PARTNERSHIP FOR CLEAN INDOOR AIR

June 2006 Issue 7

PCIA Bulletin

This quarterly newsletter provides updates on the activities of the Partnership for Clean Indoor Air (PCIA) and its Partners to improve health, livelihood and quality of life by reducing exposure to indoor air pollution, primarily among women and children, from household energy use. More than 120 governments, public and private organizations, multilateral institutions, and others are working together to increase the use of affordable, reliable, clean, efficient, and safe home cooking and heating practices. *Visit http://pciaonline.org to join!*

Indoor Air Pollution Monitoring: Informing Household Energy and Health Interventions

Key to the success of any household energy project is whether or not the intervention is effective at reducing the exposure of participating family members to indoor smoke. By monitoring indoor air pollution, implementers can gauge the impacts of the technologies and practices being promoted, and use the results to inform ongoing program design and activities to improve the lives of the billions of people using traditional fuels for home cooking and heating.

PCIA recognizes the great importance of this topic, and the need to build our collective knowledge and capacity to conduct indoor air pollution monitoring on household energy projects. Based on this recognition, and in response to the significant rise in interest and experience in this topic among PCIA partners, this issue shares experiences from implementing Partners in this arena, including articles highlighting indoor air pollution monitoring results and lessons learned to date, efforts underway to directly link monitored indoor air pollution reductions with health symptom improvements, and a synthesis of a recent PCIA meeting among EPA pilot project grantees to share experiences in conducting indoor air pollution monitoring and learn from the preliminary results of monitoring taking place through pilots.

We welcome your feedback and hope you enjoy this indoor air pollution monitoring issue of the Bulletin! Our next issue will focus on Education and Outreach; please share your experiences conducting outreach and education on household energy use by submitting an article by July 15th, 2006. We are particularly interested in learning about innovative approaches, lessons learned and results.

Call for input on Retained Heat Cookers: The USEPA and HELPS International are developing a guide to designing and manufacturing retained heat cookers (or hayboxes) and would like to include a list of current retained heat cooker projects around the world. If you have web-based information on available retained heat cookers, along with a picture or graphic that you would like to propose for inclusion in the guide, please send the internet link and photo/graphic to Brenda Doroski at doroski.brenda@epa.gov by June 30, 2006.

Update on PCIA Website!

Please visit the website (www.pciaonline.org) for information on PCIA activities!

New features on the website now include:

- Proceedings page under News and Events with workshop outputs from various PCIA and partner events
- Updated PCIA Factsheet in English
- New articles in Media Coverage

The website is undergoing some enhancements. Please check back for new features. For any website related questions please contact Winrock International at PCIAmoderator@yahoo.com.

In This Issue

PARTNER SPOTLIGHT USAID

Each quarter, the *PCIA Bulletin* highlights one or more Partners who are reducing women and children's exposure to indoor air pollution. This issue highlights the activities undertaken by USAID.

The U.S. Agency for International Development (USAID) is an independent agency that provides economic, development and humanitarian assistance around the world in support of the foreign policy goals of the United States. It operates in over 80 countries, providing technical assistance on a variety of sectors and issues.

USAID's concern over the harmful effects of smoke on women and children's health, the detrimental impact of inefficient fuelwood consumption on natural resources, and the associated constraints on economic and social development have prompted it to develop integrated programmatic approaches to improved household energy use that can be mainstreamed into USAID development efforts worldwide. Through joint support from health[1] and energy[2] offices within the agency, USAID aims to facilitate sustained adoption of improved technologies and practices to minimize indoor air pollution within high risk populations, especially young children and women. The initiative seeks to establish a comprehensive approach that includes support to existing household energy and indoor air pollution (IAP) programs and projects being implemented by key health, energy and development partners.

[[1]The Infectious Diseases Division of the Bureau for Global Health. [2] The Energy Team within the Bureau of Economic Growth, Agriculture and Trade (EGAT).]

While a number of USAID programs implemented improved cookstove projects throughout the 1980s and 1990s, the focus on indoor air pollution began in 2004. USAID is collaborating with several global partners to address three areas related to the reduction of indoor air pollution:

- The factors which lead to the most effective adoption of improved stoves and other technologies;
- The approaches that motivate improved behaviors to reduce exposure to IAP; and
- Determination of the reduction in IAP exposure and associated health impacts resulting from the adoption of improved technologies and behaviors.

Support to Partner Organizations

USAID's efforts in these areas encompass pilot projects designed by and implemented on behalf of USAID, as well as support to other organizations. Support to partner organizations is intended primarily to further international dialogue and cooperation on key issues, as well as to inform USAID projects. Key partners to date include the Partnership for Clean Indoor Air (PCIA) and World Health Organization (WHO). Specifically, USAID provided $1 million to the PCIA to fund most of its 10 pilot projects. USAID support to WHO has supported the following activities: research on the relationship between smoke reduction and malaria transmission; development of methodology for evaluations of household energy interventions; research on the relationship between indoor air pollution and birth weight; and provision of technical assistance to a key epidemiological study in the rural highlands of western Guatemala examining the relationship between smoke exposure and disease response (see Kirk Smith article on p. 7 for further details). All of these activities help support USAID objectives of gauging the relationship between indoor air pollution and human health, and ascertaining which interventions will obtain the most promising results, from both the health and energy perspectives.

