

Editorial

Progress and priorities in reducing indoor air pollution in developing countries

A call to action for governments, institutions, corporations, and individuals worldwide to reduce the deadly effects of indoor air pollution (IAP) in developing countries was published in this journal 6 years ago (*Indoor Air* 16, 2–3, 2006), and the issue is no less urgent today. Nearly half the world's population still depends on solid fuels to meet their basic household energy needs. Exposure to pollutants from inefficient burning of solid fuel indoors for cooking, heating, and lighting accounts for a significant proportion of the global burden of disease. The World Health Organization estimates that nearly 2 million people die prematurely each year from exposure to IAP. Women and young children disproportionately shoulder the burden of adverse health effects. Unless swift and effective action is taken, the health risks associated with IAP are projected to rise as the number of people using these fuels increases.

Has progress been made in the 6 years since the call to action was published in this journal? Promisingly, the answer is yes! Many regional, national, and international organizations and governments have initiated intervention efforts focused on improving cookstove design and performance. For example, in 2010 the United Nations Foundation launched the Global Alliance for Clean Cookstoves, a public–private initiative with the goal of getting 100 million homes to adopt clean cookstoves and fuels by 2020. However, it is important to acknowledge that improved cookstove dissemination programs have historically achieved mixed results, in part because there are both technical and social complexities associated with efforts aimed at successful adoption of clean cookstoves in developing countries. There remains a significant need for interdisciplinary research on intervention studies to address cookstoves as agents of public health risk and global climate change.

To bring greater attention to this topic in the indoor air research community and to encourage a new generation of young researchers to enter this field, we, students at the University of Texas at Austin, initiated, managed, and ran a symposium on IAP in developing countries at the Indoor Air 2011 conference in Austin, TX, USA, on June 6–7, 2011. The symposium was supported by the US National Science Foundation's IGERT program, which allowed us to

fund the attendance of nearly 30 students from a variety of disciplines. We sought to organize the symposium so that it would break new ground with several specific goals: (i) to forge connections between new and established researchers to accelerate new researchers' entry into the field; (ii) to clarify the role of researchers within new cookstove dissemination programs and frameworks; and (iii) to redefine opportunities for future interdisciplinary research to help academic, nonprofit, and governmental agencies work together.

Ultimately, the symposium provided substantial opportunities for exchange between new and established researchers, which is important for growth in any field. A student discussion panel focused on the experiences of working on IAP research in developing countries and highlighted the diversity of students engaged on this topic. It also revealed insights regarding best practices for introducing young researchers to the field and provided opportunities for engaging and assembling future research teams. A series of group and panel discussions provided an opportunity for networking with established professionals, who could provide young researchers with guidance and mentorship and also critically discuss the role of researchers in this field. Presentations from representatives from the Global Alliance for Clean Cookstoves and the US Environmental Protection Agency identified key issues for successful cookstove dissemination programs and enumerated roles for future researchers from the perspective of public agencies. Technical presentations (many of which were given by graduate and undergraduate students) provided a promising view of some exciting current developments in cookstove and IAP research in developing countries. Invited presentations provided a forum to discuss future directions for research and implementation.

Discussions at the symposium identified many unique challenges that this field faces. For example, balancing the goal of obtaining new research data regarding specific stoves and interventions against the demonstrated need for early intervention must be considered and constantly reevaluated. The absence of field-ready, standardized stove test methods to complement wide-scale dissemination of cookstove infrastructure makes evaluation and comparison of

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intervention programs difficult. And, of course, the cultural and political environments of both developed and developing nations must be considered. Continuing to provide a forum for researchers and field workers with varying educational backgrounds, experiences, and motivations at academic and practitioner-oriented conferences will help address these difficulties as they evolve during times of rapid change.

We hope that the interdisciplinary approach supported by this symposium will empower researchers to identify critical efforts, regardless of academic discipline, and enable research to positively support the rapid introduction of improved cookstoves into developing nations. An important thread of discussion during the symposium was that institutional support for a researcher's work in this field may alleviate some of the challenges that arise when unique collaborations are pursued, such as public-private partnerships. Milestones and achievements associated with research in developing countries may not align with traditional academic goals. Therefore, an important first venture for new researchers in this field may be working to develop more flexible internal institutional frameworks.

Rather than viewing the symposium as another opportunity to find out where future research dollars might be found, we sought to help attendees and ourselves envision a more radical future for research in this area—one where students and researchers in research-rich countries propose work that could be conducted jointly with students, nonprofits, governments, or even communities themselves in research-poor countries. Rethinking interdisciplinary collaboration in this way may allow the inclusion of partners outside of the realm of academia who can increase the value of research by improving access to directly relevant, implementable findings in countries disproportionately afflicted by IAP from solid fuel burning.

While we are proud of the outcome of our symposium, it is certainly not the first of its kind. One source of inspiration for us was a workshop in 2007 at the international conference on Indoor Climate and Build-

ings run by PhD students to address challenges faced by graduate students during their studies. While IAP in developing countries was not a specific focus of the workshop, these insightful students expressed the belief in their 'declaration from the High Tatras' (*Indoor Air* **18**, 75–76, 2008) that PhD students should have the right to conduct research on topics of international relevance and that supervisors should support the efforts of their graduate students to pursue collaboration with international institutions, academic or otherwise. In light of the symposium we ran this summer at Indoor Air 2011, we would now add that supervisors should encourage and support their graduate students to conduct research that is relevant to public health issues, even when that means the obstacles to seeking funding may initially be greater than if their students were pursuing IAP research on historically well-funded topics.

We have recently completed a full report of our symposium, which features an overview of the previous research on IAP in developing countries, a detailed summary of the symposium events, the framework for discussions, the identified research priorities, and copies of each paper presented in the symposium (again, many of these were from students, and many of these represent exciting new advancements in IAP research). The report is available online at <http://www.igert.org/documents/254>; we encourage you to read the report and search out the work of those that presented at the conference.

Finally, our experience planning this portion of the conference was an incredibly rewarding one. It would not have happened without the support of Drs. Rich Corsi and Glenn Morrison, respectively, the President and Vice President of Indoor Air 2011. We are immensely grateful for the opportunity and guidance they provided. So, students: we urge you to push your advisers to allow you to engage similarly at future conferences and workshops!

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