

Conference Summary  
Improving Environmental Health  
**CURRICULA & PRACTICE**  
*at Schools of Public Health*



Washington, DC  
June 28-30, 2000

**ASPH**  
ASSOCIATION OF  
SCHOOLS OF  
PUBLIC HEALTH

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**Improving Environmental Health  
CURRICULA & PRACTICE  
at Schools of Public Health**

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**A Commitment to Action**

***A Conference Summary***

By James E. Leemann, Ph.D.

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**JEL**

## **Foreword**

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A conference was held in June 2000 to bring together representatives from the schools of public health, federal, state, and local agencies, professional associations, and the private sector to discuss the role that basic and applied research have in influencing the curriculum in the schools of public health, and to gain a collective insight as to whether the schools are as effectively poised as is necessary to continue providing the skilled environmental health workforce that the country must sustain for its continued well being.

Representatives from the private sector were asked to prepare along similar lines; that is, What will make graduates of schools of public health attractive to them as potential employees? Additionally, the conference was designed to provide time for researchers from the schools to interact with agency representatives to explore the potential for new funding opportunities and avenues previously unknown or untried.

The positive response to the conference has been gratifying and to a large extent vindicates the original concept that the topic around which the conference was focused is timely and merits discussion. The issues discussed have resulted in a significant number of the attendees expressing an interest in, and a commitment to working with the Council on Environmental and Occupational Health to bring the issues discussed into greater focus and definition. Specifically, it is the intent of the Council and those working with us to work on definitive action steps to assure that the concerns defined in the course of the conference are effectively addressed. The Council, funders, and conference participants sincerely hope that as readers peruse this document, they will identify a role for themselves in this continuing effort, and be willing to work with those of us who believe these matters are worthy of our attention and energy.

**Daniel Boatright, Ph.D., FRSH**

Chairman  
Environmental and Occupational Health Council

Association of Schools of Public Health

## **I. A Commitment to Action Agenda: Improving Environmental Health Curricula & Practice at Schools of Public Health**

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In June 2000, the Association of Schools of Public Health, in conjunction with the Health Resources and Services Administration, the National Institute of Environmental Health Sciences, and the National Center for Environmental Health at the Centers for Disease Control and Prevention convened a conference of one hundred representatives from schools of public health, governmental agencies, professional organizations, non-governmental organizations, and the business community. The purpose of the conference was to energize the participants to contribute to the development of models of Environmental Health curricula and practice that will meet and exceed the environmental health needs of our communities. It was the intent of the conference to begin an expanded dialogue among government agencies, industry and environmental health faculty to define the roles and needs of these groups in meeting the ever-changing challenges of environmental health practice. In addition, an opportunity was afforded to the participants to meet with Federal Project Officers from various funding agencies to discuss research interests.

The following Action Agenda is a synthesis of the exchanges of the participants based on their collective wisdom and professional environmental health experiences. Even though it is not comprehensive, the conference organizers and participants hope that this Conference Summary will serve as the catalyst among environmental health educators and practitioners to address the academic and practice-based needs of the profession.

This Commitment to Action is directed at graduate and undergraduate faculty, government regulators, non-government

organizations, local communities, business and industry, and grant issuing institutions, all of whom have an important role in improving environmental health curricula and delivering environmental health services to our communities.

## **II. Background**

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### **Environmental Health Faculty/Employer Forum – Ann Arbor, Michigan**

In May of 1988, the Bureau of Health Professions convened a forum of 50 experts in environmental health to outline a series of issues and problems along with recommending solutions and action steps to address educating environmental health professionals. Academic institutions were facing a crisis in terms of recruitment, curricula, and relevance of their environmental health programs to the actual and/or perceived needs of the community. Employers were faced with having to re-train recent environmental health graduates for the specific tasks they were hired to perform. The forum noted that “[T]he environmental health profession, if in fact it is a single profession, has become a reactive force to the large number of burgeoning health problems related to environmental quality” (Rose and Manning, 1989).

This 1988 “Environmental Health Faculty and Employer Forum” began with identifying some of the key attributes of the current status of environmental health education and other workforce issues. Some of the key points made included the following:

- Although the technical knowledge of graduates has never been greater, employers have noticed shortcomings in communication, decisionmaking, leadership, and management skills in many of the recent graduates.

