RESEARCH TRIANGLE
ENVIRONMENTAL HEALTH
COLLABORATIVE

10th Annual Environmental Health Summit

When Facts Are Not Enough: Getting from Good Science to Good Decisions in a New Age of Environmental Health Science

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North Carolina Biotechnology Center, RTP, NC

Introduction

The field of environmental health (EH) science is producing some of the most advanced, evidence-based, and application-driven research and information in its history. But science is a tool, and as such is only effective when used. Challenges (both old and new) that affect the understanding, translation, credibility, and value of science increasingly are impeding society's ability to apply it to solving complex problems or using it to inform good decisions for the public's health. Because of this, the ultimate benefit of environmental health science may not be fully realized.

The 2017 Summit hosted by the Research Triangle Environmental Health Collaborative was organized to examine how the EH community (researchers, public agencies, and non-profit organizations) currently stood in its relationship to the general public. The Summit title, "How to Get from Good Science to Good Decisions in a New Age of Environmental Science: When Facts Are Not Enough," reflects the first workshop of its kind to take on this timely issue. It is a reflection of the innovative and progressive thinking that The Collaborative has consistently brought to the table in the decade in which it has existed.

In a series of expert presentations, panel discussions, and breakout work group sessions, attendees of the Summit explored issues surrounding the conduct and use of EH research from a variety of perspectives both internal and external to the field. The intended outcome of the Summit was to develop practical ways for the EH science enterprise to adapt to changing times, create greater understanding of its value, promote public trust in EH science, and ensure its continued use for the public good.

The Summit allowed priorities to be set with a clearer understanding of the "what" and the "why" of EH-based public engagement. What mostly left unanswered was the "how." This document can be a catalyst for addressing this critical issue if the EH community is sincere about making progress on many of the activities delineated in this meeting. Thus, "good science may not ensure good policy, but its absence will undermine acceptance and confidence in policy decisions."

Areas of Focus

The Summit explored several issues including:

1 The conduct and use of environmental health research, from a variety of perspectives both internal and external to the field;

2 Practical and provocative ideas on ways for the environmental health science enterprise to adapt to changing times; and

3 The creation of greater understanding of the environmental health field's value to foster increased trust in its science and ensure its continued use for the public good. These issues were examined at three levels: ***Individual***, ***Research Enterprise***, and ***Community/Societal***. However, many of the ideas expressed at the Summit crossed into and connected multiple levels. These linkages are apparent in the priorities assembled by each of the three working groups.

Recurring Themes

COLLABORATION. The EH field can improve inclusivity by encouraging multidisciplinary and "radical collaboration," a concept introduced by Dr. Carol Folt, Chancellor of the University of North Carolina, Chapel Hill. A similar concept – transdisciplinary research – was introduced by Dr. Paul Anastas when he served as the Assistant Administrator for the Office of Research at EPA. In its most fundamental form, this refers to the process of bringing non-traditional players who are nevertheless stakeholders to the table in identifying problems, planning studies, and defining solutions. This expansion, depending on the nature of the problem, may include lawyers, finance, journalists, business/industry, citizens, chambers of commerce, and so on. The traditional competitive academic model often does not encourage or reward these types of collaboration when considering tenure, funding, and publishing. However, this bias must change in order to move the areas covered in this meeting forward.

COMMUNICATION. EH practitioners need to become better communicators if they want their research to lead to better decisions, and the first step is to understand one's audience. Strategies in this area require that the messages must fit different audiences (some noted above) and their values. This means translating the science at a level appropriate for the stakeholders. The use of social media and similar outlets is increasing, and, if employed appropriately, offers tremendous opportunities for communication. However, misuse of social media can damage public credibility, and populations who are most at risk of exposure to EH hazards are often the least likely to have access to smartphones, computers, or the internet. One suggestion was to develop standards that would govern such applications. Another recommendation was the need to promote environmental health as a major component when thinking about human health as a whole. Aside from obvious environmentally-related illnesses such as asthma, chronic obstructive pulmonary disease (COPD), and water-borne diseases, the public may ignore environmental health risks or give them much lower priority than more traditional health considerations like diet. This disconnect may have negative impacts on funding.

TRUST AND CREDIBILITY. There was unanimous agreement that EH practitioners need to do a much better job of building trust and credibility with those who are impacted by EH risks. While scientists in the abstract are highly trusted by the public, this trust is diminished when their science is tied to contentious environmental issues such as climate change. Sources of public mistrust in EH science can be broken down into a mistrust of scientist biases and motives, doubts over environmental risks, and a perceived lack of accountability to the communities served by researchers. These can potentially all be addressed through greater transparency and better communication practices, such as the disclosure of funders and research motivations, allowing affected populations to co-produce research, and holding report-back sessions after research is completed.

