of Health and Human Services, 2000). Although a great deal is already known about the risk factors for disability in old age (Stuck et al., 1999) and about programs to prevent disability (Wagner, 1997), there is a popular tendency to assume that differences in care for already disabled elderly persons from less privileged socioeconomic groups must account for a substantial part of the poorer disability experience of these populations. This analysis shows, however, that at a population level differences in influences on recovery or survival with disability are of limited importance. It follows, therefore, that efforts to reduce disability disparities in old age should target prevention, including better management of disabling medical conditions before they progress to disability.

The most significant influence on the higher prevalence rates of mobility disability in older people who had fewer years of education is higher incidence rates of disability. Both recovery rates and death rates in those with disability do not differ significantly by socioeconomic status. This analysis suggests that programs aiming to reduce socioeconomic disparities in the prevalence of disability in old age should focus on prevention of disability onset.

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