

Third
Edition

NEWS & NUMBERS

**Victor Cohn and
Lewis Cope**
with Deborah Cohn Runkle

 WILEY-BLACKWELL

Praise for
News & Numbers

“*News & Numbers* is a classic that should be a must-read for journalists in all fields, from business to sports. It provides practical advice for avoiding embarrassing statistical pitfalls.”

**Cristine Russell, President, Council for
the Advancement of Science Writing**

“The demand for press coverage of science and medicine is growing as public interest grows. This book sets the standard. It uses simple language to teach the layman or the scientist how to read and understand scientific publications. Even more important, it teaches one to critically interpret and think about research findings and ask the right questions. This is a book that you can read from cover to cover and then keep as a reference.”

**Otis Brawley, Chief Medical and Scientific Officer,
American Cancer Society**

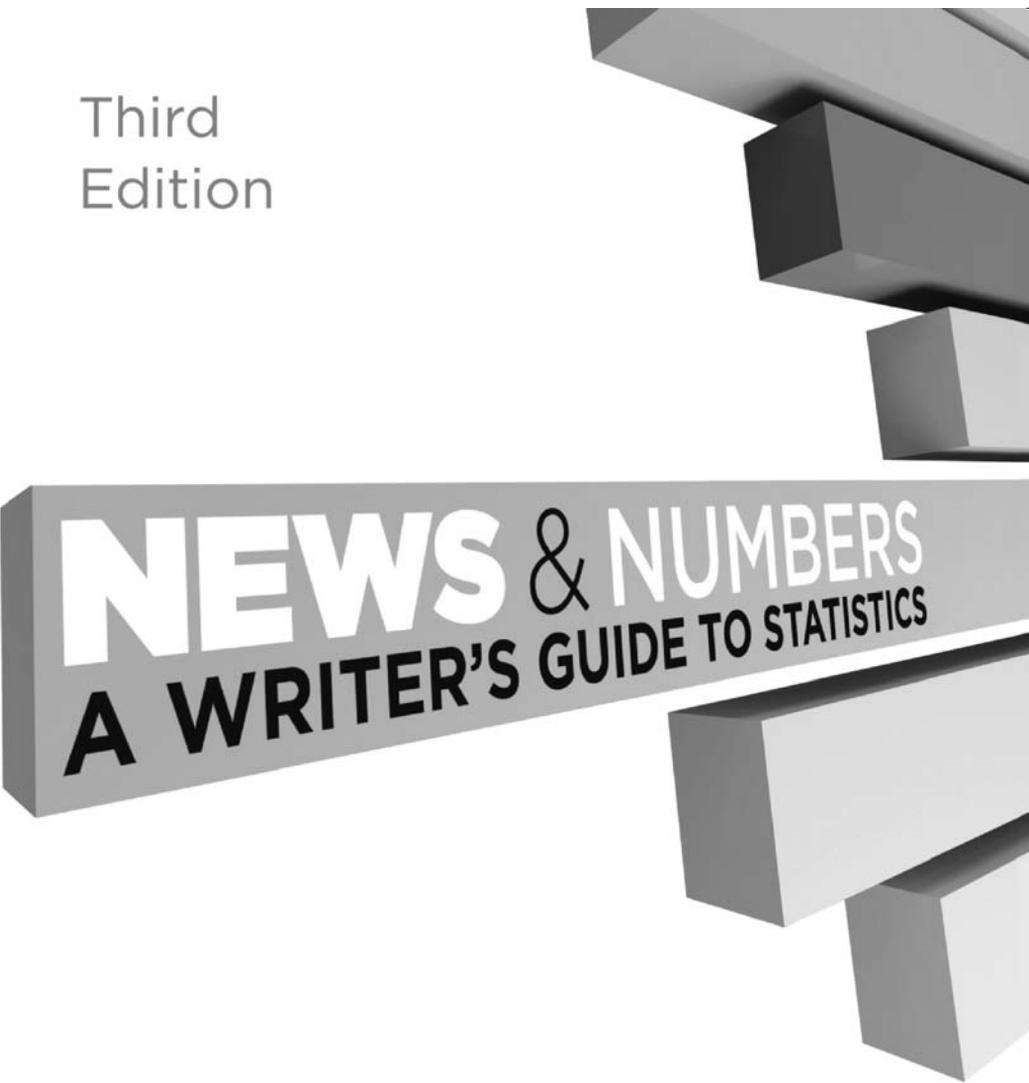
“Vic Cohn’s reporting inspired a generation of science and health writers, and he kept us on the straight and narrow with his concise and engaging book on how to interpret scientific studies. Now updated and expanded, his classic guide to statistics should be essential reading, not just for reporters but for anybody trying to separate science from pseudoscience in the torrent of unfiltered information flowing over the internet.”