LEADERSHIP. This topic drew attention across the work groups. There was strong support for establishing an Environmental Public Health Leadership Initiative. Dr. Stan Meiburg, Director of Graduate Programs in Sustainability at Wake Forest University, proposed such an idea and offered to serve as a convener. Another example was the emphasis on the need for resources and incentives for mid-career practitioners to promote mentoring and leadership roles in public health (PH) agencies.

TRAINING. The EH field can improve training by modernizing practices and developing leadership skills. One of the initial themes of this meeting dealt with whether curricula was keeping up with the emergence of new technologies such as IT and big data opportunities. The answer appears to be "yes," despite difficult funding times. Staying current with technology will be critical for looking ahead in anticipating emerging issues. A novel and popular proposal was to have negotiation training/problem resolution as part of the curriculum.

RESOURCES. These collaboration, communication, and training goals can be supported by reshaping professional incentives away from purely academic publishing to encompass public community engagement and real-world impacts. For the most part, EH practitioners know they can improve but experience difficulty finding appropriate resources; it is important for the EH community to share success stories and codify best practices to learn from one another.

Plenaries and Panel Discussions

The 2017 Summit featured plenaries and expert panels covering different facets of the Summit's central theme.

OVERVIEW PLENARY

Carol Folt, Ph.D., Chancellor of the University of North Carolina, Chapel Hill, centered her presentation on maintaining rigor and enthusiasm in EH research in the face of environmental degradation and societal uncertainties. Situating her speech against a backdrop of rising political and environmental risks like ongoing marine pollution and overexploitation, Folt urged the audience to bravely move forward with their work, trust that good science is necessary for reaching good decisions, and encourage students against succumbing to disillusionment. Folt identified five primary ways for EH practitioners to make a difference with their research:

1. Emphasizing the importance of basic research;
2. Expanding the franchise to underrepresented populations and embracing diversity;
3. Rethinking pedagogy to better encourage risk-taking and learning from mistakes;
4. Encouraging big ideas and "radical collaboration," or collaborations that transcend disciplines, occupations, and other types of boundaries; and
5. Stressing the need for communication with general audiences and other types of societal engagement, including voting.

She concluded her remarks with a quote from Dr. Dana Meadows, a pioneering environmental scientist and writer: "It's never too late as long as you start today."

MOVING FORWARD PLENARY

Wayne Holden, Ph.D., President and CEO of RTI International, addressed how public-facing sciences such as EH have been transformed over the past decade and how they will likely have to adapt over the coming years. He first noted that traditional single-sector programs have been increasingly integrated across multiple technical domains. These multidisciplinary approaches are necessary in order to make measurable impacts on the complex, multidimensional problems facing modern society. As an example, Holden cited the creation of cross-institute collaborative working groups at RTI like its Clean Water for Carolina Kids initiative, which brings together a mix of lab-based researchers, social scientists, and community engagement staff to tackle the issue of lead contamination in drinking water in North Carolina childcare centers. Holden also noted a paradigm shift in research funding, which has trended steadily away from government sources (outside of defense) and towards the private sector and foundations. Last, Holden discussed changing metrics for science and the necessary shift away from science being dominated by expert knowledge to a more pluralistic landscape that includes citizen science and community engagement. Instead of holding on to old models that no longer fit, he stated that EH practitioners should embrace and harness these trends by creating relationships and collaborating with citizen science endeavors, in this way combining expert knowledge with local knowledge.

PERSPECTIVES FROM OUTSIDE THE BUBBLE PANEL

Moderator:
Rick Woychik, Ph.D., Deputy Director, National Institute of Environmental Health Sciences

Panelists:
Elena Craft, Ph.D., Senior Health Scientist, Environmental Defense Fund
Bryan Hubbell, Ph.D., Senior Advisor on Social Science, US Environmental Protection Agency
Stan Meiburg, Ph.D., Director, Graduate Programs in Sustainability, Wake Forest University
David Price, Ph.D., US Congressman, NC District 4
Louis Rivers, Ph.D., Assistant Professor, Department of Forestry and Environmental Resources, NC State University

Moderator Woychik organized this panel into four topic areas related to improving the EH field to better engage with the general public and policymakers. The first area dealt with science communication, with two panelists approaching the issue at different scales. At a broader level, Craft discussed the EH community's prerogative to communicate their work to the general public, citing EDF's recent work in Houston, Texas, where they measured pollution and issued public health warnings in the wake of Hurricane Harvey. She noted that there was a void in the provision of EH information in the aftermath of the hurricane so EDF took it upon themselves to partner with academic, non-profit, and private actors to communicate health risks to local communities. Rivers then spoke on how individuals process information, particularly information pertaining to the environment and environmental health. Rather than processing any and all scientific information, as would be predicted by a deficit model of science communication, individual cognition is driven by social and political identity, which effectively sets filters on what information is accepted, ignored, or counterargued. Consequently, EH practitioners can improve their communication skills by focusing less on dry facts and more on values.

