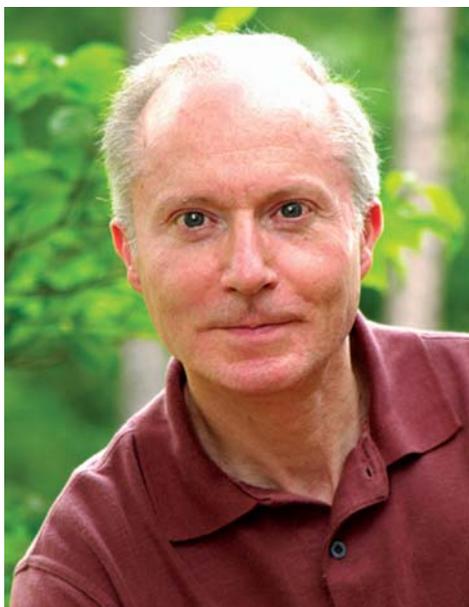


Giving a Voice to Environmental Health Research

by Thomas J. Goehl



Thomas J. Goehl is editor-in-chief of the National Institute of Environmental Health Sciences journal Environmental Health Perspectives (EHP). Previously, he has held positions with Sterling-Winthrop Research Institute, University of Pittsburgh, U.S. Food and Drug Administration, and the U.S. National Toxicology Program. He has been associated with EHP for the last 11 years initially as science editor and then as editor-in-chief. He has conducted research and published in the areas of bioanalytical chemistry, pharmaceuticals, pharmacology, and toxicology.

Translation of scientific research to health care providers, public health practitioners, and the lay public is an important goal with a high priority. Other terms besides “translation,” such as “diffusion,” “information sharing,” “knowledge transfer,” and “dissemination,” are used to convey this concept of translation. However, long before the term “translation” entered popular use, the National Institute of Environmental Health Sciences (NIEHS) was aware of this need. This led Dr. David Rall, the institute’s second director, to establish the bimonthly journal *Environmental Health Perspectives (EHP)*. In an accompanying letter to the inaugural 1972 issue of the journal, Rall wrote:

I have long been impressed by the need for a journal which would provide a vehicle for the rapid publication of research findings on environmental factors which might have broad impact on human health; a forum for exploration in context and perspective of basic research on environmental constituents; a focus for those aspects of environmental research which have implications for human health; and a medium for publication and exchange of adequately documented negative findings from research into these topics. It is my hope that *EHP* will fulfill these goals. (Rall 1972).

For that first year of publication, *EHP* was considered by Dr. Rall to be an experimental journal, with the hope and expectation that the fledging publication would become a respected vehicle for communication of environmental health issues—a voice for environmental health research. The journal was not only to contain unsolicited papers on diverse topics but also publish compilations of papers from scientific conferences devoted to single topics.

These goals were admirably met over the next 20 years with the publication of 100 volumes of peer-reviewed research articles along with those based on presentations at scientific conferences. Thus, *EHP* provided a forum for the dissemination of credible environmental health

Ensuring the quality, credibility, and timeliness of information published are the foremost responsibilities of a journal.

information to meet the needs of the scientific community; that is, the journal was a vehicle that aided in the translation of research into practice. However, the research papers often were not easily understood by the informed lay public.

The eventual expanded role of *EHP* as a vehicle for the dissemination of authoritative information for both health professionals and the lay public was foreseen in an editorial accompanying the second issue. The guest editorialist, Edward Burger from the U.S. Office of Science and Technology, wrote about the need for information to be disseminated beyond the scientific community. Burger put forth that the public must be educated on regulatory matters dealing with their health and the environment. He also noted that for the information to be effective it must be presented in a balanced manner, avoiding sensationalism (Burger 1972).