Pilot Projects

USAID's support to field interventions involves collaborative effort engaging both health and energy sector experience to develop practical intervention strategies, with trials underway in Kenya, Peru and Bangladesh under the management of Winrock International. For the Peru and Bangladesh trials, pre- and post-intervention monitoring is being conducted to evaluate the impacts on awareness, indoor air pollution (IAP) levels and selected health symptoms. As a first task, USAID supported the adaptation[3] and testing of monitoring tools by Winrock in the Philippines. These tools include household energy and health knowledge and practices surveys, and IAP monitoring protocols. These tools have in turn been adapted for local use in the Peru and Bangladesh projects.

[[3] Winrock drew from Practical Action's methods and inputs from Dr. Liz Bates, as well as inputs from a number of individuals, including in particular Dr. Eckhard Kleinau, Eva Rehfuess, Dr. Kirk Smith, Dr. Nigel Bruce, Keith Openshaw, Dr. Tami Bond, Dr. Emily Bomasang, and Conrado Heruela.]

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PARTNER SPOTLIGHT CONTINUED…

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In Kenya, USAID is funding efforts to evaluate the utility of traditional health-focused social marketing approaches to promote adoption of smoke-reducing devices. Winrock first worked with two women's cooperatives in the urban slums of Ngong and Rongai outside Nairobi, to strengthen their ability to manufacture and sell ceramic stove liners and "fireless" (retained heat) cookers. USAID, Winrock and local partners in Kenya then developed and implemented a social marketing campaign, promoting the adoption of these cleaner cooking technologies, and associated behavioral changes. The campaign featured radio ads, radio call-in shows on IAP, road shows and demonstrations, and distribution of materials promoting awareness of IAP. Post- -campaign monitoring is currently underway to gauge the campaign's impact on awareness of IAP and improved cooking technologies.

In Peru, the USAID-supported intervention is designed to reduce indoor air pollution in a typical high-Andean district, Inkawasi, in the department of Lambayeque, through access to improved technologies and information on healthy practices. In the Andes, cooking is done over open fires in kitchens with minimal ventilation, resulting in dense smoke. For the indigenous population, death rates for children under 5, who are most susceptible to acute respiratory infections, are as high as 100 per 1000 live births, well over twice the national average. Evidence exists that chronic obstructive pulmonary disease (COPD) among women is also a significant problem within this population.

The trial intervention, which builds on a previous single-community pilot implemented by GTZ and PAHO, focuses on working with rural micro-entrepreneurs, including stove builders and ceramic artisans, to build a local market for locally-adapted efficient wood stoves with chimneys. Based on experience of the local NGO Centro de Género y Ecología (Gender and Ecology Center) which adapted the stove from a "Justa" sunken-pot stove design, a reduction of up to 80% in indoor concentrations of PM and CO is anticipated from this intervention.

To maximize access to the improved stoves (and retained heat cookers) across the Inkawasi district of 6000 families, the project incorporates an animal husbandry-based micro-credit system well-suited to the local barter system. A strong behavior change component facilitates awareness of the risks of IAP and the benefits of improved ventilation, cooking practices, and stoves with chimneys. Local promoters from 23 intervention communities are transmitting these messages to women and men from the participating communities. "Healthy Kitchen" competitions among households are providing further awareness raising and incentive for participation in kitchen improvements. Radio spots, murals and posters have been developed and disseminated at strategic times and places to reach a maximum audience.

Proud Inkawasi family with improved stove

In Bangladesh, USAID is working with local NGOs Concern Worldwide Bangladesh and Village Education Resource Center, which have experience with behavior change communication in health and participatory implementation of improved cookstove programs, respectively.

The pilot project is being implemented in two urban municipalities, Saidpur and Parbatipur, located in the Northwest of the country. The project is targeting 400 urban slum households with two main types of interventions: dissemination of improved stoves; and dissemination of behavior change messages, such as improved ventilation and child care practices, aimed at leading to further reduction in exposure to IAP. Coupled with these efforts are an entrepreneurship development component and a product-based social marketing component. Potential entrepreneurs are receiving training and 10 or more of the trainees

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Baseline IAP monitoring has been completed for both the Peru and Bangladesh pilot projects. Gravimetric pumps & filters are being used in Peru to obtain data on respirable particulates (PM_4), based on methods followed by Practical Action; in Bangladesh, MiniVols (Airmetrics Inc.) are being used to keep consistent with monitoring done elsewhere in the country by the World Bank. In both cases, real-time CO monitors (ISC model T82) are being used to monitor CO levels. In Bangladesh, both cooking (CA) and living area (LA) concentrations are being measured.

