

## *How to Write, Publish, and Present in the Health Sciences*

A profound, if unacknowledged, truth is that *science could not exist without writing*. The characteristics that make science science – that it is public, objective, reproducible, predictive, cumulative, and systematic – all depend on written communication. Further, *publication is the final stage of research*. If the research is not published, it never happened. Thus, scientific writing and publishing drive the advancement of both science and scientists.

Another truth, likewise unacknowledged, is that scientific writing is not just about *writing*. It is about *communicating* with graphs, tables, statistics, and images, as well as with words. It is about *persuading* readers with reason, fact, and logic to accept the research as credible. It is about *documenting* experimental protocols, analytical methods, and results so that the research can be evaluated, interpreted, and replicated. It is about *archiving* the research in the scientific literature so that others can find it, learn it, and build on it.

By addressing these other functions of scientific writing, *How to Write, Publish, and Present in the Health Sciences* goes well beyond the usual books in this field to create a uniquely valuable resource. It provides advice and techniques for preparing formal scientific communications: abstracts, posters, slides, grant proposals, and scientific articles. It also addresses the related topics of writing effectively and efficiently; preparing tables, graphs, drawings, and photographs for publication; creating posters and slides; and documenting clinical and laboratory images for publication.

**Tom Lang, MA**, began his career in scientific publications in 1973, at Lawrence Livermore National Laboratory. Since then, he has been a medical writer at Loma Linda University Medical Center; a senior grant writer at California State University, Chico; Manager of Medical Editing Services for the Cleveland Clinic; and a senior scientific writer at the Evidence-based Practice Center at Tufts University/New England Medical Center. He is currently an international consultant and educator in medical writing and editing, scientific publications, and written communication.

He is a Past President of the Council of Science Editors, Treasurer of the World Association of Medical Editors, and the recipient of the American Medical Writers Association's 2002 Harold Swanberg Distinguished Service Award for his contributions to medical communications. His book, *How To Report Statistics in Medicine: Annotated Guidelines for Authors, Editors, and Reviewers*, now in its second edition, has become a standard reference. He teaches medical writing at the University of Chicago and the University of the Sciences in Philadelphia and has received teaching awards from the University of Chicago, the American Statistical Association, and the American Medical Writers Association. His master's degree is in Communications Management from the Annenberg School for Communication at the University of Southern California.

**Praise for**  
*How to Write, Publish, and Present in the Health Sciences*

A lucid, knowledgeable, and engaging guide on to how to publish your research, and how to do it well. This book has information that nobody tells you but is critical to know when you submit to a journal.

**Steven Goodman, MD, PhD**  
**Johns Hopkins Schools of Medicine and Public Health**



Tom Lang's new book upholds his reputation for providing practical instructions about how to write for publication. It will be useful for new and established authors alike; I will recommend this book to the faculty, fellows, and post-doctoral trainees I mentor.

**Michelle Berlin, MD, MPH**  
**Oregon Health & Science University, Portland, Oregon**



This book is a well organized, comprehensive, and authoritative reference for medical scientists and laboratory researchers. The author thoroughly covered the fundamentals of reporting and presenting medical research, especially basic research.

**Kenichi Hayashi, Chief Executive Officer**  
**Alamedic Co., Ltd., Tokyo, Japan**



*How to Write, Publish, and Present in the Health Sciences* is, in fact, an important and practical guide for clinicians and laboratory researchers. I will recommend it to my postgraduate students and faculty colleagues.

**Professor Liu Jianhua, MD, PhD, MS, DDS**  
**Zhejiang University School of Medicine, Hangzhou, China**



This is a wonderful guide for scientific writers. Clearly written, it is also well organized. Advice and examples are crisp and current with the expanding changes in both paper and electronic publishing.

**John Hoey, MD, FRCPC, FACP, Associate Editor, Open Medicine**  
**Former Editor, Canadian Medical Association Journal**

This highly readable guide is a veritable treasure trove of practical information and helpful tips for health researchers at all levels of experience. It will be especially useful for beginning investigators and their mentors. I have never seen anyone get into this level of practical detail.

**Richard L. Kravitz, MD, MSPH**  
**Department of Internal Medicine, University of California, Davis**



Lang's earlier book on how to report medical statistics proved so useful that I bought a second copy to keep in my home office. His new book features the same type of pragmatic advice on the nuts and bolts of scientific writing.

**David A. Grimes, MD**  
**University of North Carolina School of Medicine**



We are forming a new MS curriculum in clinical investigation, and everything in this book maps to something in our list of core competencies. I wish everyone involved in medical research would absorb the new chapter on tables and graphs.

**Ralph O'Brien, PhD**  
**Center for Clinical Investigation, Case Western Reserve University**



This book is a great resource for teaching researchers how to present their work.