EHP's Transformation

In 1992 Dr. Kenneth Olden, the next director of NIEHS, took a characteristically bold step and made a sweeping restructuring of *EHP*. The journal would now provide not only the best science for the professional but also would offer the added dimension of environmental news, fulfilling the need first expressed in Burger's editorial published 20 years earlier. Olden's vision was that the new format would spark interest and stimulate research on the impact of the environment on human health.

The first issue of the newly reformatted journal was published on Earth Day, 22 April 1993, under the editorship of NIEHS scientists George W. Lucier and Gary E.R. Hook, both of whom had guided the journal since the early 1970s. *EHP* became a monthly journal that included sections devoted to environmental news, peer-reviewed research, commentary, and opinion.

Publishing peer-reviewed monographs was retained as a series of supplements.

The goals of the restructured journal were clearly identified in Lucier and Hook's initial editorial, where they wrote:

Traditionally, laboratory researchers have tended to communicate primarily with each other, and the dissemination of information to the public has been slow and haphazard. It is clear that enhanced communications could contribute to the avoidance of environmental crises through both increased understanding of the underlying science and the identification of potential problems before they become overwhelming, expensive, and perhaps irreversible. (Lucier and Hook 1993)

This transformation of *EHP* positioned the journal to become the principal vehicle for the dissemination of basic research as applied to environmental public health. Again, the NIEHS took another step in participating in the translation of research into practice and kept the institute in the forefront of this movement.

From 1993 to 2002 the supplements series was very well-received by the scientific community. However, because of resource limitations, only six supplements could be published annually and each supplement addressed only one or two topics. This limitation led to the idea of covering more topics but in a more concise manner. Thus, the following year, the mini-monographs were introduced. These were intended to meet the same principal goal as the supplements—to provide a balanced, updated landmark statement on a particular subject. Each mini-monograph comprised up to six concisely written manuscripts that addressed a specific topic and included original research, reviews, or a combination of original research and review. This series goes beyond the limits of the traditional review article by providing insights and in-depth coverage that a traditional review cannot. The mini-monographs provide a quicker read and are intended for researchers, teachers,

legislators, and the informed public. An added feature is that mini-monographs are published throughout the year as special sections in the journal.

The Electronic Age

Over the course of the first 3 years of the newly restructured journal, *EHP* embraced new research technologies and grew as an important vehicle for the dissemination of environmental health information and research findings. In 1996 *EHP* took another bold step and began online publication of the journal. In a later editorial, Hook and Lucier (1997) said that the new service being established by the NIEHS "can better serve the community of environmental health scientists, regulatory agencies, and the interested public." They also noted that the availability of the electronic version was "designed to facilitate the dissemination of environmental health information . . . [and that] . . . the world of communications as it exists today is quite different from what it used to be 10 years ago. Communication is becoming more and more based on the Internet". In the 9 years since the introduction of the online version of *EHP*, the number of individuals visiting the website monthly has increased to more than 150,000.

The *EHP* website (<http://www.ehponline.org>) provides the same current, credible environmental news articles and research findings available in the print version but offers additional services as well. One of these is *EHP*-in-Press articles. These articles are peer-reviewed papers published in downloadable PDF file format within 24 hours of acceptance. Full citation is possible using the CrossRef Digital Object Identifier (DOI) system (<http://www.crossref.org/>). The CrossRef DOI system, which *EHP* began using in 2002, is a reference-linking service that functions as a digital switchboard allowing linkages through DOI codes that are tagged to article metadata supplied by the participating publishers.

Through online publication along with the CrossRef DOI system, *EHP* makes peer-reviewed research findings available much more rapidly. Instead of months from acceptance to publication, we now are able to make the accepted peer-reviewed manuscripts available on our website within 24 hours of acceptance. And, it is worth repeating that these articles are fully citable using the assigned DOI number.

Open Access

The move to online publication then spawned the very serious possibility of *EHP* becoming an open access

journal. If there is one issue that breeds controversy in the world of publishing, it is the idea of open access. This struggle for open access to the scientific literature that began in earnest a decade ago continues unabated today.