- Most students are not learning to think creatively and to solve problems.
- Faculty often have difficulty keeping up with the state-of-the-art of the profession.
- It is unclear as to the effect that accreditation, credentialing, registration, licensing, and certification has had on environmental health academic programs.
- Attracting the best, most talented students to environmental health programs has been problematic.
- Evaluation of the suitability of environmental health curriculum for employment is suspect, usually accomplished through informal contacts with graduates and alumni.
- MPH holders may not have the necessary science background to compete favorably for positions within environmental regulatory agencies.
- The federal government, with an estimated 40,000 environmental health personnel, hires many graduates of non-science curricula to fill environmental health positions because of the lack of qualified applicants.

The Forum work group participants then outlined some key issues and made recommendations for future action. Some of the key issues and recommendations are summarized below:

- All groups recommended that a coordinating council or integrating body of academicians, professional associates, and employers meet regularly to discuss issues and problems in the field and profession.
- There is a general lack of understanding and/or appreciation of the environmental

health profession by the public and the private sectors, which impedes recruitment of undergraduate students and subsequent placement of graduates. It is important to market skills of the graduate to the community, particularly among high school and college career counselors, as well as to public and private sector employers.

- The issue of a Bachelor of Science environmental health essentially produces a “generalist” in the field, which raised concern as to the preparation of these people for graduate level work. There was general agreement that the BS in environmental health does provide a broad basis for practicing the general profession and that possibly this entire issue of “specialist vs. generalist” was oversimplified. All participants, however, recognized that students with a degree in one science may have deficiencies in another and that most graduate students need to address deficiencies in their knowledge either before or while in graduate school.
- The value of internships was split among the participants. Some participants questioned the benefit of internships for those undergraduate students preparing for graduate school. Others believed the experience to be important and meaningful for both graduate and undergraduate environmental health students and their employers.

The Forum participants noted that current [1988] environmental health academic programs are usually deficient in providing practitioners with the management, administration, organizational, and communication skills necessary to develop and implement plans and policies. Some of the key weaknesses of environmental health

academic programs that the participants identified included the following:

- Currently a wide range of continuing professional education activities exist with no coordination, very little public health orientation, and no standards of operation.
- Most environmental health problems require team approaches, but it is not clear how these teams get formed and who the team leaders should be.
- Insufficient communication and interaction between environmental health theoreticians and practitioners has resulted in graduates with inappropriate balance. This has promoted a philosophy and strategy of educating environmental health professionals, which has not been examined for relevance to the development of current and emerging practice needs. This includes no overall agreement on the appropriate distribution of the educational effort for producing generalists and specialists. Another consequence is a lack of uniformity in core curricula, including research and internship components, resulting in substantial variation in the attributes and skills of graduates.

Over the past 12 years considerable attention has been given to a few of the issues and recommendations raised during the 1988 Forum, while others have received virtually no attention. To gain an appreciation and understanding of the progress made to date with respect to environmental health curricula in particular, the following summary of a comprehensive survey of Schools of Public Health is presented.

**Practice or Research? Environmental Health Curricula at Schools of Public Health – February 2000**

During 1999, the Association of Schools of Public Health in a cooperative agreement with HRSA undertook a survey to address the question “what is being taught in environmental health in Schools of Public Health?” John B. [Jack] Conway and Kerry A. Rosettie at the School of Public Health, University at Albany prepared the report that is summarized below (Conway and Rosettie, 2000).

The survey focused on describing the environmental health science curricula for masters’ degree programs taught in the 29 accredited schools of public health which include:

Boston University  
Columbia University  
Emory University  
George Washington University  
Harvard University  
Johns Hopkins University  
Loma Linda University  
Ohio State University  
San Diego State University  
St. Louis University  
Tulane University  
University of Texas at Houston  
University of Alabama at Birmingham  
University of California Berkeley  
University of California Los Angeles  
University of Illinois Chicago  
University of Massachusetts Amherst  
University of North Carolina Chapel Hill  
University of Albany  
University of Hawaii  
University of Michigan  
University of Minnesota  
University of Oklahoma  
University of Pittsburgh  
University of Puerto Rico  
University of South Carolina  
University of South Florida  
University of Washington  
Yale University

These schools of public health within their MPH, MS, MSPH, MOH, and MHS programs offer an environmental health master's degree track. Within these schools of public health there is quite a bit of variability as to the departments and divisions that administer the environmental health master's degree.

The environmental health core courses most often required by these schools of public health to complete all environmental health masters' degrees are listed in the following table.