Hubbell explored the second area: translating research results to public use. He stressed that science translation should be seen as a process – involving research planning, conduct, analysis, communication, and evaluation of results – that engage with stakeholders both upstream and downstream. To more effectively translate

EH science to good decision-making, panelists suggested changing professional incentives so that EH researchers are rewarded for public engagement, underserved communities are integrated into the research process and not merely the results, and that practitioners keep in mind the ideological barriers that may hinder full and accurate science translation, such as with vaccines or climate change.

The third topic area focused on how to develop better leaders in the EH field. Meiburg pointed out that, despite clear overlaps, there remain institutional divides between the public health and environmental health enterprises, and similarly with private entities in these spaces. Consequently, EH leaders need to develop soft skills such as communication and values-bridging and find frameworks that allow them to facilitate personal collaboration and communication. The overall goal for EH leaders should be to control the discourse so that public attention to EH issues does not swing wildly from panic on one end to complacency on the other.

Last, Price spoke about how EH practitioners can work with legislators and other policymakers to help them make more informed decisions. Speaking as a longtime Congressman, Price remarked that recently proposed budget cuts for EPA, NIH, NIEHS, and other federal agencies involved with EH have made the federal political process more difficult for EH researchers; he characterized this as the federal government disinvesting from EH expertise. To combat this disinvestment, Price recommended that EH practitioners continue their advocacy practices in order to show that they are doing good work with good results that can translate into pending bills or legislative pushes. To do so, EH practitioners need to become better communicators and learn how to talk to both the general public and to policymakers, as each audience has their own interests and drivers. For a policymaking audience, this means being familiar with bills and legislation, and presenting EH research as the answer to their policy problems.

POLICY STAFF PANEL

Moderator:
Brian Southwell, Ph.D., Director, Science in the Public Sphere Program, Center for Communication Science, RTI International

Panelists:
Jean Fruci, Energy and Environmental Policy Advisor, US House Committee on Energy and Commerce
Mitch Gillespie, Senior Advisor, NC House Speaker Tim Moore
Jeremy Tarr, Policy Advisor, NC Governor Roy Cooper
Pamita Weerasinghe, Professional Staff, US House Subcommittee on Environment

When it comes to translating science into policy, Fruci commenced the panel by reiterating that good science does not necessary lead to good policy, but that good policy cannot exist without good science. All of the panelists agreed that, in general, policymakers are interested in science and being correct, but they rarely if ever have the time to look themselves. Similarly, staffers may be stretched so thin with responsibilities that their time to conduct research into the state of a science is extremely limited. Fruci emphasized that policymaking is generally more of a reactive process than a proactive one. Consequently, EH practitioners should feel empowered to approach policymakers to keep them updated on the state of a field and what they have learned in the course of conducting their research. In particular, scientists should approach policymakers with clear goals in mind and a knack for timing by positioning themselves as bearers of relevant, novel information at times when related legislation is being written or discussed. By reaching out to policymakers, EH practitioners can form and cultivate relationships with them and their staffs. This relationship can solidify to the point that policymakers can trust a practitioner enough

to call upon them for advice on future pieces of policy relevant to the researcher's expertise. EH practitioners were also advised to reach out to science journalists, both as a means of disseminating their research to wider audiences and as a practice audience for communicating to policymakers. Science journalists are trained to think about how research can contribute to societal impacts, and these are the same types of goal-oriented messages policymakers want to hear.

Multiple panelists agreed with the notion that ideology and political polarization have increasingly interfered with scientist engagement with policymakers and the policy process, such as with conservative skepticism on climate change. When ideology becomes a barrier, Weerasinghe recommended that EH practitioners lead with a focus on desired outcomes that are similarly attractive to skeptical policymakers, and then work back to discussing the process to reach those outcomes. Fruci also added that EH practitioners can tally public attention to an issue if policymakers seem to be ignoring it, referencing past environmental policy successes on water pollution issues.