The open access philosophy was formalized at an Open Society Institute meeting in 2001 (http://www.soros.org/initiatives/information/focus_areas/openaccess). The consensus goal of the meeting participants was to work to provide on the internet peer-reviewed scientific literature without restriction. The participants hoped that such a move would accelerate the pace of research, stimulate learning, and improve the usefulness of the available literature.

After discussing these issues extensively, Dr. Olden decided the time was right for *EHP* to adopt an open access model:

After carefully considering various scientific publishing models, we have concluded that the rationale behind the open access philosophy—that science best benefits society when it is freely and immediately available to all—is just too compelling to ignore. And as part of the United States government, we feel it is incumbent on us to take a leadership role in this area. (Olden and Goehl 2004)

Not only did we begin making all current *EHP* content freely and immediately available on our website, but we also opened up all archival research content and news articles. We are also depositing *EHP* research content into the National Library of Medicine (NLM) public digital library archive PubMed Central (<http://www.pubmedcentral.nih.gov/>), which is another essential feature of the open access model.

International Outreach Initiatives

Converting to an open access model allowed us to accelerate our international translation efforts, which had begun almost 10 years previously when *EHP* began providing free subscriptions to institutions in developing countries. Dr. Olden felt that it was critical to make information available internationally (Olden 1995).

EHP remains one of the few journals that provides complimentary print copies of the journal to institutions in developing countries. Many journals provide free or low-cost online access, but the problem with this approach is that internet accessibility is often limited in some developing countries.

Our next step in building our international program was to launch the *EHP* Chinese language edition. A quarterly Chinese-language edition is now published

jointly by the NIEHS and the Shanghai Centers for Disease Control and is distributed to 35,000 readers throughout the world. This edition contains original editorials, translated environmental news articles, and synopses of news and research articles.

Another aspect of our efforts to share international content is the posting of online translations of summaries of *EHP* articles in Chinese, French, Japanese, Russian, and Spanish (<http://ehpnet1.niehs.nih.gov/docs/iti.html>). We provide this service because we understand the skill and effort needed to translate articles from English to other languages. By providing translated summaries of articles, interested readers can make informed decisions on choosing the articles they would like to have fully translated into their native languages. We are committed to doing everything possible to allow the cutting-edge environmental health research published in our journal to benefit people across the globe.

Capacity Building Efforts

All journal publishers face many formidable obstacles in their efforts to publish critical health information. Regional journals in the developing world face even more difficult challenges, including political and institutional stability. The benefits of the regional journals are unique. One of the main benefits is that these journals provide research articles relevant to local situations that would not otherwise be published in international journals. Other benefits are that these regional journals provide training opportunities for young researchers and are a source for continuing medical education.

Dr. Olden understood that journal capacity building is critical to improving world health. He committed NIEHS to work closely with the Fogarty International Center (FIC) and the NLM to develop an initiative for regional journal capacity building in developing countries. To date, the most extensive program is in Africa.

On the African continent there is a severe shortage of viable medical and scientific journals. The above-mentioned three agencies of the National Institutes of Health are participating in building capacity through collaborations between medical journal editors in the Northern hemisphere and in sub-Saharan Africa (<http://www.fic.nih.gov/about/drcetradv20030916.html>). This African journal partnership is an ambitious program. Journal participants from the Northern hemisphere (*Journal of the American Medical Association*, *The Lancet*, *British Medical Journal*, *American Journal of Public Health*, and *Environmental*

Health Perspectives) were partnered with journal participants from the Southern hemisphere (*African Health Sciences*, *Ghana Medical Journal*, *Mali Medical*, and *Malawi Medical Journal*). Through the partnership program, computer hardware and software needs of the African journals are met, training for editors, authors, and reviewers is provided, business management issues are addressed, journal websites are developed or enhanced, and systematic medical reviews on topics relevant to the region are commissioned.

