

22. The PURSUIT Trial Investigators. Inhibition of platelet glycoprotein IIb/IIIa with eptifibatid in patients with acute coronary syndrome. *N Engl J Med.* 1998;339:436-443.
23. Boersma E, Harrington RA, Moliterno DJ, et al. Platelet glycoprotein IIb/IIIa inhibitors in acute coronary syndromes: a meta-analysis of all major randomised clinical trials. *Lancet.* 2002;359:189-198.
24. Braunwald E, Antman EM, Beasley JW, et al. ACC/AHA 2002 guideline up-

- date for the management of patients with unstable angina and non-ST-segment elevation myocardial infarction—summary article: a report of the American College of Cardiology/American Heart Association task force on practice guidelines (Committee on the Management of Patients With Unstable Angina). *J Am Coll Cardiol.* 2002;40:1366-1374.
25. Van den Berghe G, Wouters P, Weekers F, et al. Intensive insulin therapy in critically ill patients. *N Engl J Med.* 2001;345:1359-1367.

## Reducing Disability in Older Age

James F. Fries, MD

IN THIS ISSUE OF THE JOURNAL, FREEDMAN AND COLLEAGUES<sup>1</sup> present encouraging evidence from a number of sources that disability in seniors is decreasing. The authors identified and reviewed 16 articles based on 8 surveys that assessed US trends in the prevalence of self-rated older adult disability and physical, cognitive, and sensory limitations among older adults beginning in 1982 through 1999. Of the studies assessed as having at least fair quality, surveys showed consistent declines in instrumental activities of daily living (IADLs) and in functional limitations. These findings are conservatively presented and all are consistent with the single best study, the report by Manton and Gu,<sup>2</sup> which presents the most recent data, has the most detailed end points, surveys the most representative sample of the US population, and shows the most striking findings. Manton and Gu studied trends in disability in the National Long Term Care Surveys (NLTCs) of 1982, 1989, 1994, and 1999 of the Medicare-eligible population aged 65 years and older, which include both institutionalized and noninstitutionalized individuals.

Surveying a sample that includes both institutionalized and noninstitutionalized older adults is important because the proportion of elderly individuals institutionalized declined from 6.8% in 1982 to 4.2% in 1999.<sup>2</sup> This increase in the number of persons with relatively greater amounts of disability into the noninstitutionalized population would be expected to decrease observed improvements in noninstitutionalized populations and to underestimate the actual decline, as may have occurred in some of the studies reviewed.<sup>1</sup> In the NLTCs, similar declines were observed in those with any disability, IADL disability, and activities of daily living (ADL) disability, with the greater declines seen in IADL. In general, declines in disability are greatest in the studies with the most recent data, and rates of decline appear to have accelerated after 1994, being 1.7% annually over the 17 years of the NLTCs and 2.6% per year from 1994 to 1999. A rapid decline in disability in blacks of nearly 4% per year, not seen previously, occurred from 1994 to 1999. It has been argued that a decline in any disability of 1.5% per year would

ensure the long-term solvency of the Medicare and Social Security programs.<sup>3</sup> These are important changes.

In 1980, I introduced the compression of morbidity hypothesis, suggesting that if the age of onset of disability could be postponed to a greater degree than senior life expectancy would increase, then lifetime disability could be compressed into a shorter average period and cumulative average lifetime disability could be reduced.<sup>4</sup> Furthermore, if decreases in health risk factors such as lack of exercise, obesity, and cigarette smoking could be achieved in seniors, substantial postponement of disability might result and that, in general, preventive approaches to health enhancement and chronic disease prevention held the greatest promise for improving the health of older individuals. At that time, any suggestion that senior health futures could be improved was considered naively optimistic.<sup>5,6</sup> Direct proof that morbidity could be compressed would be documentation that age-specific disability rates were declining more rapidly than age-specific mortality rates. The present data indicate that senior mortality rates are declining at about 1% per year<sup>7</sup> and disability is declining at about 2% per year.<sup>2</sup> Thus, compression of morbidity is occurring nationally, and that certainly is good news.