**Required Environmental Health Core Courses**

Course Name	# SPHs Requiring
<b>Environmental and/or Occupational Health</b>	<b>All SPHs</b>
<b>Toxicology</b>	<b>All SPHs</b>
<b>Risk Assessment</b>	<b>26</b>
<b>Air Pollution</b>	<b>24</b>
<b>Industrial Hygiene</b>	<b>19</b>
<b>Hazardous Waste</b>	<b>16</b>
<b>Env. Epidemiology</b>	<b>14</b>
<b>Water Pollution</b>	<b>13</b>
<b>Occupational Safety</b>	<b>13</b>
<b>Radiological Health</b>	<b>12</b>
<b>Occupational and Environmental Policy</b>	<b>12</b>

Elective environmental health courses are determined through the student's consultation with his or her faculty advisor, to meet the student's career goals. Twenty-one of the 29 schools of public health reported elective course titles, which are listed in the following table:

**Environmental Health Elective Courses**

Course Name	# SPHs Offering
<b>Risk Assessment</b>	<b>9</b>
<b>Radiation &amp; Health Physics</b>	<b>8</b>
<b>Waste Management</b>	<b>7</b>
<b>Water Pollution</b>	<b>6</b>
<b>Safety</b>	<b>6</b>
<b>Industrial Toxicology</b>	<b>5</b>
<b>Air Pollution Control</b>	<b>5</b>
<b>Environmental Epidemiology</b>	<b>5</b>
<b>Biochemistry</b>	<b>4</b>
<b>Microbiology</b>	<b>4</b>
<b>Legislation/Law</b>	<b>4</b>
<b>Occupational Medicine/Health</b>	<b>4</b>

There is great variability in the environmental health tracks offered in these schools of public health. The name of the tracks in the various departments and divisions are:

- Air Quality/Pollution
- Environmental and Occupational Health
- Environmental Chemistry
- Environmental Epidemiology
- Environmental Health
- Environmental Health Management
- Environmental Health Policy
- Environmental Health Sciences
- Environmental Microbiology
- Ergonomics
- Hazardous Waste Management
- Industrial Hygiene
- Occupational Health
- Occupational Health Nursing
- Occupational Health and Safety
- Occupational Medicine
- Occupational Medicine Residency
- Radiation Health Science
- Risk Assessment
- Toxicology
- Water Quality/Pollution

For these environmental health tracks, the number of schools of public health that offer these tracks for all master's degrees is provided in the following table:

**All Environmental Health Tracks Offered at SPHs**

Track Name	Offered at SPHs
Air Quality	2
Env/Occup. Health	11
Env Chemistry	3
Env Epidemiology	6
Env Health	15
Env Health Management/Policy	9
Env Microbiology	3
EH Sciences	9
HazWaste Mngt.	4
Industrial Hygiene	21
Occup. Health	11
OH Nursing	5
Occup. Medicine & Residency	10
Radiation Health	4
Risk Assessment	3
Toxicology	15
Water Quality	3
Other	7

The master's level environmental health curriculum in many schools of public health is oriented towards training in industrial hygiene, occupational health, and toxicology. An overview environmental health course is taught at all schools of public health, but the content covered varies greatly from school to school. There has been a shift away from the former "keystone" areas of microbiology, food sanitation, sewage containment, and vector control. Other environmental health subject areas infrequently reported or missing from many schools of public health curricula are: consumer product safety, disaster preparedness and emergency response,

housing and/or institutional health, injury control, and solid waste control.

It is axiomatic that universities teach courses and engage in research in academic areas that provide jobs for graduates and funding for faculty research activities.

Environmental and occupational health is such an academic area and industrial hygiene, occupational health, and toxicology are the "hot" topics.

Environmental and occupational health graduates from schools of public health traditionally obtain positions with federal and state governmental agencies and the private sector. Schools of public health are very good at training environmental health professionals for teaching and research positions in academic institutions.

Schools of public health do not have a mandate to train students for environmental health careers in state and local health departments or in other state and local agencies responsible for managing the environment. However, these agencies could profit enormously by hiring trained graduate environmental health workers. The major deterrents to hiring school of public health graduates are salary and potential for professional growth and advancement.

**III. Research and Its Influence on Curricula and Practice**

One of the key areas on which the conference focused was the influence that environmental health research has on determining the topics that are taught to future environmental health professionals. Prior to the conference, the participants were provided with the following premise, which served as the foundation for developing ideas for action.