Another region of the world that has a very limited number of health journals is Latin America. We are currently in the initial stages of developing a partnership program similar to the African journal partnership. At this point, partners and funding mechanisms are being sought. Potential partners include the *American Journal of Public Health* (AJPH), Asociacion Latino Americana de Educacion en Salud Publica, FIC, International Society for Environmental Epidemiology (ISEE), International Training in Environmental and Occupational Health (ITREOH) program awardees, NIEHS, NLM, and the Pan American Health Organization (PAHO).

EHP is entering into partnerships with journals in other countries with the same objective of developing strong regional journals that provide high quality research articles in subject areas relevant to their own populations. For example, *EHP* is working in partnership with the Mount Sinai School of Medicine, which has a ITREOH grant from FIC, and the Asociacion Chilena de Seguridad to support the development of the Latin American journal *Ciencia y Trabajo* (www.cienciaytrabajo.cl) in providing news content and technical consultation. We are also working with the Chinese journal *Journal of Environmental and Occupational Medicine* to co-publish environmental medicine articles in both Chinese and English.

Educational Initiative

The hope for improvement of our environment health lies with our children. Knowing this, *EHP* and the Community Outreach and Education Program (COEP) of the NIEHS have jointly launched a student edition of *EHP*. After conducting a survey of 1,500 U.S. high school science teachers, we determined that a science curriculum focused on news articles published in *EHP* would be an ideal way to stimulate a student's natural interest in the environment to motivate science learning.

A one-year pilot project was launched this year in which 60 U.S. high school science teachers are being

provided with free print copies of the *EHP* Student Edition for use in their classrooms. Monthly lesson plans are developed by COEP members and provided on our website for free download by participating teachers. The three standards-based lesson plans list specific skills and meet all national and state educational standards of the schools. Lessons are aligned with National Science Education Standards in biology, chemistry, environmental science, earth science/geology, and physical science. The subject focus rotates to complement the various scientific disciplines and demonstrate the interdisciplinary nature of environmental health.

More than 60 teachers will be provided with print copies of the Student Edition and any teacher can participate in the program by downloading articles and lesson plans from the *EHP* science education website (www.ehponline.org/science-ed).

Conflicts of Interest

Because of the increasing importance of the research that *EHP* published, we decided in 2002 to strengthen the journal's position on the question of conflicts of interests. To focus the concern because the phrase "conflicts of interest" is such a broad term, in 2003 we decided to limit reportable conflicts to competing financial interests. In the October 2004 issue, I published an editorial addressing the issues.

We now clearly instruct our authors to err on the sign of caution, and we have added the admonition that authors are to disclose all competing financial interests that might in any way be perceived as representing a competing financial interest. As has been our practice, *EHP* will continue to publish all disclosures made by our authors. Because we feel that full disclosure is an absolute requirement we are now adding clear consequences for an ethical violation. (Goehl 2004)

In addition, authors are no longer be permitted to refuse to declare conflicts. The importance of declaring conflicts was emphasized: "When in doubt about the need to report, authors should always err on the side of caution and report all interests that might in any way be perceived as representing a competing financial interest."

We now impose a 3-year ban on publication for authors who willfully fail to disclose a competing financial interest:

Implementation of the ban will be made in consultation with our editorial board. If complete disclosure of possible conflicts would have caused the journal to reject the manuscript, the article will be retracted. If the article is not retracted but an ethical omission has occurred, an Expression of Concern will be written, published in the journal, and added to the online version of the article. (*EHP* 2005)

Future Directions

EHP has accomplished much over the past three decades. However, there is still much to be done. Our efforts in the near future revolve around six themes—ensuring the quality, credibility, and publication timeliness of content; improved readability; improving accessibility; serving as a vehicle for translation of basic research; participating in educational programs; and promoting journal capacity building in the developing world.

Ensuring the quality, credibility, and timeliness of information published are the foremost responsibilities of a journal. To address these areas, we are looking for innovative ways to better use our editorial board. We are also examining how to ensure that bias is not a factor in reporting research findings.