Reasons for these trends are less clear. Improvements in lifestyle risk factors do not seem adequate to account for much of the change. Over the past 2 decades, the prevalence of obesity has increased,<sup>8</sup> and exercise levels have not changed appreciably.<sup>9</sup> The decline in cigarette smoking has been estimated to account for as much as 1 percentage point of the decline but cannot account for the complete decline.<sup>10</sup> Arguments for major contributions from prostate-specific antigen testing, bone density screening, immunization rates, or other preventive services are not convincing.<sup>10</sup> Health promotion and self-management programs have not been broadly adopted, and Medicare has remained reluctant to remunerate for preventive services.

The impact of improvements in medical care on reducing disability is difficult to quantitate. The number of total joint replacements and cataract surgery procedures have doubled over this period, and hypertension, diabetes,

See also p 3137.

**Author Affiliation:** Department of Medicine, Stanford University School of Medicine, Stanford, Calif.

**Corresponding Author and Reprints:** James F. Fries, MD, 1000 Welch Rd, Suite 203, Palo Alto, CA 94304 (e-mail: jff@stanford.edu).

and hyperlipidemia are now treated more aggressively in elderly patients. However, access to care has not improved and access to prescription drugs may have decreased even as more effective drugs have become available.<sup>11</sup>

Although medical care itself may be insufficient to explain the decline, the increasing expectations of aging adults to maintain good health may be self-fulfilling. Better health is associated with increased educational levels, and educational levels of older adults have been increasing.<sup>1</sup> Perceived self-efficacy, the belief that an individual can alter his or her own health future, is powerfully associated with health and offers a possible mechanism for the education and health associations.<sup>12</sup> Data for broad changes in senior self-efficacy, however, are lacking.

On balance, the reduction in disability is largely unexplained, and the most reasonable explanations are multifactorial.<sup>9</sup> However, the present lack of clarity represents opportunity as much as it reveals ignorance. Multidisciplinary research with a finer grain is required to approach these questions. Regardless of the causes, however, several means to improve senior health have not yet been exploited and provide some promise that the current improvements may be continued and possibly accelerated. Two research areas not discussed by Freedman et al<sup>1</sup> suggest that the greatest future declines in disability may result from reductions in lifestyle risk factors.

Longitudinal studies of aging have shown strong associations between lifestyle risk factors and the incidence of disability, with substantial postponement of the onset of disability. A study of University of Pennsylvania alumni, initiated in 1986 at an average participant age of 68 years, documented postponement of disability by 7.75 years in those who exercised, had normal body mass indexes, and did not smoke compared with those who did not exercise, were obese, and smoked.<sup>13</sup> The cumulative lifetime disability of those with low risks was one fourth that of those with high risks. In a study of vigorous exercisers and community controls, the heavy exercising group was projected to postpone disability for 12.8 years compared with controls.<sup>14</sup> These disability postponements exceed any increases in life expectancy. In a study of the 418 members of the University of Pennsylvania cohort who had died,<sup>15</sup> those without risk factors had slow progression of disability beginning 10 years before death, whereas those at high risk had more disability throughout and also experienced a surge in disability to high levels in the 2 years before death.

In addition, randomized trials of health promotion programs for seniors, especially those using tailored print interventions specific to the participant, demonstrate significant improvement in health risk reduction, health status, and reduced medical care utilization.<sup>16,17</sup> Such programs hold promise for systematic approaches to improve senior health and potential attendant societal gains.<sup>18,19</sup> The promise of healthier lives through active approaches to primary and secondary prevention may yet accrue.

In general, postponing premature morbidity is likely to be easier than postponing premature death, not only for medical and social approaches but also for prevention-oriented approaches. The most prevalent conditions of later life, such as osteoarthritis, depression, isolation, and Alzheimer disease, have relatively little effect on mortality yet cause immense amounts of morbidity; postponement of the onset of these disorders or improvement in their treatment should help decrease morbidity substantially without major effect on average life expectancy.

