

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

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MAJOR 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)¹ or by their acronym (eg, GUSTO V).² 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 criteria³ (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.⁴ 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).

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Another approach involves identification of a writing group or committee in the byline as the group of authors writing on behalf of the research group:

Writing Group for the Women's Health Initiative Investigators

The individual authors constituting the writing group meet full criteria and requirements for authorship as stated above, and their names and contributions typically appear in the affiliation footnote on the first page of the article or are listed at the end of the article.¹ The names and roles of the other group participants also generally are listed at the end of the article.

However, some authors and research groups might prefer that only the group name appear in the bylines of their articles to emphasize the collaborative nature of the effort. In this case, another option is for the byline to list only the group name followed by an asterisk:

The DAVID Trial Investigators*

The asterisk corresponds to listing of the research group, which must include a specifically identified list of authors or writing group members whose names and contributions appear in the affiliation footnote on the first page or at the end of the article.⁵ This allows for group name recognition and formal association with the specific article, while maintaining the ability to identify named accountable authors. As with other options, all persons identified as authors or as part of a writing group must meet full authorship criteria, complete authorship forms, take responsibility for the article, and have their specific contributions as authors published at the end of the article.

In another possible, but rarely used format for group authorship, all members of the entire research group may be designated as authors, with only the name of the research group appearing in the byline. However, such an approach requires clear justification that each group member meets the full criteria and requirements to truly merit authorship.

All authors are required to indicate their contributions to the work,⁶ report their conflicts of interest,⁷ and transfer or waive their ownership of copyright for the work.⁸ Individuals who do not fulfill authorship criteria should not be identified as authors^{9,10} simply by virtue of being a member of the research group, or performing some activities such as acquisition of funding, enrolling patients, assisting in manuscript preparation, or supervising study personnel.³ The names of members of the research group who have made these or other contributions to the work, but who do not qualify for authorship, should be listed at the end of the article, with a description of their role.

The publication of group names in bylines has been reported to be problematic for bibliographic databases, such as those developed by the National Library of Medicine (NLM) and the Institute for Scientific Information (ISI).¹¹ Both institutions are working to improve their ability to capture and cite the names of research groups that appear as

Box. International Committee of Medical Journal Editors Criteria for Authorship³

Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. One or more authors should take responsibility for the integrity of the work as a whole, from inception to published article. Authorship credit should be based only on (1) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; and (2) drafting the article or revising it critically for important intellectual content; and (3) final approval of the version to be published. Conditions 1, 2, and 3 must all be met.

authors and to identify individually named authors who are part of groups. Until recently, however, articles that listed only a group name in the byline may not have been identified in standard bibliometric searches and may not have been cited by other authors.^{11,12} For example, group authors may have been added to the end of the title in the NLM index and the author field may have appeared as anonymous or blank (ie, "no authors listed"). In such cases, a PubMed search for articles using the research group or trial name as a search term might produce citations to a specific article. However, a search using the name of the first author in this group might not produce a citation to the same article. Moreover, the actual PubMed citation might indicate "no authors listed," and if the trial name was not part of the article title, the citation may not include any mention of the group at all. In the ISI database, the author field may have been listed as "anon" when no individual author was named in the byline. Thus, others may not be able to search for and capture citations that do not include the names of individual or group authors and may fail to cite them in subsequent papers.

Even when actually cited though, articles referenced by different means (ie, listing the group name, the first individual author, or a writing group) can create problems for bibliometric databases and may result in inconsistencies and inaccurate citation "weight" given to articles by ISI.¹³ For example, authors have cited the report of initial sequencing of the human genome published in *Nature*¹⁴ in 2001 by listing the International Human Genome Sequencing Consortium or by listing the first author (ie, ES Lander, et al). The ISI erroneously identified these types of citations as 2 different articles, and thus reported an undercount of total citations to the article.¹³ This became apparent when editors at *Nature* noted that the human genome sequence report published at the same time in *Science*¹⁵ was ranked by ISI as a highly cited paper and the comparable *Nature* article was not included on the high citation list.¹³ The *Science* article byline lists the individual authors by name (ie, J. Craig Venter, Mark A. Adams, Eugene W. Myers, et al).¹⁵ However, the *Nature* article lists the group name in the byline (ie, International Human

Genome Sequencing Consortium^{*}) and provides a partial list of named authors on the second page of the article that corresponds to the asterisk in the byline.¹⁴