Preliminary results:

PM concentrations (µg/m³ ± SD) :	**Peru (n = 45)***	**Bangladesh (n = 42)****
24-hr average	675 ± 862 (PM_4)	340±344 ($PM_{2.5}$,CA); 294±319 ($PM_{2.5}$,LA)
Cooking period	964 ± 1310 (5AM-9PM)	551±370 (CA); 471±368 (LA) 7AM-7PM
Range (cooking period)	10 – 6312	85 – 1447 (CA); 81 – 1447 (LA)
Non-cooking period	172 ± 352 (9PM-5AM)	129±105 (CA); 118±86 (LA) 7PM-7AM
CO concentrations (ppm ± SD):		
24-hour average	36 ± 43	2.3±2.0 (CA); 1.9±1.9 (LA)
Cooking period	47 ± 60	3.8±3.5 (CA); 3.0±3.4 (LA)
Non-cooking period	14 ± 35	0.8±1.2 (CA); 0.7±1.0 (LA)

*Data collected and analyzed by Swisscontact.

**Data collected and analyzed by Dr. Mohammad Alauddin, Wagner College, New York, and Mr. A. B. M. Zakaria, Exonics Technology Ltd., Bangladesh.

Note: By comparison, the U.S. National Ambient Air Quality Standards set by the USEPA for PM2.5 in indoor air give an annual limit of 15 µg/m3, and a 24-hour limit of 65 µg/m3; for CO the limits are 9 ppm for 8 hours and 35 ppm for 1 hour. In Bangladesh, 24-hour PM averages are five times the EPA limit, and in Peru they can be well over ten times this limit.

will receive micro-credit seed funding to launch improved stove businesses. Appropriate stove models are being identified through VERC's innovative Methodology for Participatory Assessment (MPA), which has been adopted by the Asia Regional Cookstove Program (ARECOP) for improved stove programs. Concern Bangladesh is disseminating behavior change messages, primarily through their existing network of heath committees and volunteers, which were originally established to disseminate maternal and child health messages for USAID-funded health programs; it is expected that area concentrations of IAP will be reduced by at least 50%.

Women and children learn about the dangers of indoor air pollution in Bangladesh

Looking Ahead

Ultimately, program success will be measured by sustained changes in behavior, including adoption of improved stove technologies, use of higher quality fuels, improved household ventilation, and other approaches to reduce exposure. This approach explicitly recognizes the need for cross-sector collaboration to improve household energy-related health impacts.

USAID expects the results from the Kenya, Peru, and Bangladesh programs to be available by early 2007, and data analysis from the completed field activities in the Guatemala field trial is underway.

Your comments are welcome!

For comments, suggestions, or news that you would like to share please email Winrock International at PCIAonline@yahoo.com. The deadline for contributions to next quarter's bulletin, the topic of which will be Education and Outreach, is **July 15, 2006**.

☼ FEATURE ARTICLES

Reducing Indoor Air Pollution through Improved Cookstoves Dissemination: The Case of Patsari Stoves in Rural Mexico

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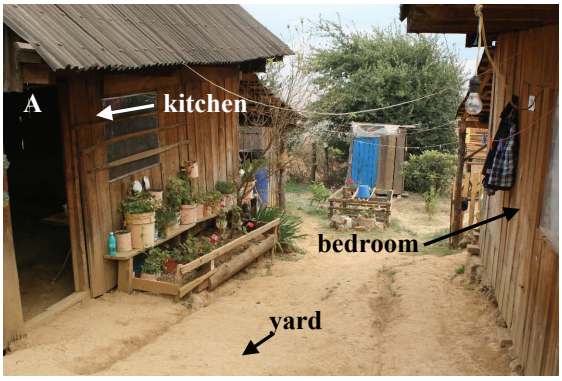
In Mexico, nearly 25 million people rely on fuelwood as their main energy source for cooking. Some 17 million use it exclusively and 8 million use it in combination with LPG (INEGI, 2000, Masera, 2005). Cooking is typically done on three-stone open fires (known locally as fogones), a deeply-rooted tradition associated with extensive fuelwood use, the release of various pollutants due to incomplete combustion, and health impacts caused by exposure of women and children to smoke (Smith, 2000). To help solve these problems, a multi-institutional and integrated project was launched in the Central Mexican Highlands aimed at the dissemination of improved wood-burning cookstoves (ICS) (Masera et al. 2005). A new model of ICS, called *"Patsari"* was developed, along with an innovative dissemination strategy that includes a participatory users`-centered approach. The project includes comprehensive monitoring of user preferences and attitudes, and ICS impacts on: fuelwood savings and other parameters related to stove performance, greenhouse gas emissions, health and indoor air pollution.