The panelists recommended that the EH community improve and prioritize communications training to be more effective in engaging policymakers in conversation. Negotiation training may also be an appealing option so that EH practitioners can learn how to reach compromise when they enter into conversations with dismissive or combative audiences. Similarly, data visualization and graphical training may be beneficial to communicating EH issues in a visual manner, especially if problems themselves are invisible, such as with chemical contamination issues.

Working Group Issues and Solutions

Participants of the summit – which included academic researchers and students, public health practitioners, non-profit non-governmental organization (NGO) and private industry representatives, and officials from governmental agencies at multiple levels – discussed how to better bridge the EH world with broader society in order to positively impact the future.

Attendees were divided into working groups to explore, discuss, and develop recommendations to the overall mission at three different scales: the ***Individual Level***, the ***Research Enterprise Level***, and the ***Community and Societal Level***.

INDIVIDUAL LEVEL

Charge: The Individual Level working group addressed whether there were specific challenges or gaps in knowledge regarding the preparation of EH professionals to address local public and environmental health needs. Once challenges were identified, the group proposed short- and long-term strategies and activities for preparing EH practitioners to address those needs.

Expert Panel Background Presentations

The work group started with brief background presentations from the public health and academic sectors on preparing, employing, and using public health professionals to address community EH concerns.

Layton Long, Jr., Health Director for the Chatham County Public Health Department, spoke on the discrepancy between how EH practitioners are trained with general knowledge in mind and then deployed into very specific programmatic areas where they can lose perspective and passion for the overall mission of public health. He suggested that professional training focus on understanding and utilizing data, promoting critical thinking skills, providing instruction on communication

and conflict resolution, understanding the importance of process over outcomes, and maintaining adaptability to changing conditions. To provide this more directed training, Long advocated for greater use of online training technologies in order to reduce inconvenience for practitioners, as well as networking opportunities so that professionals can interact and learn from peers.

Larry Michael, State Environmental Health Director of the NC Department of Health and Human Services, laid out the path for individuals to become registered Environmental Health Specialists (EHS) in North Carolina, which involves formal education, completion of an internship, and delegation of authority to operate in up to eight topical areas of EH. However, Michael noted a potential weakness in the current system: while continuing education is required to maintain EHS registration, continuing education is not required to operate in their topical specializations, which might leave practitioners out-of-date on emerging issues in EH, changes in laws and administrative rules, and other dynamic characteristics of the field. He also stated that training methods may need to be modernized so that they address communications skills as well as keep up with technological progress in order to suit younger, more tech-savvy practitioners entering the workforce.

Kimberlee Hall, Ph.D., of Western Carolina University continued the focus on potential gaps in training by asserting that technical and analytical competencies derived from formal education are useless if they are not matched with oral and written communication skills. The ability to communicate and engage local communities and stakeholders is an essential and important aspect of being an EH practitioner, and training should explicitly recognize to train that skillset. In doing so, Hall stated that these "soft" competencies instill resiliency, empathy, and compassion in young EH practitioners that will facilitate positive community relations and more effective science and risk communication.

Key Questions Identified:

Following the background presentations, summit participants in this working group focused on questions around:

1. Are changes required in how EH practitioners are trained?
2. What are the fundamental skill sets needed to communicate EH research?
3. In what ways are younger professionals being trained currently that are different from the past?
4. What role do new communication technologies play in training practitioners?
5. How important is it to incorporate wider science communication skills into the EH realm?

Changes in how EH practitioners are trained: In preparing EH practitioners for the workforce, the working group emphasized the need for establishing mutual understanding of certain concepts, including education (knowing why certain policies exist) versus training (knowing how to implement policies), as well as mutual definitions of environmental health and environmental public health. With a number of universities represented in the working group, participants pointed out that universities are underutilized in training EH professionals. The working group also recommended other changes in training, including providing tailored trainings, conducting cross-training for rotating staff, broadening trainings for field specialists and management, and teaching students how to make themselves more marketable via their EH training.

Fundamental skill sets needed among EH Practitioners: Working group participants agreed that communication skills are critical, particularly when the practitioner is relaying information to community constituents. Tactful communication and listening, as well as humility, are important

when addressing communities. Critical thinking and risk communication are needed so that EH practitioners can help community residents understand that some cause-effect relationships in environmental public health are not simply linear. Finally, training in conflict resolution and cultural sensitivity were emphasized to support adequate communication with community residents.

Generational differences in how young professionals are trained: Expert panelists and a number of summit participants with decades of experience working in supervisory capacities in public health agencies noted that young/new EH practitioners are now exposed to much more online and self-study training, including virtual role play, learning management systems and other alternatives to lectured training. Present-day trainings involve more cross-communication and teamwork to solve EH problems. This has been particularly helpful with the flipped classroom concept toward self-study. Training is also less siloed for both practitioners and research, opening doors for more collaboration between those in practice and researchers.