## The Premise

*Faculty at schools of public health conduct scientific research in areas being awarded by funding institutions (e.g., federal agencies, philanthropic organizations, and industry). The faculty then teach coursework in environmental health that directly reflects the research they are conducting; therefore, the curricula at schools of public health is driven to a great extent by the direction and availability of research funding. This funding/curricula paradigm drives academic environmental health to be critiqued for its want of a public health foundation and concomitant lack of focus on practice-based applications. The students "produced" in this academic system are exposed mainly to the areas of environmental health that are most heavily funded, but have limited opportunity to learn about many of the other areas of environmental health that may not receive substantial funding yet are considered the most relevant in the actual practice of environmental health.*

## Perspectives

The conference participants offered a variety of perspectives on the influence research and, in particular, the funding of research has on setting the focus of environmental health topics that are taught in schools of public health. There was a high degree of unanimity among the participants when it came to agreeing on most of these perspectives. Obviously, some perspectives surfaced disagreements; however, interestingly enough these were few and far between. The perspectives offered include the following:

- Environmental health faculties have a strong tendency toward teaching coursework that directly reflects the research they are conducting or seeking.
- Research funding has an overwhelming influence on the environmental health curriculum being taught at schools of public health.
- Environmental health students are primarily exposed to areas of environmental health that are receiving research funding, consequently they potentially are missing the opportunity to learn about areas that are considered more relevant to the actual practice of environmental health.
- Senior faculty members with good practitioner experience are being replaced by active researchers who pursue basic research dollars and have little to no practical experience.
- Core public health curriculum requirements are not being affected by research; however, the opposite is true for essentially all other course requirements.
- Research affects the type of courses faculty are capable of teaching, it changes the kind of practice experiences or work opportunities that are available to help enhance classroom work, and it limits the variety of tracks or specialties within an environmental health curriculum.
- Research dollars affect the depth offered more than the breadth, but it was recognized that faculty may be truncating the breadth after meeting the core public health curriculum requirements.
- Research ultimately shapes curricula, which shapes faculty composition.
- Research areas reflect the changing job market, for example, chemistry, molecular biology, and toxicology are being funded, but food safety and

radiation protection are not being funded.

- Along with historic funding sources drying up, research dollars are targeting “fad” topics, such as West Nile Virus, leaving little to no funding for more traditional environmental health topics.
- Research findings can and do lead to specific enhancements in courses and specialty tracks, which, in turn, become susceptible to and dependent upon funding streams.
- Research and examples from research findings are often incorporated into course content and taught by the instructor/researcher, both as examples and case studies. The content may seem similar, but the methods used to present the material vary considerably based on the research interests of the instructor.
- Several areas affect curriculum and the influence of research is interwoven throughout all of these areas:
  - Type of degree...MS is researched-based, whereas MPH is practiced-based
  - Faculty interests and their research areas affect curriculum and practice
  - Public community drives curriculum through tuition dollars
  - Schools of public health missions are driven by the community in the areas of service, research, and teaching
  - Private community funds research, but expects results to be returned for commercial purposes
- Applied research provides a major opportunity at graduate schools of public health to affect curriculum and practice.
- Applied research is rewarded less in promotions and tenure considerations than basic research, and teaching is rewarded even less. In addition, within

the research category, there is a lack of rewards for fieldwork and field-related publications when compared to basic research.

- Alumni feedback can influence curriculum and research through identifying those areas not being taught or being lightly covered that would have provided the practicing alumni a more well-rounded education.
- At the undergraduate level, without funding, they are still teaching basic environmental and public health courses in vector control and food safety, for example.

## **Actions**

Along with offering perspectives on the influence research has on environmental health topics being taught in schools of public health, the conference participants provided ideas for action within the research system. For some, “working within the system” required a paradigm shift. Even so, excellent ideas for future consideration were provided. The ideas raised included the following:

- The reward system used for promotion and tenure decisions needs to give more meaningful consideration to applied research and teaching.
- The basic and applied research funder and researcher’s relationship lacks an effective feedback mechanism that would allow research findings and experiences to be incorporated into course content, practical applications, and further research work.
- The NIOSH ERC funding of curricula and practice led to the rise of industrial hygienists and the recognition of their certification. A similar model is needed for environmental health research,

curriculum development and teaching, and practice.

- There is a considerable amount of tension created when faculty has to balance time spent on teaching and time spent doing research. This is especially true in schools of public health that emphasize one over the other. There is a need to develop purposeful means to “buy out” a faculty member’s teaching time to allow for more research time.