To evaluate the impacts of *Patsari* cookstoves on indoor air pollution (IAP), monitoring of $PM_{2.5}$ and CO was conducted in Comachuen, a rural village in Michoacán, Mexico. The study compared concentrations of both pollutants in the same houses before and after installation of *Patsaris*. A total of 60 houses were monitored in three microenvironments: a) near the stove (1m from the combustion zone, 1.25m above the ground and at least 1.5m from doors and windows), b) personal exposure and c) at the Main Plaza (the central point in the village where the school, market, church and medical centre are located). UCB and HOBO real time monitors were used for $PM_{2.5}$ and CO respectively. Measurements were carried out in November and April of 2004; both months fall in the dry season. The longitudinal study design allowed for controlling the variability caused by type of fuel, ventilation conditions and cooking practices.

Sample Selection. Comachuen has 4,300 habitants and is located at 2,600 meters above sea level, surrounded by hills. The sample for the IAP study was selected according the following criteria: Mothers of children under 5 years old, kitchens with 4 walls and roof, ventilation in the form of one window and one door and users of wood for most cooking tasks. In total 200 women were interviewed and 60 chosen for the IAP survey.

Methodology. The monitoring plan included: 48-hour measurements near the stove to analyze the effect of technology change, 48-hour measurements in the Main Plaza to have an average of local ambient and 24-hour measurements of personal exposure. Measurements of $PM_{2.5}$ were made near the stove using SKC pumps and cyclones, and a UCB monitor, for both the stove microenvironment and personal exposure. The objective was to analyze the reductions obtained



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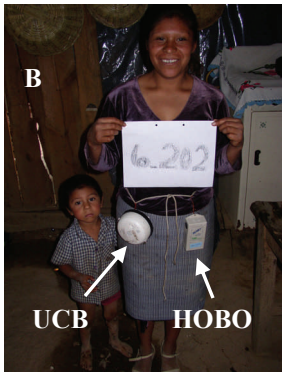

by Patsari stoves as well as to examine the correlation between real time and pump-filter measurements. As a part of a formal experimental design, 10% of filters were located as blanks (to identify potential contamination sources) and some duplicate UCB's were placed side by side in order to compare measurements. Pictures A-D show the physical location of devices used for the two periods of measurements: *A) typical distribution of a Michoacán rural home, B) Personal monitoring, C-D) stove monitoring.*

Results and Lessons Learned

Rather than switching exclusively to Patsaris, most users chose a multiple-device strategy (Masera et al. 2000). Because of this practice, the sample was divided in four different groups: exclusive users of fogon (open fire), users of both Patsari and fogon in the kitchen, users of both Patsari and fogon in separate rooms and exclusive users of Patsari. Table 1 shows the IAP levels associated with each of the groups sampled. A reduction of 66% for $PM_{2.5}$ near the stove (from 1090 µg/m^3 to 370 µg/m^3) and 54% for personal exposure was obtained by exclusive Patsari users.

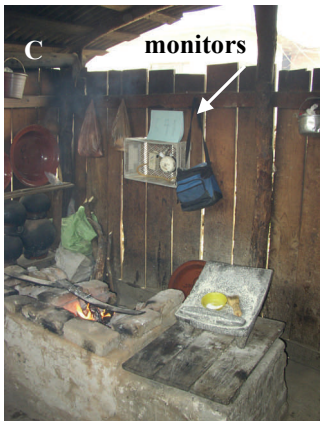

Table 1 Reductions in $PM_{2.5}$ and CO concentrations associated to Patsari stoves NOTE: 48-hour measurements for stove and 24-hour for personal.

		PM (µg/m^3)		CO (ppm)	
		Stove	**Personal**	**Stove**	**Personal**
Fogón	Mean	1,090	290	8.20	1.82
Patsari + Fogón	Mean	600	180	3.75	0.83
	Reduction (%)	**45**	**38**	**54**	**54**
Patsari + Fogón different room	Mean	510	160	3.31	0.91
	Reduction (%)	**53**	**47**	**60**	**50**
Patsari only	Mean	370	140	1.50	0.97
	Reduction (%)	**66**	**54**	**82**	**47**

For CO, 82% and 47% reductions were found for stove and personal exposure, respectively. An average concentration of 59µg/m^3 for $PM_{2.5}$ was found for the Main Plaza (outdoor) measurement and a correlation of *R=0.81* for $PM_{2.5}$ and CO in the stove microenvironment has been found, which indicates that future measurements less equipment could be used, and we can estimate one as a proxy of the other.

It is important to point out that the monitoring of Patsaris was carried out after only one month use of the stove. Therefore, people were in a transitional period and still adapting to the new stove. The number of exclusive Patsari users has increased since final IAP monitoring took place.

Continuous measurements (presented in Figure 1), help associate specific cooking tasks with concentration peaks. This gives an accurate estimation of when and to what degree a woman may be exposed to different pollutants. The measurements also help identify the main factors affecting pollutant distribution and amounts (for example, type of kitchen, ventilation, fuel, maintenance of stove, and cooking practices).

Recommendations for IAP monitoring

Further development of suitable equipment for field conditions is necessary, including for high IAP levels, poverty situations, space constraints and inherent variability caused by type of fuel, ventila-

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tion, season, and cooking practices. Use of real time monitors provides the possibility of better exposure estimates.