Role of new communication technologies in training: Summit participants discussed certain specific technologies that they are currently using or would use, given the appropriate resources to acquire such technologies. They include the SMART podium, as well as Turning Point and other polling/audience technologies that could be used in large-group trainings. Google Earth was touted as a great visual learning tool to help university students and EH practitioners understand a concept affecting a particular geographic area. 2U and Sakai are among the tools that help to expedite trainings and get people into the field of work.

Importance of science communication skills: Panelists and other participants shared that risk communication is best served when EH practitioners have sufficient science communication skills, particularly when there may be differences in the perceptions of community residents and the EH practitioners serving them. Science communication skills help the practitioners understand that environmental public health goes hand-in-hand with risk communication. During a discussion about emerging EH concerns, participants noted that science communication is needed to ensure consistent messaging for the sake of maintaining trust and credibility with the communities they serve.

PRIORITIZED CHALLENGES AND RECOMMENDATIONS

In the context of preparing EH practitioners to address community needs, this working group focused on four primary challenges with accompanying recommendations for strategies and activities.

Challenge 1: Developing a method to teach communication in EH and PH programs

Recommended strategies and actions: Currently, communication training is sparse and largely seen as optional for EH practitioners. Specific solutions included promoting communication training in Centralized Internship Trainings, regional environmental health meetings and trainings, and in the State of Practice Trainings. In the short term (<2 years), trainings should be led by external experts proficient in effective communication skills. The training agenda should include examples of communication successes in field work with community residents, as well as reiterating that good EH communication is preventative in order to avoid mitigation. In the long term (2+ years), there should be a push to restructure formal training programs (such as within universities) to offer professional communication training, preferably as a mandatory requirement.

Challenge 2: Reducing silos between varying disciplines/practices

Recommended strategies and actions: To promote collaborations and broader thinking, the current EH training system should be overhauled so that students can engage in multidisciplinary group projects and internalize the benefits of intellectual diversity at an early stage, At the professional level, hiring practices should place greater emphasis on candidates with a breadth of experience rather than encourage narrow specialization or specific formulaic procedures. To do so, management should take a greater role in the screening and hiring process in order to better inform human resources departments. Agencies could also embed professionals across disciplines for six to 12 months to improve recruitment and conduct periodic meetings across programs to foster cross-discipline relationships.

Challenge 3: Collaborating so that agencies/universities/communities can access each other's resources

Recommended strategies and actions: In the EH community, universities contain a wealth of information and agencies contain a bounty of experience. Collaboration between (i.e., university-to-agency) and within (i.e., agency-to-agency) these two bodies should be encouraged in order to spread this vital institutional knowledge to students, current practitioners, and upcoming leaders. Being proactive in fostering agency-to-agency connections is essential in being prepared for potential internship projects and inter-agency emergency preparedness activities. Examples of collaboration opportunities include the development of a state/local clearinghouse of resources, which could serve as a university student project.

Challenge 4: Improving talent management to understand how to mentor and support young EH practitioners

Recommended strategies and actions: At the educational stage, talent management should be revamped so that EH students are evaluated and steered towards appropriate career paths in order to maximize student engagement and minimize attrition. At the professional hiring stage, applicants to EH jobs should be screened via an aptitude test (perhaps using the military ASVAB as a model, with input from NEHA, University HR, and public health agencies) in order to best place applicants into appropriate positions. Allowing university students to participate in the Public Health Centralized Intern Training (CIT) could enhance their marketability and knowledge of the work prior to employment.

RESEARCH ENTERPRISE LEVEL

Charge: The Research Enterprise Level working group focused on the status of the current EH research enterprise, in particular how the institution can be improved to better develop practitioners and foster increased engagement with the general public.

Expert Panel Background Presentations

Rob Smart, Ph.D., Director of NC State University's Center for Human Health and the Environment, asserted that traditional academic departments might limit the training of modern EH researchers, who must be conversant in concepts from natural science, social science, and emerging fields like big data analysis. To move towards a more holistic model of EH training such as the One Health model, Smart commended the recent formation of centers and schools within universities that approach EH from an array of intellectually diverse perspectives and avoid siloing. To illustrate the benefits of this multidisciplinary approach, Smart pointed to his Center's work tackling the GenX drinking water contamination problem in Eastern North Carolina.