#### **IV. Partnerships and their Influence on Curricula and Practice**

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Another key area the conference participants targeted was the influence that partnerships can have on environmental health curricula and in providing students with a practice-based application of environmental health. The participants identified a variety of groups with which environmental health faculty should consider establishing partnerships, to include:

- Graduate academic units, such as the schools of engineering, law, business, and sciences
- Undergraduate academic units
- Vocational trade schools
- Alumni organizations
- K -12 schools
- Accrediting organizations
- Local community groups
- Non-governmental organizations, such as national professional associations and other national organizations
- credentialing organizations
- Federal agencies, such as the U.S. Environmental Protection Agency and the Occupational Safety and Health Administration
- State and local health and environmental agencies and boards
- Congressional and legislative bodies

- Foundations and institutions
- Corporations, for profit and not-for-profit

#### **Perspectives**

The conference participants provided a number of perspectives on partnerships and how they influence curricula and practice. Along with identifying numerous potential partners, the participants recommended a wide-range of interactive relationships for consideration with these partners. The perspectives provided include the following:

- Partnerships with environmental health practitioners lead to practiced-based examples for inclusion in environmental health courses.
- Partnerships with federal, state, and local agencies result in field assignments, research funding, training money, and potentially long-term employment for graduates.
- Graduate schools of public health that partner with undergraduate schools lead to future graduate students.
- Partnerships with national professional associations provide more technical relevancy to environmental health courses and tracks.
- Partnerships with employers, from the public and private sectors, lead to internships, research funding for targeted issues, money for in-house training, case study research, and future employment for environmental health graduates.
- Partnerships with local communities and national organizations that represent local community health interests provide real-time problems and issues that faculty can help address and incorporate into their

curriculum and practiced-based research.

## **Actions**

In addition to identifying numerous partners and potential partners, the conference participants offered a number of action-oriented ideas to establish and sustain partnerships that would lead to enriching environmental health curricula and practice. Indeed, some participants expressed reluctance to establish partnerships with industry. Although this surfaced several opposing views, one participant argued that environmental health and industrial hygiene in the private sector is as much public health practitioner work as the same work in a governmental department of public health. The only difference is the former practitioner work is public health in a workplace. The ideas raised included the following:

- Partnerships between academicians and employers are needed in order to craft environmental health curricula that meets the needs of our current and future environmental health challenges.
- Environmental health academic units need to capitalize on campus resources that exist within other academic units (e.g., business, law, sciences, and engineering) by offering courses or tracks that compliment environmental health.
- Environmental health practitioners from the private and public sectors need to be invited into the classroom as guest lecturers or encouraged to become adjunct faculty.
- Environmental health academicians need to develop a new model for writing environmental health case studies based on industrial experiences

that is acceptable to corporate legal review.

- New alliances will need to be established with new sources, such as industry, to insure a continual stream of research money for basic and applied research. In addition to these new sources, there is a need to explore funding that exists in current federal environmental, safety and health laws and regulations with the intent of directing a portion of this available funding to environmental health education, training and development.
- Better lines of communication are needed between environmental health faculty and the communities they serve in order to improve and validate their academic offering.
- Often mid-career environmental health practitioners seek out MBA or other business management academic programs to qualify themselves for higher paying and more responsible managerial positions. Consideration needs to be given to the possible development of an "Executive Environmental Health Program" that would encompass traditional business management courses along with managing environmental health programs.
- Both the private and public sectors are looking for new graduates that possess multiple skills that go beyond just technical environmental health skills. This creates an opportunity for environmental health academicians to design curricula that meet this need.
- Environmental health faculty need to be providing services, such as continuing education, to the public and private sectors within our local communities. While the consensus is that emphasis is primarily placed on

extramural funded research, thought needs to be given to providing more *pro bono* type work in order to strengthen the relationship with the community and better understand its needs.

- Partnerships with accrediting bodies are needed to develop and enforce specific relevant criteria on environmental health curricula.
- Professional organizations should consider establishing mentoring programs between their members and environmental health students.
- Outreach to public and private K-12 schools is needed to increase awareness of environmental health education and to help students nearing graduation decide on an environmental health undergraduate academic program.
- Industry needs new and innovative methods to do environmental health work while capturing individuals' environmental health knowledge through time.
- State agencies with public health responsibilities appear to be facing a significant loss of environmental health knowledge due to eligible retirements over the next five years. Partnerships with these state agencies are needed to address this shortfall in environmental health knowledge.
- Skills in collaboration, leadership, community development, teamwork, communication, facilitation, policy decision making, and interpersonal and intrapersonal skills in the context of delivering environmental health services at the state and local agency levels are needed.