The health of seniors is one of the greatest medical problems facing developed nations and is one of the largest single economic burdens. An urgency of addressing these issues is increasingly recognized.<sup>19,20</sup> In 2001, after an evidence-based review of senior health promotion programs determined that a Medicare demonstration project should be initiated, an experimental design project has begun with the goal of establishing effective health promotion as a Medicare benefit.<sup>21</sup> A consortium of concerned institutions and individuals (HealthPromotionAdvocates.org) has formed to actively seek legislative action for federal support to develop the basic and applied science of health promotion. Subsequent legislation would seek support for programs for the most vulnerable segments of the population. A Sense of the Congress Resolution on Building Health Promotion into the National Agenda has attracted strong support in both the Senate and the House, and Healthy Senior bills have been presented in both houses of Congress.

In 1990 I wrote in *THE JOURNAL* an editorial titled "The Sunny Side of Aging"<sup>22</sup> in which I urged a research agenda that would (1) establish an epidemiology of aging and trends in aging, (2) understand the fundamental basis of age-associated conditions and of nonfatal chronic illness, and (3) set a priority for documenting and implementing effective programs in prevention that could improve health and perhaps mitigate the economic consequences of unnecessary morbidity among older adults. It is still a good agenda, and a hopeful one, and health care has come quite a ways further along with it than it was. There are going to be a great many more older adults over the next decades, and it will be best if we are healthy seniors.

**Funding/Support:** This work was supported in part by grant AG15815 from the National Institute on Aging.

#### REFERENCES

1. Freedman VA, Martin LG, Schoeni RF. Recent trends in disability and functioning among older adults in the United States: a systematic review. *JAMA*. 2002; 288:3137-3146.
2. Manton KG, Gu X. Changes in the prevalence of chronic disability in the United States black and non-black population above age 65 from 1982 to 1999. *Proc Natl Acad Sci U S A*. 2001;98:6354-6359.
3. Singer BH, Manton KG. The effects of health changes on projections of health service needs for the elderly population of the United States. *Proc Natl Acad Sci U S A*. 1998;95:15618-15622.
4. Fries JF. Aging, natural death and the compression of morbidity. *N Engl J Med*. 1980;303:130-135.
5. Myers GC, Manton KG. Compression of mortality: myth or reality. *Gerontologist*. 1984;24:346-353.
6. Schneider EL, Brody JA. Aging, natural death, and the compression of morbidity: another view. *N Engl J Med*. 1983;309:854-856.

7. Day JC. *Population Projections of the United States by Age, Sex, Race, and Hispanic Origin: 1990-2050*. Washington, DC: US Government Printing Office; 1996. Current Population Reports, Publication 25-1130
8. McGinnis JM, Williams-Russo P, Knickman JR. The case for more active policy attention to health promotion. *Health Aff (Millwood)*. 2002;21:78-93.
9. US Department of Health and Human Services. *Physical Activity and Health: Report of the Surgeon General*. Atlanta, Ga: US Dept of Health and Human Services, Centers for Disease Control and Prevention; 1996:175-206.
10. Cutler DM. Declining disability among the elderly. *Health Aff (Millwood)*. 2001;20(6):11-27.
11. US Department of Health and Human Services. *Health, United States, 2000*. Washington, DC: US Dept Health and Human Services; July 2000. DHHS Publication No. 00-1232.
12. Lorig KR, Ritter P, Stewart AL, et al. Chronic disease self-management program: 2-year health status and health care utilization outcomes. *Med Care*. 2001;39:1217-1223.
13. Vita AJ, Terry RB, Hubert HB, Fries JF. Aging, health risks, and cumulative disability. *N Engl J Med*. 1998;338:1035-1041.
14. Wang BWE, Ramey DR, Schettler JD, Hubert HB, Fries JF. Postponed development of disability in senior runners: a 13-year longitudinal study. *Arch Intern Med*. 2002;162:2285-2294.
15. Hubert HB, Bloch DA, Oehlert JW, Fries JF. Lifestyle habits and compression of morbidity. *J Gerontol*. 2002;57A:M347-M351.
16. Fries JF, Bloch DA, Harrington H, Richardson N, Beck R. Two-year results of a randomized controlled trial of a health promotion program in a retiree population: the Bank of America study. *Am J Med*. 1993;94:455-462.
17. Fries JF, Harrington H, Edward R, Kent LA, Richardson N. Randomized controlled trial of cost reductions from a health education program: the California Public Employees Retirement System (CalPERS) study. *Am J Health Promot*. 1994;8:216-223.
18. Fries JF, Koop CE, Sokolov J, Beadle CE, Wright D. Beyond health promotion: reducing need and demand for medical care. *Health Aff (Millwood)*. 1998;17:70-84.
19. Rowe JW. Geriatrics, prevention, and the remodeling of medicare [editorial]. *N Engl J Med*. 1999;340:720-721.
20. Fries JF. Aging, cumulative disability, and the compression of morbidity. *Compr Ther*. 2001;27:322-329.
21. RAND Corp. *Evidence Report and Evidence-Based Recommendations: Health Risk Appraisals and Medicare*. Baltimore, Md: US Dept of Health and Human Services; 2002. Available at: <http://www.healthtrac.com/index.tam?Tame?SwitchTo=studies-rand-report>. Accessed December 14, 2002.
22. Fries JF. The sunny side of aging [editorial]. *JAMA*. 1990;263:2354-2355.