Colin Norman, News Editor, *Science* magazine

“The third edition of *News & Numbers* is welcomed, bringing alive again with new examples the wisdom and uncommon common sense of a great man and missed colleague. The updates by Lewis Cope and Vic’s daughter, Deborah Cohn Runkle, add freshness and immediacy to the advice Vic gave.”

**Fritz Scheuren, 100th President, American
Statistical Association**

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Edition



NEWS & NUMBERS
A WRITER'S GUIDE TO STATISTICS

**Victor Cohn and
Lewis Cope**
with **Deborah Cohn Runkle**

 **WILEY-BLACKWELL**

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A Note to Our Readers

This is a book to help you decide which numbers and studies you probably can trust and which ones you surely should trash.

The rules of statistics are the rules of clear thinking, codified. This book explains the role, logic, and language of statistics, so that we can ask better questions and get better answers.

While the book's largest audience has been health and other science writers, we believe that it can also be helpful to many other writers and editors, as well as to students of journalism. Health studies are emphasized in many of the chapters because they are so important and they illustrate many principles so well. But this book shows how statistical savvy can help in writing about business, education, environmental policy, sports, opinion polls, crime, and other topics.

News & Numbers is the brainchild of the late Victor Cohn, a former science editor of the *Washington Post* and sole author of the first edition. I'm glad I could help with later editions, but this is still "Vic's book." His inspiring spirit lives on with this edition.

I am particularly pleased that one of his daughters, Deborah Cohn Runkle, a science policy analyst at the American Association for the Advancement of Science, has provided her expertise to help update and expand this latest edition of *News & Numbers*.

We've added a chapter to delve deeper into writing about risks. With President Obama's health system overhaul plan now law, we've added new things to think about in the chapter on health care costs and quality. There's also a new section on "missing numbers" in the last chapter that we hope will stir your thinking. And we've added other new information that we hope you will enjoy along with the old.

Lewis Cope

A Tribute to Victor Cohn, 1919–2000

Victor was a pioneer science writer and a master of his craft. Often referred to as the “Dean of Science Writers,” he became the gold standard for others in his profession.

Beginning his career in the mid-1940s, following service as a naval officer in World War II, he quickly showed an uncanny ability to write about complex medical and other scientific topics in clear, easy-to-understand ways. He provided millions of readers with stories about the landing of the first humans on the moon, the development of the polio vaccine, the then-new field of transplant surgery, the latest trends in health care insurance and medical plans, and many, many other exciting developments over a career that lasted more than 50 years. Throughout, he remained diligent at explaining the cost and ethical issues that came with some of the advances, particularly in the medical sciences.

As part of all this, he showed his fellow journalists the importance of probing numbers to discover what they can reveal about virtually every aspect of our lives. He wrote *News & Numbers* to share his techniques for doing this in the most revealing and the most responsible way. His quest for excellence in reporting lives on in the Victor Cohn Prize for Excellence in Medical Science Writing, awarded yearly by the Council for the Advancement of Science Writing. With this new edition, Victor’s message lives on.

Lewis Cope, coauthor of this edition

Foreword

I've long thought that if journalists could be sued for malpractice, many of us would have been found guilty some time ago. We often err in ways that inevitably harm the public – for example, by distorting reality, or framing issues in deceptively false terms. Among the tools we sometimes wield dangerously as we commit our version of malpractice is the subject of this book: numbers. At one time or another, most of us have written a story that either cited as evidence some number of dubious provenance, or that used numbers or statistics in ways that suggested that the meaning of a medical study or other set of findings was entirely lost upon on us.

Fortunately for many of us, before we did any serious harm, someone handed us a copy of Vic Cohn's marvelous *News & Numbers*, now released in a third edition co-authored by Vic and Lewis Cope, with the assistance of Vic's talented daughter, Deborah Cohn Runkle. I was rescued in this fashion early in my journalistic career, and later had the honor of meeting Cohn and thanking him for his wonderful book. With the advent of this new edition, it is heartening that an entirely new generation of journalists will now have the chance to be saved similarly from their sins.

Much of the content of this book will be familiar to readers of previous editions, even as some of the examples have been updated to reflect recent events, such as the now-discredited vaccines-cause-autism controversy, or the 2010 BP oil spill in the Gulf of Mexico. Perhaps the most important lesson is that almost all stories of a scientific nature deal with an element of uncertainty. And with so much to study amid the rapidly changing sciences of medicine and health care, "truth" often looks more like the images of a constantly shifting kaleidoscope than a message carved on a stone tablet. Thus the book's excellent advice: "Good reporters try to tell their readers and viewers the degree of uncertainty," using words such as "may" or "evidence indicates" and seldom words like "proof."