- Partnering with local boards of health to train their board members on environmental health and how to manage and develop programs at the community level are needed.

## **V. Recommendations and Next Steps**

The conference participants offered a variety of recommendations for action in addition to those presented above. In addition, many of the participants volunteered to become members of Action Teams that will address these recommendations and actions. The five teams and their members are listed below:

### **Graduate Faculty Applied Research**

- Pat Bohan
- Mike Brandt
- Chip Carson
- John Conway
- Bernie Goldstein
- Susan Goodwin
- Tee Guidotti
- Kathie Hammond
- Craig Hedberg
- Wendy Heiger-Bernays
- Guy Lanza
- Bob Lynch
- David McSwane
- Deb Olson
- Grace Paranzino
- Rebecca Parkin
- Paul Schur
- Chuck Treser
- LuAnne White

### **Graduate Faculty Basic Research**

- LM Ball
- KC Donnelly
- RH Gray
- Tee Guidotti

- Kathie Hammond
- David Johnson
- Jenny Quintana
- Ron Rahn
- Sam Soret
- DW Underhill
- James Vincent

### **Undergraduate Faculty**

- Sandi Donahue
- Barbara McCarthy
- Michelle Morrone
- Gary Silverman
- Tom Simmons
- Chuck Treser

### **Practitioners**

- Diane Baird-Holmes
- Chip Carson
- Bob Galvan
- Larry Gordon
- Donna Gurule
- Jim Leemann
- Bob Powitz
- Paul Schur
- Bob Venezia

### **Federal Project Officers**

- Don Lentzen

The recommendations for action included the following:

- Today's environmental health curriculums in large part are based on public experiences that may be as much as 20 to 30 years old. Developing curriculum for tomorrow's workforce based on yesterday's experiences will no doubt continue; however, an effort needs to be undertaken to define a vision of what the environmental health field will look like in the next 15 years.
- Many public and private organizations are facing a major environmental health knowledge flight due to retiring

practitioners over the next five years. Understanding the skill sets that will be necessary for the next generation of environmental health professionals will be critical to addressing this coming loss of knowledge and experience.

- There appears to be a lack of understanding and appreciation for the qualifications necessary to do environmental health work. Attention needs to be given to better define the field of environmental health and where this expertise can best be applied to solve environmental health challenges.
- In the pre-conference materials a definition of *environmental health and protection* was provided. Environmental health and protection was defined as *the art and science of protecting against environmental factors that may adversely impact human health or the ecological balances essential to long-term human health*. Environmental health professionals certainly know the *science*, but do they know the *art* of integrating their environmental health knowledge in a way that serves the public's environmental health needs? More focus is needed to teach the art of environmental health.
- Most environmental and health laws include sections that fund education and training. Environmental health needs to secure its fair share of these monies for environmental health students and research.
- The environmental health field lacks a cause champion in the U.S. Senate or the House of Representatives. A cause champion needs to be identified to represent environmental health in this highly political arena.
- Graduate environmental health programs need to make undergraduate environmental health schools better

aware of their offerings to assist undergraduates in making decisions about pursuing an environmental health career.

- Larry Gordon raised a number of salient questions in his presentation *Two Roads Diverged ---, and that made all the Difference*. Action needs to be taken to attempt to answer these questions. The paper can be found in Appendix A.
- A future conference should be held with other professional associations struggling with the same issues to work on the issues raised in this conference.

The next steps will entail organizing the Action Teams to begin addressing the myriad issues raised during the *Improving Environmental Health Curricula & Practice at Schools of Public Health Conference*.

### **Bibliographical Note**

In addition to the references cited in the text of this conference summary, the following reports provided significant background material for the success of the conference.

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## Appendix A

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### **TWO ROADS DIVERGED ----, AND THAT HAS MADE ALL THE DIFFERENCE**

Larry Gordon, Adjunct Professor, University  
of New Mexico

Relevant education for environmental health practitioners continues to be a vexatious challenge. Today, I have been requested to offer a few observations, and then suggest some questions to be considered by academicians, practitioners, public policy makers and business and industry leaders.