Calibration, adjustment and data management procedures must be clear and followed closely to avoid delays in analysis and to assure the best data quality, so that feedback and immediate decisions about study design can be made.

Conclusions

Literature on the subject points to the strong association between IAP and health impacts. The results of the study described here demonstrate that the *Patsari* Improved Stove constitutes an alternative to mitigate high levels of indoor pollutants, even when multiple combinations of fuelwood and stoves are used. The study has provided substantial baseline information on rural homes in Michoacán, Mexico. It is important to compare the results with others surveys to best understand rural dynamics and assess the efficacy of other implementing interventions.

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Household Woodsmoke and Health in Guatemala

Professor Kirk R. Smith for the RESPIRE Team (krksmith@berkeley.edu)

Acute lower respiratory infections (ALRI) kill nearly 2 million children under five in developing countries, but well-established risk factors such as malnutrition incompletely account for their scale. More than a dozen observational studies have found consistent associations with household use of solid fuels and other indicators of indoor air pollution (IAP), but fall short of fully establishing causality and exposure-response relationships. Due to resource constraints, most were also not able to employ methods to confidently distinguish lower from upper respiratory infections, the latter presenting little serious risk to children. To improve knowledge of IAP risks and to isolate the benefit of a real intervention on confirmed ALRI, a randomized controlled trial using improved woodstoves with chimneys has been undertaken by an international team in the US, Europe, and Guatemala. Primary funding for RESPIRE (Randomized Exposure Study of Pollution Indoors and Respiratory Effects) was provided by the US National Institute of Environmental Health Sciences (NIEHS).

After unsuccessful efforts in the 1980s to fund a study in Nepal, an international committee was established in 1991 by the Child and Adolescent Health office of the World Health Organization in Geneva to locate the best site. Based on criteria related to local health, IAP exposure, logistics, and institutional conditions, a dozen sites were examined in Asia, Africa, and Latin America. Highland Guatemala was chosen and a range of pilot studies undertaken in the 1990s to develop data needed to design and successfully fund RESPIRE, which began in 2001 to examine effects in young children and their mothers.

The site is home to a largely indigenous primarily agricultural Mayan population living at 2700-3000 m in the western Guatemalan highlands. Most of the population speaks a local language, Mam, with Spanish as a second language for many. Nearly all households in the area use only wood for all household fuel requirements. Pre-intervention ALRI rates in young children were estimated at 0.5/child-year.

A rapid assessment was undertaken in 2002 among 5500 households in the area to screen for recruitment based on use of an open fire for cook-

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ing indoors, presence of a pregnant woman or child under 4 months, migration patterns, and willingness to participate. To meet statistical goals, 534 households were eventually recruited. After baseline household and indoor air quality (IAQ) surveys, households were randomly assigned to receive an improved chimney stove, the *plancha*, at the start of the study or at the end, when the study child reached 18 months, or a household dropped out. Pilot work showed that *planchas,* which were indigenously developed in Guatemala and have been deployed widely since the late 1980s, were popular, sturdy, and capable of substantially improving kitchen IAQ.

Traditional three-stone open fire

After stove installation, weekly household visits were conducted by trained fieldworkers to identify potentially ill children, who were then referred to study MDs for medical confirmation and treatment. Among other project measures, X-ray, pulse-oximetry, and antigen tests (to determine whether or not the ALRI episode was likely to be of viral origin) were conducted to provide objective indicators of disease and verbal autopsies were performed for all deaths in study children. *Planchas* were repaired by the study when structural problems appeared. Quarterly personal 48-hour CO exposures were obtained for all study children and mothers. Intensive personal and area IAP monitoring for CO and small particles was conducted in a 13% subsample, along with outdoor monitoring and assessment of exposures from use of wood-fired saunas (*temascals),* which are widely used in the study population.

Study children contributed about 600 child-years of surveillance, meeting project goals. Randomization was successful as there were no significant differences between the two groups for any of the dozens of household, demographic, and social variables examined, Preliminary data evaluation indicates that although IAP in the kitchens dropped by nearly a factor of ten, personal exposures to the babies decreased by only about half, a pattern implied by other comparative, but non-randomized, studies of improved chimney stoves around the world.

Overall child ALRI rates were quite similar to those estimated in advance and analyses of the effects of intervention on ALRI of different severity are being undertaken as well as comparisons of the accuracy of different diagnosis levels (fieldworker, MD, and independent specialists). Improvements in some respiratory symptoms but not others and a significant drop in blood pressure (a health benefit) for the women were reported at the International Society for Environmental Epidemiology (ISEE) meeting in 2005. Additional results for children's and mothers' health will be reported at this year's ISEE meeting in Paris, with details submitted for journal publication. Separate analyses for viral and bacterial pneumonia will be presented, the latter being more likely to lead to child mortality.