**Cynthia Mulrow, MD, MSc, Deputy Editor**  
**Annals of Internal Medicine**



Tom Lang goes beyond being an expert in health science publishing because his books increase the potential of everyone in the field. In each chapter of this book, he presents realistic examples in considerable detail, allowing readers to learn approaches that are truly helpful to authors and editors.

**Cate Timmerman**  
**Co-President, Palladian Partners, Inc.**



Lack of money is no obstacle. Lack of an idea is an obstacle.

**American inventor and television personality, Ken Hakuta ("Dr. Fad")**

# **How to Write, Publish, and Present in the Health Sciences: A Guide for Clinicians and Laboratory Scientists**

With a Foreword by  
**Stanly Lemeshow, PhD, Professor and Dean**  
College of Public Health, The Ohio State University

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## ABOUT THE AUTHOR

I graduated from California State University, Chico, in 1973, with a BA degree in Social Science—emphasis on the science—and there developed an interest in both research and writing. My first job out of college was as a technical writer at Lawrence Livermore Laboratory in California, where I was trained to edit journal articles and technical reports in the physical sciences. Later, as an inpatient normal volunteer for medical research at the National Institutes of Health in Bethesda, Maryland, for more than a year I learned about medical research the hard way and at the same time interned in the Department of Graphic Design at the National Library of Medicine.

Having lived in a hospital long enough, I returned to Chico, and, as an independent writer, became the co-author of a college text on personal health, *Health Behaviors: Concepts, Values, and Options*, which covered life "from birth to earth, womb to tomb, sperm to worm, and lust to dust." The book done, and now with a solid background in health science, I became a medical writer at Loma Linda University Medical Center in southern California. Eventually returning to Chico, I worked as a Senior Grants Officer in the University's Office of Institutional Pandering for several years.

After receiving an MA degree in Communications Management from the Annenberg School for Communications at the University of Southern California, I became Manager of Medical Editing Services for the Cleveland Clinic Foundation in Cleveland, Ohio, in 1990. In addition to editing and preparing for publication manuscripts from all clinical departments and from the Research Institute, I was involved with the design and evaluation of the procedures for producing the *Cleveland Clinic Journal of Medicine*. During this period, I also published *How to Report Statistics in Medicine: Annotated Guidelines for Authors, Editors, and Reviewers*, which led to participation in the CONSORT, QUOROM (now PRISMA), and MOOSE Committees that develop standards for reporting medical research.

My interest in evidence-based medicine and outcomes research took me next to Boston, as a Senior Scientific Writer for the New England Cochrane and Evidence-Based Practice Centers at the New England Medical Center/Tufts University School of Medicine. Despite wonderful working conditions at the Medical Center, personal reasons took me back to Cleveland, where I became an independent consultant in scientific publications and medical writing. I now live in Davis, California, where I am Chief of Stick Throwing for my dog, Velvet, the world's most solicitous Black Lab-Golden Retriever mix.

I have taught on the University of Chicago's Medical Writing and Editing Certificate Program since its inception in 1998 and since 2005 have been an Adjunct Professor of Biomedical Writing in the Biomedical Writing Masters Degree Program at the University of the Sciences in Philadelphia, the nation's oldest college of pharmacy.

In 2005, I received the first Excellence in Teaching Award from the Graham School of General Studies, through which the University of Chicago's medical writing and editing program is run. I received the 2002 Excellence in Continuing Education Award from the American Statistical Association and the 1994 Golden Apple Award for Outstanding Workshop Leader

from the American Medical Writers Association, which also bestowed on me its 2002 Harold Swanberg Award for Outstanding Contributions to the Field of Medical Writing.

Other professional activities have included being the President of the Council of Science Editors, a Fellow of the American Medical Writers Association, and the Treasurer of the World Association of Medical Editors. I have taught more than 100 Core and Advanced Curriculum Workshops for the American Medical Writers Association, helped develop and teach the Council of Science Editors' ShortCourse on Statistics for Editors, and since 2001 have conducted annual trainings for the Japanese Union of Scientists and Engineers in Tokyo.

As an independent consultant, trainer, and educator, I teach regularly throughout the United States, Canada, Japan, China, and Europe and occasionally in India and Africa. I provide medical writing and editing services to physicians and researchers in the health sciences, teach medical writing at universities and for professional organizations, train editorial boards and medical writing groups, and consult with university-based medical communications programs and professional associations, here and abroad.

My current professional focus is to promote what I call "analytical editing," or the ability to understand, critique, and report research designs and activities, statistical methods and results, and clinical and laboratory procedures, skills that contribute to the practice of evidence-based medicine. A second focus is to develop the practice of "evidence-based writing and editing"—the application of results from composition, readability, and cognitive science research to improving scientific communication—to advance the profession of medical writing. A third interest is developing ways to document and measure the value-added and productivity of medical writers and editors.

Tom Lang  
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April 2008

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