To paraphrase Robert Frost, “**Two roads diverged in a wood,**” and schools of public health followed the money trail that lead toward health care and basic science research rather than the field of environmental health practice, “**and that has made all the difference.**”

Schools of public health have long and proud histories. Schools were developed to educate practitioners who had the potential to lead. The emergence of schools of public health was a significant factor in the development of sound environmental health programs. Schools of public health had the unique capacity to inculcate competencies in the environmental health sciences, as well as develop an environmental health philosophy and vision. Due to efforts of schools of public health, environmental health practitioners contributed significantly to:

- improving environmental health activities,
- improving the health status of the public, and
- improving the quality of our environment.

As intended, graduates earned practitioner leadership roles at all levels of the public and private sectors.

When I attended a school of public health in the mid-fifties, all of my professors including the Dean, had enviable reputations and histories of achievement as practitioners prior to appointment to the hallowed halls of academia. All taught from bases of practice as well as theory. To my knowledge, none of my professors was deeply involved in research. They all served as role models and mentors for their students, and they understood and glamorized the potentials of the field of practice. Invariably, weekly Friday afternoon guest lecturers were distinguished federal, state and local practitioners. I still recall, and often quote, some of the pearls of wisdom offered by those practitioner “giants.”

- Today, in the Year 2000, environmental health is a high priority issue in our society. It is demanded by the public, the media and political leaders, and is widely considered to be an entitlement.
- Today, environmental health is a complex, multifaceted, multidisciplinary, and interdisciplinary field of endeavor engaged in by a wide spectrum of disciplines, professions and others within a **bounteous array** of public and private organizations.
- Today, 90 to 95% of environmental health activities are assigned to agencies **other than health departments** at the state level,, and there is a similar trend at the local level.
- Today, as differed from earlier times, I am not aware of a single director of a lead state environmental health agency who could be classified as an environmental health professional.

- Today, expenditures and numbers of personnel for environmental health account for roughly half of the field of public health practice and is, therefore, the **largest single component of the field of public health**. Few public health leaders recognize this fact because the widely referenced annual reports of the Public Health Foundation do not include the expenditures of the 90 to 95% of environmental health activities **not** administered by health departments. This under-representation of environmental health expenditures continues to make environmental health appear to be but a minor player in the field of public health.

Most environmental health practitioners may be classified as **environmental health professionals**, or as **professionals in environmental health** such as geologists, biological scientists, chemists, physicians, engineers and attorneys, among others. Probably less than 5% of the workforce are environmental health professionals. Few **environmental health professionals** are utilized by agencies other than health departments. And even in health departments, most environmental health practitioners are **professionals in environmental health** rather than environmental health professionals. **Both categories are essential components of any comprehensive effort**. The mantle of leadership falls to those who earn it.

All practitioners, however, would benefit from continuing education in such basic environmental health competencies as epidemiology, toxicology, risk assessment, risk communication, risk management, as well as an inculcation of an environmental health vision and philosophy. The philosophy must include an understanding of the scope, the values, the goals and the marvelous potential of environmental health practice. Whatever disciplines and professions **are** involved, all must be competent to do a public health job.

I have enjoyed a rewarding career in public and environmental health, commencing as an entrance grade sanitarian and retiring as a state Cabinet Secretary for Health and Environment. But more significant than having titles; developing agencies, laws, ordinances; holding offices and receiving recognition, I am most proud of my successes in mentoring scores of professionals who went on to more prestigious roles. By placing a high value on competency, I encouraged scores of personnel to earn graduate degrees in public or environmental health. At one time, I was in the enviable position of having individuals with such graduate credentials as Director of the State Environmental Agency, Director of the State Public Health Agency, Director of the State Scientific Laboratory System, and as State Epidemiologist. Importantly, all had started at the local level. In the state environmental agency, the Director as well as every division director and district manager had an MPH or closely related graduate environmental health degree. I also developed and gained passage of a state law requiring that a director of a local health department have an MPH. That was at a time when schools of public health produced professionals for the **field** of practice. For me, those were days of Camelot.

Most of my personnel went on to greener pastures. Two of these long ago protégés recently called me for lunch. I want to tell you a little about these two as examples of the potential of individuals having the necessary competencies for the **field** of practice.

I hired both right out of college as entrance grade sanitarians when I was Director of the Albuquerque Health Department. I admonished that everyone should be re-potted every few years so as not to become root bound. I encouraged both to earn their MPHs in environmental health. I recruited both back to New Mexico while I was Director of the New Mexico Environmental

Improvement Agency. One became Director of Field Operations, one became Director of OSHA. At later dates, each became Director of the Environmental Improvement Agency. A new Governor eventually left both with the need to seek more rewarding responsibilities – the potential price of leadership ventures.