## Authorship for Research Groups

Annette Flanagin, RN, MA

Phil B. Fontanarosa, MD

Catherine D. DeAngelis, MD, MPH

**M**AJOR CLINICAL RESEARCH INVESTIGATIONS, especially large multicenter trials, require the involvement, cooperation, and dedication of many individuals. Roles and responsibilities range from conceiving the study and designing the protocol to collecting and analyzing the data, and numerous essential steps in between. Following completion of the study, the most important responsibilities are prompt preparation of a manuscript that reports the study findings, and timely submission of the paper to a journal for peer review, publication, and communication of the study findings to the scientific and clinical communities.

The number of collaborative studies and multicenter clinical trials seems to be growing, with increasing numbers of published articles involving a study group. For instance, 22% of the 185 research articles published in *JAMA* as Original Contributions in 2001 specifically identified a study group, compared with 6% of 172 Original Contributions published 10 years earlier. Authorship of these studies increasingly involves some indication of group participation and responsibility, reflecting the cooperative nature, multidisciplinary teamwork, and complexity of such investigations.

Many large trials and some large observational studies are often best known and frequently referred to by their study name (eg, the Women's Health Initiative)<sup>1</sup> or by their acronym (eg, GUSTO V).<sup>2</sup> Yet, the recognition of and authorship involved in these large group efforts have created dilemmas for journal editors, librarians, and researchers as well

as the members of these research groups. On the one hand, because large trials are often better known by their study names than the names of individual authors, it is helpful to have the name of the study group in the byline (ie, the position on an article's title page where authors are listed). On the other hand, because not all members of these research groups meet established authorship criteria<sup>3</sup> (see BOX), simply including the group name in the article byline does not distinguish those who qualify for authorship vs those who do not.

Several options are available to authors and editors for articles involving research groups. For articles published in *JAMA*, group authorship can be designated in several ways. In perhaps the most common format, the names of individuals are listed in the byline with a designation that these authors are writing on behalf of or "for" the research group:

Steven R. Steinhubl, MD, Peter B. Berger, MD, J. T. Mann III, MD, Edward T. A. Fry, MD, Augustin DeLago, MD, Charles Wilmer, MD, Eric J. Topol, MD, for the CREDO Investigators

In this case, the named individuals meet full criteria for authorship, complete THE JOURNAL's authorship forms (which includes indicating responsibility and specific contributions, disclosing conflicts of interest, and transferring or waiving copyright), and have their specific contributions as authors published at the end of the article.<sup>4</sup> The other group participants, who do not meet full authorship criteria, also may be listed as members of the group with their contributions or roles also designated (eg, investigators, study coordinators, members of the steering committee, members of the data and safety monitoring board).

**Author Affiliations:** Ms Flanagin is Managing Senior Editor, Dr Fontanarosa is Executive Deputy Editor, and Dr DeAngelis is Editor, *JAMA*, Chicago, Ill.

**Corresponding Author and Reprints:** Annette Flanagin, RN, MA, *JAMA*, 515 N State St, Chicago, IL 60610 (e-mail: [Annette\\_Flanagin@ama-assn.org](mailto:Annette_Flanagin@ama-assn.org)).