Plancha chimney wood stove

Although not primary outcomes for the study, RESPIRE also documented high rates of low birth weight, stunted growth, diarrhea, and infant mortality in its child population, which reveal the extremely poor socioeconomic, environmental, and

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nutritional conditions in which these indigenous populations live.

NIEHS has provided funding for four more years of fieldwork at the site to follow the RESPIRE children to find if their differences in early life IAP exposures translate into different rates of asthma and related chronic respiratory conditions. As part of this effort, a third group of households will receive improved stoves in 2007.

In addition to this study in Guatemala, the University of California, Berkeley team is currently undertaking several other studies, including four IAP measurement studies in India. Two of these will develop methods to evaluate improved stove programs, and the other two will develop methods for doing large-scale IAP measurements as a part of a national household sample survey. UC-Berkeley is also working with four South Asian research teams in India and Nepal to conduct a multi-center study of the relationship of household IAP and tuberculosis (TB); it is thought that the main mechanism by which this occurs is that a latent (inactive) TB infection, common in developing country populations, is allowed to break out into an active infection due to the suppression of the respiratory immune system caused by high levels of IAP. Previous studies in India and Mexico have found the households using solid fuels have 50-100% higher rates of TB; this is the first time studies will be done using common methods across different populations starting with medically confirmed TB cases. Data are being collected until summer 2006 for analysis later in the year. Also in Nepal, UC-Berkeley is coordinating a study of changes in eye opacity related to indoor air pollution exposures by use of digital photographs in follow-up to a recently published study showing a relationship between indicators of IAP and cataracts. (See http://ehs.sph.berkeley.edu/krsmith/publications/2005%20pubs/Pokhrel%20et%20al%20-052.pdf). Finally, with technical support from UC-Berkeley, Winrock International is conducting indoor air pollution monitoring to study the effects of IAP as one of the risk factors in acute lower respiratory infections in children under 3 years old in Bhaktapur, Nepal. This is a part of a larger casecontrol study being conducted by the Child Health Research Project, a collaboration between researchers from the Institute of Medicine, at Nepal's Tribuhwan University; the Centre of International Health, Bergen, Norway; and the Department of Epidemiology Research, Statens Serum Institut, Denmark. Extensive and intensive household survey and monitoring will be conducted in participating households. The results are expected by early 2007.

Partnership for Clean Indoor Air
Indoor Air Pollution Monitoring Meeting
(Doroski.Brenda@epamail.epa.gov)

Thirty six members of the Partnership for Clean Indoor Air -- 18 from outside of the U.S. -- participated in an Indoor Air Pollution Meeting on January 30, 2006 in Seattle, Washington, USA following the ETHOS Conference. The diverse participation and experiences contributed greatly to achieving the purpose of the meeting which was to build our collective knowledge and capacity to conduct indoor air pollution monitoring on household energy projects, and to utilize the results to improve the lives of the billions of people using traditional fuels for home cooking and heating.

Presentations were given on the IAP monitoring programs of eight pilot projects in China, India, Ethiopia, Uganda, Honduras and Mexico. We were very fortunate to have each of the pilots represented by their local IAP coordinator, and in three cases by their research counterparts. All of the meeting participants were actively engaged in IAP monitoring and contributed to meeting the specific workshop objectives to:

-Learn how projects are conducting IAP monitoring;
-Offer insights and/or assistance where requested;
-Inform projects that are in the beginning stages of their IAP monitoring; and
-Learn from the preliminary results of the monitoring.

Each presentation addressed the same questions: why monitor, how are projects monitoring, equipment used, initial findings, lessons learned, and next steps. This resulted in workshop participants gaining a good understanding of how each of the diverse projects addressed similar topics, enabling them to compare and contrast approaches, successes, challenges, and results.

Overwhelmingly the participants reported that the meeting objectives were met and that additional outcomes of the meeting included: highlighting challenges that are unique to various community settings; networking with other groups conducting IAP monitoring; planning future collaboration;

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acknowledging and comparing universal challenges so we can collectively address them, while finding solutions that work in our respective situations; and beginning to build consensus on such things as interpreting the data, analysis of data and presenting the results in simple terms to better understand and communicate the IAP data.

PCIA partners discovered a feeling of solidarity resulting from being true pioneers in monitoring the IAP reductions of household energy projects and paving the way for other organizations to assess the impact of their interventions. There was a great interconnectiveness between different teams; participants shared valuable and reliable information and insight; and participant's progress was validated by other people's approaches.

As the day progressed, it became clear that all the groups were facing common problems and possible solutions. For instance, in almost all cases, the demand of resources was bigger than expected; and sample size selection had proven to be very challenging, leading to the recommendation to select more households than required for statistical significance in anticipation of some dropouts.

There was excitement that initial findings indicate that IAP levels are being reduced in households using improved cook stoves; not just in an isolated case, but in every case. Participants also acknowledged that people are still using traditional stoves for select purposes. In fact, multiple stove usage is more common than we'd like to admit and there was agreement that it is important to recognize and accept this fact. During this session, the group discovered that there is quite variable data from various groups which led to a request to define how NGOs report initial findings and how to handle data to assure better understanding by other partners.