Kim Lyerly, M.D. of Duke University School of Medicine asserted that, in order for policymakers to make good EH policy decisions, researchers must first demonstrate enough evidence of whatever

effect they wish to bring to the policymakers' attention. However, the current division and lack of coordination among schools can hamper researchers' ability to clear this bar of evidence. To remedy this, Lyerly suggested collaboration projects such as sharing of large datasets to bridge researchers of health, environment, and society. He referenced the creation of the Environmental Health Scholars program at Duke, which brings together students and mentors from the School of Medicine, the Nicholas School of the Environment, and the School of Law to combine and analyze large datasets for insights into EH issues.

Key Questions Identified:

1 What problems exist in the current EH research enterprise paradigm?

2 How are EH leaders developed? What skills are currently valued? Are they the best ones to ensure the continued success of the enterprise?

3 Is the EH research enterprise biased against young or new practitioners in the field?

4 What training practices might be abandoned or adopted?

5 What problems exist with conducting team science or multidisciplinary research?

PRIORITIZED CHALLENGES AND RECOMMENDATIONS

Challenge 1: Engaging the public to improve understanding of research and its relevance to society

Recommended strategies and actions: EH practitioners should devote more thought to how to communicate their research to public audiences in order to make their work (and its implications) more visible and accessible. This process may include creating new storytelling platforms or products, media outreach, or public visibility campaigns.

Challenge 2: Funding, supporting, and rewarding innovative approaches across the EH research enterprise

Recommended strategies and actions: In the short-term, EH researchers should engage funders to educate them about current trends and needs in the field. In the long-term, this engagement should attempt to shift the incentives of funders to reflect more modern considerations, such as supporting multidisciplinary research, young investigators using new technologies, and projects that explicitly include research translation and communication objectives. New funders may also need to be recruited, such as entities in the technology or philanthropy sectors.

Challenge 3: Investing in developing Environmental Health leaders throughout the career path

Recommended strategies and actions: In order to support young EH researchers, institutions such as universities and agencies should develop mentorship programs in order to train, evaluate, and appropriately steer practitioners at early stages in their career paths. Graduate school curricula should also include leadership training so that young practitioners can develop their own leadership skills.

Challenge 4: Fostering an environment for multidisciplinary research to thrive

Recommended strategies and actions: In the short term, the EH community should establish clear rules and processes for how multidisciplinary research should be developed in order to increase that work's effectiveness. This process may also involve opening up seed money to fund these projects. In the long-term, the research enterprise should increasingly remove barriers

to multidisciplinary research, such as creating a common EH vocabulary in order to reduce field-specific jargon.

Challenge 5: Strengthening internal communication within the EH research community

Recommended strategies and actions: The EH community should improve accessibility to information and correspondence within the research enterprise. This may involve initiatives to share online drives for data, create public calendars of events that may appeal to EH researchers, and produce a directory of practitioners so that members of the community can more easily see what others are working on and contact them if desired.

COMMUNITY AND SOCIETAL LEVEL

Charge: The Community/Societal Level working group was tasked with addressing how researchers can better communicate to audiences in the general public, engage those audiences to build public confidence, and whether society is currently undergoing a crisis in public trust in science.

Expert Panel Background Presentations

Megan Mullin, Ph.D. of Duke University's Nicholas School of the Environment began the working group's discussion by presenting recent and longitudinal public opinion data showing that, despite perceptions of a crisis in public trust in science, Americans generally hold those working in science and medicine in high regard. However, issues of the environment have become highly polarized along partisan and ideological lines, which follows a general widespread trend in contemporary American politics. In light of this information, she emphasized the importance of EH practitioners becoming more strategic with how they communicate their research to general audiences, underscoring that the deficit model of scientific communication will likely be ineffective or even counterproductive depending on issue and context.

Terry Lansdell, program director for Clean Air Carolina, spoke on his organization's work in bringing together scientists, regulatory agencies, nongovernmental organizations, and members of the general public to collaborate on an effective citizen science air quality monitoring program within North Carolina. While he noted that some citizens were at first wary of potential privacy and property value implications of participating in the program, they were won over by patient answers to their questions and consistent messages focusing on the harms of air pollution and the importance of knowledge-gathering. Lansdell asserted that these sorts of wide-reaching and inclusive collaborations can increase public trust in science by being participatory and emancipatory for non-scientists, deepening their engagement with the research community and the scientific process.

Last, **Katy May** of NC State University's Center for Human Health and the Environment discussed her group's work in engaging general public audiences with EH research and the ways that science informs public health. She identified four points of public mistrust in both scientists and science as an institution: mistrust of scientists' biases, mistrust of scientists' motives, mistrust of alarmism, and a lack of baseline scientific literacy to understand researchers. To overcome these challenges, she recommended that EH practitioners create bidirectional communication with public audiences, focusing on transparency, reciprocity, and effective and appropriate messaging.