One subsequently became Santa Fe City Manager, Vice President of the University of Arizona, Deputy Assistant Secretary of Defense for Environment, a key environmental health position with BDM International, Director of Environmental Management for Los Alamos National Laboratories, and was recently recruited to become Vice President for Material Stewardship for Kaiser-Hill -- the contractor responsible for cleaning up Rocky Flats, because Tom Baca has the competency and confidence to get the job done.

The other was subsequently appointed Regional EPA Director of Environmental Services, resigned to become Director of Environmental Quality for the State of Arizona, a new Governor intervened, and Russell Rhoades is now Director of Environmental Affairs for Public Service Company of New Mexico.

Neither Tom Baca nor Russell Rhoades could ever resist a challenge.

Both practitioners continue to **achieve** and enjoy their careers utilizing competencies acquired while earning an MPH during the days when schools of public health placed a high priority on educating practitioners and emphasizing environmental health.

I could cite numerous similar examples, but I have mentioned Tom Baca and Russell Rhoades to emphasize the benefits of competency to practice in the **field** of environmental health, and to stress the importance of mentoring as a gratifying leadership responsibility.

Now, for a few questions for you to consider individually:

- Do schools of public health still function to “enhance health in human **populations** through **organized community effort**” in accordance with the goal of the agency that accredits schools of public health? Or do most graduates serve in health care and research settings rather than as practitioners?
- Do schools recognize that **public health is not health care**, that public health and health care are in eternal competition for the budget dollar, and that increased emphasis on health care by schools has not served the needs of the field of environmental health practice?
- Has the emphasis on health care and basic science research created by the **choice of money trails** diluted and redirected the nature of curricula in schools of public health?
- Are schools “isolated from public health practice” as alleged by the IOM Report on the Future of Public Health?
- Are schools generating personnel who are competent, willing and available to vie for top level **managerial, policy and other leadership positions** in the varied spectrum of roles in the field of environmental health practice?
- Why are institutions such as the Kennedy School of Government and law schools, rather than schools of public health, preparing students for environmental health policy and leadership roles?
- Do schools of public health still have justifiable reputations as **prime**

**incubators** of environmental health practitioners?

- Can many questionable environmental health priorities and policies be attributed to the shortage of practitioners having competencies in environmental health?
- Do schools offer courses in:
  - environmental health finance as well as in health care finance,
  - environmental health law as well as in health care law,
  - environmental health policy as well as in health care policy, and
  - environmental health administration as well as in health care administration?
- Have schools of public health constructed and consistently traveled bridges reaching various **public and private** environmental health practitioner interests such as:
  - federal, state and local environmental agencies,
  - planning agencies,
  - conservation groups,
  - agriculture,
  - energy,
  - defense,
  - public works,
  - transportation,
  - resource development and utilization,
  - economic development
  - professional and trade groups, and
  - environmental health advocacy groups?
- Have schools incorporated **relevant educational competencies** for environmental health practice such as those recommended by the *Report of the Faculty/Agency Forum*, the HRSA Report *Blueprint for Education and*

*Training*, and the HRSA publication *Educating Environmental Health Science and Protection Professionals?*

- Do schools utilize the talents of academically qualified environmental health practitioners both as faculty and as guest lecturers to enhance student opportunities to develop practitioner's competencies, and to serve as **mentors and role models** for the field of practice?
- Do schools assure internships in the field of environmental health practice?
- Do schools **seek the counsel and cooperation** of environmental health practitioners to identify and fund applied research needs?
- Do schools and practitioners **collaborate** to actively seek financial support for educating environmental health practitioners?
- Do schools and practitioners collaborate to develop financial support for relevant environmental health continuing and distance education?
- Do school faculty **believe** there is a paucity of environmental health competencies in the practitioner workforce?
- Are schools of public health **concerned** that few environmental health practitioners are being developed by schools of public health?

And for the final question, **Do you believe there is a problem?**

If you **do not** believe there is a problem, practitioners lacking environmental health competencies will continue to be responsible for most environmental health programs at all levels of the public and private sectors.

If you **do** believe there is a problem, a **successful effort to construct an additional money trail** designed to **regain** leadership for educating environmental health practitioners will require a diligent, coordinated effort by academicians, policy makers, professional and trade groups, industry, and public and private practitioners.

Unlike cold fusion, you will not get something worthwhile with little or no effort.

If you **do** choose to construct an **additional** money trail, Robert Frost might add approvingly, “**That too, will make all the difference!**”

## **Appendix B: Conference Participants List**

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