The session on lessons learned was one of the most useful and informative, highlighting things like time and resources required for staff training and the need for simple and portable equipment. Partners shared practical lessons learned, for example, the need to keep at least one set of equipment in the lab as a standard against which other equipment can be calibrated.

The session on next steps generated lots of outstanding requests and offers for continuing to advance the IAP monitoring work being implemented by partners in the field. Participants emphasized the continued need for technical training (e.g., calibration of instruments, data analysis, monitoring results, fixing graphs) and requested to meet again in a year's time to compare and discuss results and think ahead. Other next steps included exploring ways to make monitoring less intrusive and make equipment more compact and sharing information on how groups are planning on correlating their IAP data with other key parameters (e.g. time/activity, ventilation, etc). Finally, there was significant interest in standardizing reporting mechanisms in order to better understand results among partners.

Looking to the future, participants suggested other topics that would benefit from this type of PCIA forum: 1) influencing local energy/health policy; 2) conducting outreach and education for improved cook stoves; and 3) developing local markets and business plans. Look for announcements of upcoming forums addressing these topics over the next year.

For more information on the outcomes of the workshop, you can download the presentations and a summary of the discussions from the PCIA website at http://pciaonline.org/events.cfm?v=n.

☼ What's New...?

...in Technology?

Weyer Dung-burning stove prototype
Utilizing the design principles developed by Larry Winiarski and Aprovecho, Kristina Weyer has developed a prototype dung-burning stove employing a modified rocket stove design with high draft, high firepower, and great flame activity with relatively little smoke, which also received an enthusiastic reception at ETHOS 2006. For more information, please visit: http://www.repp.org/discussiongroups/resources/stoves/apro/dung/Aprodung.htm

☼ HAPPENINGS

Upcoming Events…

The **2006 International Solar Cookers Conference** will be held in Granada, Spain, July 12th to 16th. The conference will bring together solar cooker researchers and practitioners to share experiences, dissemination strategies and recent advances in solar cooking, water purification and related solar food processing applications. Representatives from 50 countries or more are expected. PCIA Partner Solar Cookers International is a co-sponsor of this event. For further details, visit www.solarconference.net

Recent Partner Activity…

South Asia Regional Workshop on IAP, Health and Household Energy
February 2006, Kathmandu, Nepal

The South Asia Regional Workshop on Indoor Air Pollution, Health and Household Energy was held on February 27-28, 2006 in Kathmandu, Nepal to exchange information on successful technologies, model and challenges in reducing indoor smoke and associated health burden in South Asia. The workshop was organized jointly by Practical Action Nepal and Indoor Air Pollution and Health Forum Nepal.

Over 90 participants attended from Bhutan, Bangladesh, India, Pakistan, Sri-Lanka, Nepal and Indonesia, including government officials from health, environment, energy and rural development sector; donors; practitioners from non-government and private sectors working in the area of household energy and health; academicians, researchers and medical professionals from South Asia; and representatives from Practical Action United Kingdom, USEPA (United States Environment Protection Agency), and The Massachusetts Institute of Technology, USA.

Group discussions held and working papers from the region and abroad covered partnership-building, health, indoor air quality monitoring, gender and energy, poverty, economics & finance, awareness raising, technologies, scaling-up model and policy issues.

Concrete outcome of the event included specific recommendations for increasing awareness at the regional level on the health burdens of IAP and policy improvement, including regional networking, and identified a host of potential areas for future interventions. For more information please visit http://pciaonline.org/events.cfm?v=n.

The challenges of the wood stoves *Changeout* program in the USA

In early March the USEPA organized a workshop in Utah to discuss the challenges faced by the U.S. woodstove *Changeout* program, the goal of which is to spur the replacement of inefficient and polluting woodstoves that not comply with USEPA wood stove certification. Currently 75% of the approximately 10 million wood stoves used primarily for space heating in the U.S. do not meet certification, which requires smoke emissions of no more than 7.5 grams of $PM_{2.5}$ per hour for non-catalytic stove models. These source emissions pollution levels were defined to meet the National Ambient Air Quality Standards (NAAQS) maximum emission level of 65 $\mu g/m^3$ of $PM_{2.5}$ in a 24-hr standard.

Due to the high cost for stove owners of upgrading to newer, more efficient models, and the fact that the old woodstoves have a long working life of 15 to 20 years, the pace of the *Changeout* program has been slow. Workshop participants discussed the challenges faced by the program, presented successful case studies, and suggested strengthening approaches such as social marketing to raise awareness and behavior change, alternative stove technologies and special attention to Native Americans who also cook on their woodstoves. For more information on this workshop see http://www.pciaonline.org/events.cfm.

Third WHO regional training workshop

The third WHO regional training workshop on indoor air pollution and household energy monitoring was held in Sri Lanka May 22-26. These 5-day training workshops are intended to empower governmental and non-governmental agencies to evaluate the impact of their intervention projects on indoor air pollution, health and wellbeing, and the socioeconomic situation of the household. Main target audiences are persons currently undertaking household energy intervention projects and "future trainers" willing to provide training and ongoing support to projects located in a given region. For more information, please contact Eva Rehfuess at rehfuesse@who.int.