Key Questions Identified:

1 What factors affect public trust in science and the use of science?

2 What practices by scientists and scientific institutions can improve the public's trust in the use of science?

3 What opportunities exist for scientists to engage with the public to build trust?

4 How does the EH field build constructive dialogue and engagement between scientists and the public to address issues with trust in science?

PRIORITIZED CHALLENGES AND RECOMMENDATIONS

Challenge 1: Being a good communicator

Recommended strategies and actions:

Learning to listen: Communication should be bidirectional, and EH practitioners should be open to feedback from public audiences in order to understand their audiences' interests and concerns. In addition, the EH field should institutionalize holding report-back sessions where, after a research project has run its course, the researchers return to the communities they studied to share their results and respond to feedback. In this way, practitioners are directly accountable to their audience, increasing the chances for effective communication and continuing dialogue.

Keeping it simple: Rather than giving the same talk to public audiences as they would for scientific conferences, EH researchers should make sure that their words and materials are appropriate for whatever audience they face. In the same way, practitioners should hold back from diving into caveats and conditional cases as they are trained in academia; these tangents are likely to confuse and lose public audiences. Simple and direct messages are the easiest for public audiences to accept and digest.

Increased media and communications training: It was the group's general view that media and communications training for EH practitioners is sorely lacking and not currently emphasized in their career training. Given that EH researchers work in fields directly affecting members of the public, it is important that they be comfortable and effective speaking to media and public audiences. Institutional structures and professional norms should accommodate media training so that scientists may avoid pitfalls when communicating with media.

Challenge 2: Accounting for different values in audiences

Recommended strategies and actions:

Knowing your audience: The most basic lesson of communications training is to understand one's audience: their interests, concerns, and capacities. EH practitioners should be encouraged to research their desired audiences (e.g., values, histories, relationships, etc.) in order to both inform their scientific inquiries and ensure that whatever communication they engage in will not fall on deaf ears.

Developing source credibility: Source credibility is based on two components: perceived expertise and identity acceptance. For an EH researcher to be credible to an audience, they need to be both seen as knowledgeable and acceptable to that audience's norms and expectations. This generally means that those with shared in-group characteristics (e.g., ethnic, geographical, ideological, etc.) will be more likely to be seen as credible than those without these characteristics. When attempting to effectively engage with an audience, it is important to consider both tailoring the message and the communicator to that audience.

Messaging authentically: While audiences may be open to hearing confirming information from unexpected sources (so-called "expectancy violation" effects), that receptiveness can be extinguished quickly if the audience suspects they are being pandered to. When developing communications materials, EH practitioners should attempt to tailor those materials to their audience while staying authentic and not compromising their own values. Audiences are likely to sniff out and reject inauthenticity.

Challenge 3: Implementing radical collaboration

Recommended strategies and actions:

Developing equitable relationships with external partners: When it comes to working with external partners in collaboration, citizen's groups and NGOs can at times take a backseat to the vision of EH researchers. However, this sort of unequal power dynamic minimizes the potential for radical collaboration and can undermine the credibility of researchers in their partners' eyes, reducing the effectiveness of these programs. Practitioners seeking to collaborate should have a deliberate, focused strategy going in on how to incorporate NGOs, community-based organizations, neighborhood groups, etc. into their question development, research planning, implementation, and review processes. This practice will establish expectations of responsibility and involvement with partners from the very beginning of projects.

Fostering transparency between partners: EH practitioners should be receptive to bidirectional flows of information and communication to and from partner groups, other organizations, and the communities in which they work. Practices of transparency and accountability strengthen collaborative work.

Translating scientific research appropriately: NGO and community partners may be more qualified or credible in communicating the purposes and results of collaborative work than EH researchers, particularly to community audiences. Practitioners can best support their research translation efforts by providing straightforward and appropriate scientific information.