Because the volume of information continues to increase and the time to pursue that information decreases, we are addressing the issue of readability. Successful dissemination of information depends on writing that is not only clear and concise but that is also presented in a reader-friendly manner. We have charged our our editors and designers with the task of accomplishing these goals.

Our open-access publication model makes it possible for us to provide accessibility to critical environmental health information. However, we look at open access as only one approach. Other approaches we are exploring are specialty print issues such as the Student Edition, CD distribution, translating content into other languages, and providing content into other archives.

Assisting in the translation of basic research findings to clinical and public health practice is another goal of *EHP*. In the near future we will be participating in discussions with individuals who bring to the table a broad range of skills to help us determine how *EHP* can best contribute to this objective.

Our current pilot program to reach high school students through lesson plans revolving around our news content is our first focused effort to engage K–12 students. We plan to continue exploring other innovations in cooperation with the NIEHS Science Education Committee.

Because of the global nature of the field of environmental health, development of additional credible regional journals needs to be encouraged. *EHP* will continue to participate in partnerships to promote journal capacity building efforts. We are especially interested in partnerships that can help reduce disparities in global

health. Our participation will include making available our news content for translation and re-publication in regional journals and co-publication of qualified research articles.

Conclusion

EHP has become a valuable venue to promote the translation of research findings to clinical and public health practice, and is read in nearly every country of the world. Currently, with an impact factor of 3.40, *EHP* ranks second of the 132 environmental sciences journals and fifth of the 90 public, environmental, and occupational health journals. The journal is published monthly with sections devoted to children's environmental health, environmental medicine, and toxicogenomics. Mini-monographs are published frequently throughout the year.

Electronic submission and review are standard for the more than 1,000 manuscripts received each year. All articles are published within 24 hours of acceptance on our website as *EHP*-in-Press articles, which are completely citable using the CrossRef DOI system.

The journal has many value-added services. The journal's Environews section provides analysis of topical issues. Science Selections summarizes selected research papers appearing in the same issue, putting current *EHP* research findings into perspective. Other services include book reviews of important current publications, a calendar of events, position announcements, and updates on the latest news from the NIEHS Division of Extramural Research and Training. Our website (<http://www.ehponline.org>) contains archived *EHP* issues and provides a search-by-topic feature.

Dr. Olden is credited with not only broadening the understanding of environmental health but with giving the field a voice. Commenting on Dr. Olden's role in the development of *EHP*, Dr. Bernard Goldstein said

an excellent but only narrowly relevant scientific journal has been transformed into a major means of multidisciplinary communication across the many basic and applied sciences and across the many national and international cultures relevant to environmental health. *EHP* is a truly remarkable example of the importance of the context and distribution of good science as a means to positively affect public health. (Goldstein 2005)

EHP has become more than a scientific journal bringing the best environmental health research to the global research community. It is also a news source for the balanced presentation of environmental health news to scientists, health care providers, policy makers,

and the informed public. And yes, it is a movement with the objective of spreading credible environmental health information throughout the world.

SUMMARY

Over the past three decades, *Environmental Health Perspectives (EHP)* has grown from an obscure, narrowly focused scientific journal to the premier journal for the publication of research on the impact of the environment on human health. NIEHS Director Kenneth Olden's decision to restructure and broaden the scope of the journal was a seminal moment in the journal's history. The inclusion of an environmental news section has allowed *EHP* to better fill the role of helping to translate research findings into clinical and public health practice. *EHP*'s conversion to an open access journal has made the journal more readily accessible by people around the world and is a key feature of an extensive global information-sharing program. By imposing penalties for willful failure to report conflicts of competing financial interest, *EHP* has taken a strong step toward further ensuring the credibility of the published research. Future contributions of the journal to improvements in public health can be attributed directly to the journal's founder, former NIEHS Director David P. Rall, and the bold steps taken by Kenneth Olden.

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