CSD-14

The 14th Meeting of the Commission for Sustainable Development (CSD-14) was held in New York on May 1st to 12th, 2006, representing year one of

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the two-year CSD cycle focused on sustainable energy. Household energy was discussed and highlighted throughout the two-week meeting.

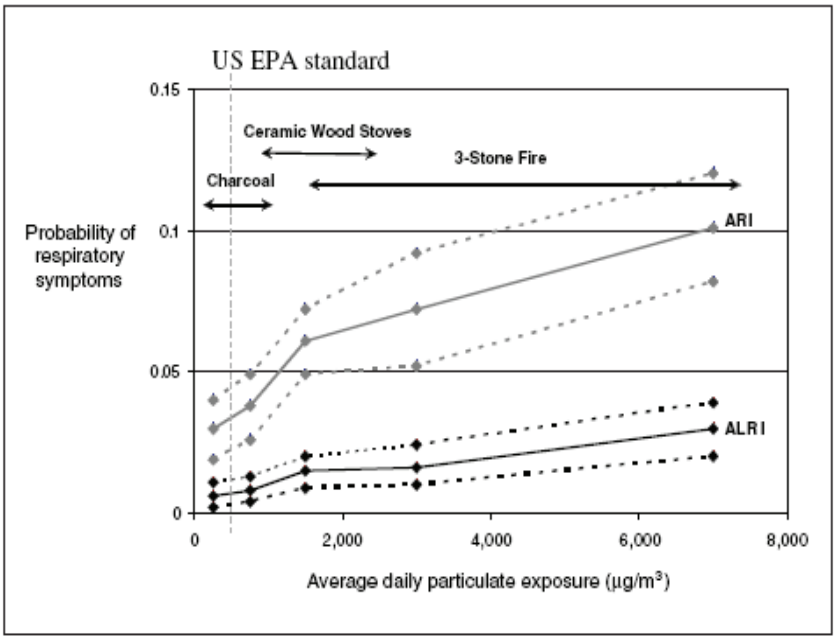
At CSD-14, the Partnership for Clean Indoor Air and Partners organized events and participated in panels to increase awareness and generate action among international development organizations to reduce indoor air pollution from household energy use. The Partnership participated in a Partnership Fair briefing, wherein representatives from the USEPA, WHO, and GTZ presented an overview of the Partnership's mission, goals, and results, and discussed their individual contributions as examples of Partner activities to achieve the Partnership's mission. In the Partnership Fair information area, PCIA had a table for a day and WHO for the entire meeting to educate delegates about the health effects of household energy and to inform them about efforts to address this challenge. The PCIA was highlighted in the US Government's side event as a successful international sustainable energy partnership, and a representative from Winrock International was interviewed in Spanish for a UN radio program (see http://pciaonline.org/mediacoverage.cfm). The interview was aired on May 5 to more than 60 networks in Latin America and worldwide with the potential to reach an audience of 33 million people. In addition, household energy experts spoke on plenary panel discussions; Elizabeth Cecelski of ENERGIA spoke about household energy and gender and Dr. Kirk Smith of UC-Berkeley spoke about on household energy and health.

On May 11th, WHO, GTZ, USEPA and Practical Action organized a joint side event entitled ***'4000 deaths a day from cooking fires? Lets prevent them!'*** to draw attention to the numerous risks of using biomass and coal for cooking and heating in developing countries, and to gain recognition from policy makers of the need to improve household energy supply for the poorest households. Over 70 participants attended the event, including representatives of governments, NGOs and partnerships. For more information on the side event, go to http://www.who.int/indoorair/policy/hhhcsd14/en/index.html

In addition to all these activities, WHO and Practical Action staff organized a photo exhibit on household energy that was prominently displayed throughout the two week meeting.

GAPFund Awards Announced

Twenty proposals, many including household energy and health components, have been selected for funding by the GVEP Action Programs Fund (GAPFund), out of more than one hundred and fifty received. GVEP has also made an addition award from the GAPFund in collaboration with the World Bank's Development Marketplace. Grantees include PCIA Partners AHDESA, Solar Cookers International, and TaTEDO and TERI. For more information, please visit http://www.gvep.org/content/general/detail/12841/



FACT BOX

The exposure-response graph from a six year, 500 person, exposure and stove intervention study in Kenya. Vertical axis: percentage of time subjects participating in bi-weekly health examinations exhibited ARI or acute lower respiratory illness (ALRI) symptoms. The EPA particulate exposure standard of 200 g/m3 for PM10 (particles with diameters of less than 10 microns) is indicated by the dotted vertical line, which forms a lower bound for the exposure range observed in the Kenya project. The stove and fuel combinations indicate exposure ranges. Adapted from Ezzati and Kammen, 2001.