Foreword

From the standpoint of the First Amendment, it's a good thing for society that reporters don't have to be licensed. But it's not so good that one can become a reporter – even for an esteemed national publication or news channel – without even a rudimentary grasp of statistics. This book's crash course on probability, statistical power, bias, and variability is the equivalent of educating a novice driver about the rules of the road. Readers will also be introduced to the wide array of types of medical and scientific studies, and the strengths and weaknesses of each.

Portions of several chapters are devoted to the all-important topic of writing about risk. Important concepts are defined and differentiated, such as relative risk and absolute risk – two different ways of measuring risk that should always be stated together, to give readers the broadest possible understanding of a particular harm. A useful discussion focuses not just on distortions that journalists may make, but common public perceptions and misperceptions that affect the way readers or viewers respond to various risks.

Among the new entries in this edition is a chapter on health costs, quality, and insurance, which wisely cautions careful observation of the effects of the 2010 Affordable Care Act. Because this chapter was written so far ahead of the implementation of most of the law in 2014, its main message is “wait and see” what happens. Perhaps equally important is to encourage journalists to consider and convey to our audiences the totality of the law's effects, which inevitably will bring tradeoffs – for example, possibly more spending on health care because many more Americans have health insurance. As critical as verifying the “numbers” coming out of health reform will be understanding how the many different sets of numbers will relate to each other, and what values – and I don't mean numerical ones – Americans will assign to the collective results.

Overall, this new edition upholds Cohn's perspective that behind bad use of numbers is usually bad thinking, sometimes by the user and sometimes by the person who cooked up the numbers in the first place. And Cohn was a staunch believer in the notion that journalists had a duty to be good thinkers. This edition's epilogue quotes a list Cohn once made of what constitutes a good reporter; one entry asserts, “A good reporter is privileged to contribute to the great fabric of news that democracy requires.” This edition powerfully evokes Cohn's spirit, and his belief that, with that privilege, the responsibility also comes to get the facts – and the numbers – right.

Susan Dentzer
Editor-in-Chief, *Health Affairs*

Acknowledgments

Victor Cohn's main mentor and guide in preparation of the first edition of this book was Dr. Frederick Mosteller of the Harvard School of Public Health. The project was supported by the Russell Sage Foundation and by the Council for the Advancement of Science Writing.

Cohn did much of the original work as a visiting fellow at the Harvard School of Public Health, where Dr. Jay Winsten, director of the Center for Health Communications, was another indispensable guide. Drs. John Bailar III, Thomas A. Louis, and Marvin Zelen were valuable helpers, as were Drs Gary D. Friedman and Thomas M. Vogt at the Kaiser organizations; Michael Greenberg at Rutgers University; and Peter Montague of Princeton University. (For those who aided Cohn with the first edition of this book, the references generally are to their universities or other affiliations at the time of that edition's publication.)

For their assistance with later editions, special thanks go to: Dr. Michael Osterholm of the University of Minnesota, for his great help on epidemiology; Rob Daves, director of the Minnesota Poll at the Minneapolis-St. Paul *Star Tribune*, for sharing his great expertise on polling; and Dr. Margaret Wang of the University of Missouri-Columbia, for her great enthusiasm about all aspects of patient care.

Very special thanks go to Cohn's daughter Deborah Cohn Runkle, a senior program associate at the American Association for the Advancement of Science. Without her encouragement and assistance, this edition would not have been possible.

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Despite all this great help, any misstatements remain the authors’ responsibility.

Notes on Sources

Book citations – The full citations for some frequently cited books are given in the bibliography.

Interviews and affiliations – Unless otherwise indicated, quotations from the following are from interviews: Drs. Michael Osterholm, University of Minnesota; John C. Bailar III, Peter Braun, Harvey Fineberg, Thomas A. Louis, Frederick Mosteller, and Marvin Zelen, at Harvard School of Public Health; H. Jack Geiger, City University of New York; and Arnold Relman, *New England Journal of Medicine*. In most cases, people cited throughout the book are listed with their academic affiliations at the time that they first were quoted in an edition of *News & Numbers*.

Quotations from seminars – Two other important sources for this manual were Drs. Peter Montague at Princeton University (director, Hazardous Waste Research Program) and Michael Greenberg at Rutgers University (director, Public Policy and Education Hazardous and Toxic Substances Research Center). Quotations are from their talks at symposiums titled “Public Health and the Environment: The Journalist’s Dilemma,” sponsored by the Council for the Advancement of Science Writing (CASW) at Syracuse University, April 1982; St. Louis, March 1983; and Ohio State University, April 1984.

Part I

Learning the Basics

A Guide to Part I of *News & Numbers*

In the first five chapters, we cover the basics:

1. **Where We Can Do Better**
Improving how stories with numbers are reported.
2. **The Certainty of Uncertainty**
Scientists are always changing their minds.
3. **Testing the Evidence**
Thinking clearly about scientific studies.
4. **What Makes a Good Study?**
Separating the wheat from the chaff.
5. **Your Questions and Peer Review**
What to ask the experts.