To address these concerns, the ISI is working to link citations to articles whether the group name or first author in the group is cited. The NLM has designated 2 specific author fields: one for individually named authors and a second for group names. In addition, the current version of the NLM *Indexing Manual* indicates that any individuals who are part of a group and are listed explicitly as “authors” or members of a “writing committee,” at any point in the article, also will be listed as well in the NLM author field.¹⁶ When such indexing is fully functional, PubMed citations to specific trials published after 2001 should be identified when searching by either the group name or an individual author’s name, and citations to these articles should no longer appear as “no authors listed” provided journals indicate the name of the group, the names of the individual authors, or both.¹⁶

The names of research groups and individual authors should be formally associated with published articles as well as the bibliometric citations to these articles in online databases—and thus easily recognized and retrieved. Accordingly, we encourage the NLM and ISI to list both the group names and the names of individual authors, when both are published in the bylines and/or as author footnotes, in all citations and indexes. To ensure appropriate responsibility and credit, and to help direct citations and make them more readily retrievable, *JAMA* will include the research group name in the title or subtitle of relevant articles, even though this may appear redundant with some bylines, until it is clear that articles with group names in the bylines are consistently captured and cited in bibliometric databases.

THE JOURNAL will continue to require the identification of named and accountable authors for every article. Authors may choose whether they prefer to list individuals, or the research group name, or both individuals and the group name in the byline of articles. Recognizing the increasing

complexity and collaborative nature of clinical research, we hope the options available to authors of large research groups will allow for appropriate identification of individual and collective contributions, credit, and accountability.

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REFERENCES

1. Writing Group for the Women’s Health Initiative Investigators. Risks and benefits of estrogen plus progestin in healthy postmenopausal women: principal results from the Women’s Health Initiative randomized controlled trial. *JAMA*. 2002;288:321-333.
2. Lincoff AM, Califf RM, Van de Werf F, et al, for the GUSTO V Investigators. Mortality at 1 year with combination platelet glycoprotein IIb/IIIa inhibition and reduced-dose fibrinolytic therapy vs conventional fibrinolytic therapy for acute myocardial infarction: GUSTO V randomized trial. *JAMA*. 2002;288:2130-2135.
3. International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. October 2001. Available at: <http://www.icmje.org>. Accessed November 21, 2002.
4. Steinhubl SR, Berger PB, Mann JT III, et al, for the CREDO Investigators. Early and sustained oral antiplatelet therapy following percutaneous coronary intervention: a randomized controlled trial. *JAMA*. 2002;288:2411-2420.
5. The DAVID Trial Investigators. Dual-chamber pacing or ventricular backup pacing in patients with an implantable defibrillator: the Dual Chamber and VVI Implantable Defibrillator (DAVID) Trial. *JAMA*. 2002;288:3115-3120.
6. Rennie D, Flanagan A, Yank V. The contributions of authors. *JAMA*. 2000;284:89-91.
7. DeAngelis CD, Fontanarosa PB, Flanagan A. Reporting financial conflicts of interest and relationships between investigators and research sponsors. *JAMA*. 2001;286:89-91.
8. Instructions for authors. *JAMA*. 2002;288:108-114. Available at: <http://www.jama.com>.
9. Flanagan A, Carey LA, Fontanarosa PB, et al. Prevalence of articles with honorary authors and ghost authors in peer-reviewed medical journals. *JAMA*. 1998;280:222-224.
10. Mowatt G, Shirran L, Grimshaw JM, et al. Prevalence of honorary and ghost authorship in Cochrane reviews. *JAMA*. 2002;287:2769-2771.
11. Dickersin K, Scherer R, Suci EST, Gil-Montero M. Problems with indexing and citation of articles with group authorship. *JAMA*. 2002;287:2772-2774.
12. Errors in citation statistics. *Nature*. 2002;415:101.
13. Cherfas J. With missing citations reported: *Nature* genome paper jumps. *Sci Watch*. 2002;13:8.
14. International Human Genome Sequencing Consortium. Initial sequencing and analysis of the human genome. *Nature*. 2001;409:860-921.
15. Venter JC, Adams MA, Myers EW, et al. The sequence of the human genome. *Science*. 2001;291:1304-1351.
16. National Library of Medicine. *Indexing Manual*. Bethesda, Md: National Library of Medicine; 2001:section 41.