Summit Attendees

Martin Armes, The Collaborative
Mikayla Armstrong, UNC Chapel Hill
Trisha Castranio, NIEHS
Elena Craft, EDF
Sally Darney, EHP
Nancy Deal, NC Public Health
Leah Devlin, UNC Chapel Hill
Catherine Doyle, NC State
Christie Drew, NIEHS
Anna Dye, NC State
Jeff Engel, CSTE
Greg Fishel, WRAL TV
Jessica Frank, US EPA
Kenda Freeman, MDB Inc.
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Jean Fruci, US House Committee
Andrew George, UNC Chapel Hill
Mitch Gillespie, NC House Policy
Neasha Graves, UNC Chapel Hill
Kasia Grzebyk, UNC Chapel Hill
Kimberlee Hall, Western Carolina
John Hardin, NC Commerce
Bob Healy, Duke
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David Hinton, Duke
Wayne Holden, RTI International
Kennedy Holt, NC Public Health
Don Holzworth, UNC Chapel Hill
Bryan Hubbell, US EPA
Chandra Jackson, NIEHS
Crystal Lee-Pow Jackson, NC Public Health
Amanda Karam, NC State
Catherine Kastleman, Duke
Greg Kearney, East Carolina
Tim Kelley, East Carolina
Paul Knechtges, East Carolina
Carol Kwiatkowski, NC State
Terry Lansdell, Clean Air Carolina
David Lipton, NC Public Health
Layton Long, Chatham County
Anne Lowry, Chatham County
Bryan Luukinen, Duke
Kim Lyerly, Duke
Jackie MacDonald Gibson, UNC Chapel Hill
Melissa Manus, Duke
Katy May, NC State
Melissa McKenzie, NC Public Health
Stan Meiburg, Wake Forest
Larry Michael, NC Public Health
Megan Mullin, Duke
Kristen Naney, US EPA
Ed Norman, NC Public Health
Ken Olden, NIEHS/US EPA (retired)
Bill Pan, Duke
Terry Pierson, RTI International
David Price, US Congressman
Jamie Pritchett, NC Public Health
Liz Ramsey, NC State
Jennifer Redmon, RTI International
Donna Rewalt, NC Cooperative Extension
Jess Rinsky, NC Public Health
Amy Risen, NC Public Health
Louie Rivers, NC State
Megan Rodgers, UNC Chapel Hill
Bill Ross, Brooks Pierce
Jennifer Runkle, Social & Scientific Systems
Mina Shehee, NC Public Health
Rob Smart, NC State
Brian Southwell, RTI International
Jeremy Tarr, NC Governor Policy
Kimberly Thigpen Tart, NIEHS
Victoria Triana, UNC Chapel Hill
Hawley Truax, EDF
Barbara Turpin, UNC Chapel Hill
Steve Wall, UNC Chapel Hill
Pamitha Weerasinghe, US House Subcommittee
Rick Woychik, NIEHS
Michelle VonCannon, NC Biotech Center
Sarah Elizabeth Zelasky, UNC Chapel Hill
Hal Zenick, US EPA (retired)
Jack Zhou, Duke

INDIVIDUAL LEVEL

Mikayla Armstrong, UNC Chapel Hill
Nancy Deal, NC Public Health
Kenda Freeman, MDB Inc.
Neasha Graves, UNC Chapel Hill
Kimberlee Hall, Western Carolina
David Hinton, Duke
Kennedy Holt, NC Public Health
Amanda Karam, NC State
David Lipton, NC Public Health
Layton Long, Chatham County
Jackie MacDonald Gibson, UNC Chapel Hill
Melissa McKenzie, NC Public Health
Larry Michael, NC Public Health
Bill Pan, Duke
Liz Ramsey, NC State
Victoria Triana, UNC Chapel Hill

RESEARCH ENTERPRISE LEVEL

Catherine Doyle, NC State
Kasia Grzebyk, UNC Chapel Hill
Greg Kearney, East Carolina
Bryan Luukinen, Duke
Kim Lyerly, Duke
Melissa Manus, Duke
David Peden, UNC
Terry Pierson, RTI International
Donna Rewalt, NC Cooperative Extension
Jess Rinsky, NC Public Health
Mina Shehee, NC Public Health
Rob Smart, NC State
Kimberly Thigpen Tart, NIEHS

COMMUNITY AND SOCIETAL LEVEL

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Elena Craft, EDF
Sally Darney, EHP
Anna Dye, NC State
Jessica Frank, US EPA
Andrew George, UNC
Bob Healy, Duke
Jerry Heindel, Commonweal
Catherine Kastleman, Duke
Tim Kelley, East Carolina
Carol Kwiatkowski, NC State
Terry Lansdell, Clean Air Carolina
Crystal Lee-Pow Jackson, NC Public Health
Katy May, NC State
Megan Mullin, Duke
Kristen Naney, US EPA
Ed Norman, NC Public Health
Jamie Pritchett, NC Public Health
Amy Risen, NC Public Health
Megan Rodgers, UNC Chapel Hill
Jennifer Runkle, Social & Scientific Systems
Hawley Truax, EDF
Rick Woychik, NIEHS
Sarah Elizabeth Zelasky, UNC Chapel Hill
Jack Zhou, Duke

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