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## Introduction

# Behavior Change Communication: A Key Ingredient for Advancing Clean Cooking

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Household air pollution, caused by the indoor burning of solid fuels such as wood, coal, and crop residues, represents one of the most challenging and entrenched public health problems of our day. The burning of biomass fuel using traditional cookstoves releases smoke that contains a complex mix of health damaging pollutants such as carbon monoxide, particulate matter, and other organic compounds into the living environment of billions of households each day. Estimates indicate that household air pollution is associated with roughly 11,000 deaths daily, making it one of the leading risks to public health on a global scale.

Beyond its effects on health, cooking with rudimentary stoves and fuels has major social and environmental consequences. Inefficient cooking means that women and children may spend additional time and financial resources securing fuel; it also contributes to environmental degradation and climate change.

Until recently, efforts to promote improved cooking have focused on technological advances primarily to reduce the environmental effects of inefficient stoves. To achieve this, engineers and stove designers have worked to develop more efficient biomass stoves. Gains in stove efficiency, however, have not translated to the emissions reductions necessary to improve public health.

In addition, very few improved stove programs have explicitly used behavior change theories or frameworks to guide their initiatives; and the few that have did so simplistically. Earlier behavior change interventions tended to focus on educating the poor about the health and economic effects

of household air pollution with very little understanding of other important determinants of adoption and sustained use of clean cookstoves. Formative research on other factors influencing the performance of behaviors fundamental to clean cooking has not been frequently used to design interventions. Methods used have also been relatively weak, relying largely on only quantitative (e.g., knowledge, attitude and practice surveys) or qualitative methods (e.g., focus group interviews) that have focused on frequencies of knowledge and perceptions rather than determinants of behavior over time. Study designs had very little methodological sophistication or rigor to understand both effectiveness as well as acceptability of changing cooking practices in a given household or community.

Although carbon credits and other finance mechanisms have lowered the price of stoves, uptake of cookstoves has remained low, especially among the poorest households. Even when acquisition barriers are overcome and households are able to obtain an improved stove, consistent and correct use of the stoves is sporadic at best.

To successfully reduce household air pollution, it is now clear that the focus must expand beyond hardware and technology to address human behavior, especially given that clean cooking requires many interrelated actors to practice complex behaviors consistently and correctly over time. This includes behaviors of cooks, husbands, mothers-in-law, health providers, wood sellers, stove sellers, stove distributors, stove producers, public health professionals, governments, nongovernmental organizations, microfinance institutions, and medical researchers, among others.

Research has highlighted that gender differences in the home often result in male decision makers not valuing the benefits of improved cooking solutions. Thus, women, who typically experience the greatest risks from household air pollution exposures and have the most to gain, often lack

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authority to make purchases for cleaner cooking solutions. Efforts to scale up cleaner more efficient cooking must ensure a central role for women and promote greater decision-making power for women over the household budget.

The evidence now shows that major reductions in emissions are required to achieve health benefits. Many past health research studies have used only slightly improved stoves that resulted in negligible changes in emissions and were not substantially different from the traditional stoves they aimed to replace. Moreover, emerging evidence, highlighted in this supplement by Johnson and Chiang (2015), demonstrates that without nearly complete replacement from traditional to new improved stoves, households see little health benefit. This has major implications for behavior change and communications given that health gains will only be made if there is near exclusive adoption of extremely low emission technologies.

In addition to developing promising advanced biomass technologies, there is a need to scale up the use of better fuels—liquefied petroleum gas, electricity, ethanol, biogas—that can greatly reduce household exposures to air pollution. Ongoing research highlights that clean fuels are highly desired; when people have access to very clean fuels, they use it consistently and stop using their traditional stoves. Furthermore, the use of clean fuels has great potential to bring exposures down to the World Health Organization's air quality guideline levels. In regions where use of cleaner fuels is feasible, this approach should be given primary importance. In regions where liquidity constraints, lack of infrastructure, and reliance on solid fuels persist, however, improved solid fuel stoves may remain the only feasible option.

We are in the midst of a paradigm shift, from a focus solely on technologies to a focus that will include three critical pillars: clean cooking technologies, the enabling environment, and demand creation. These three pillars must all be in place to achieve cleaner cooking and improve household air quality.

The first pillar, clean cooking technologies, must remain an essential component and must address issues of quality, design and packaging, customer service and after-sales service, distribution, location, and methods of product delivery, being certain to include user perspective in all these supply-side issues.

The second pillar, the enabling environment, includes the policies and systems necessary to encourage and support cleaner cooking. Strong global and national partnerships, including government, civil society, and the private sector, are required to foster policy improvement, institutional strengthening, and cross-sectoral coordination.

The third pillar, demand creation, is a fundamental component of the solution and includes activities such as marketing research to better understand customers and what methods of advertising, direct marketing, personal selling and sales promotion will be most effective. Successful marketing and communications must reflect the consumer point-of-view and therefore requires community engagement. Specialized consumer research and market methods must identify priority audience segments and create strategic communications that appeal specifically to them.

Communication methodologies are essential not only for formative assessment but also for assuring an integrated, strategic linkage of the components of the three-pillar framework. The shifting focus from hardware and technology to human behavior requires understanding what motivates behavior and behavior change, and constructing a theory of change behind our interventions. Decades of public health failures have taught us that this “do it because it is good for you” appeal rarely succeeds. Success requires broad consulting—from cooks and their families to religious leaders and tea stall owners—to discuss cooking techniques, food preferences, aspirations and psychological impulses far removed from the actual domain of cooking or nutrition. The application of rigorous methods—incorporating a sophisticated mix of quantitative and qualitative approaches—is needed to better customize communication strategies to particular target audiences and settings.

Various elements of communication are necessary to bridge and bond all these disparate parts and disciplines together in a coordinated and integrated strategy, which is why it is so vital to feature this series of articles in this special issue of the *Journal of Health Communication*. The USAID Translating Research into Action Project (TRAction) has sponsored this special issue to capture some of the more exciting and promising learning, and to advance our understanding of behavior change in the clean cooking domain.

Several articles in this special issue highlight the importance of the technology pillar. Johnson and Chiang (2015) focus on the effectiveness and limitations of improved cookstoves, stressing that because near complete displacement of traditional stoves and open fires is needed to achieve health benefits with stoves that are currently available, behavior change and communication strategies are essential. Prasodjo and colleagues (2015) focus on larger housing structure as a key element influencing exposure to household air pollution. They explain the importance of understanding cultural practices driving the types of ventilation, floor material, and size of wood burned in order to promote healthier practices. Rosenbaum, Derby, and Dutta (2015) used formative research to understand consumer preferences for cookstove design and willingness to pay for new stoves in Bangladesh (Figure 1). Their findings suggest that incorporating desired stove attributes and financing options are necessary for people to sufficiently value a stove.

Key elements of the enabling environment are explored by Lewis and colleagues (2015). Informed by social marketing, the researchers conducted a series of pilot studies in India to understand the determinants of stove acquisition. Among others, the study highlighted the role of communication channels, pricing, and place (remoteness and nongovernmental organization capital) as important determinants of stove acquisition. The authors recommend context-specific programs rather than a one size fits all approach, which has been a common feature of many failed interventions in the past.

Other articles in this special issue also emphasize the complex drivers of and barriers to the acquisition and use of clean cooking technologies that make up the third pillar



**Fig. 1.** Formative research conducted with early stove adopters in Bangladesh.

for reducing household air pollution, demand creation. Goodwin and colleagues (2015) provide a review of the literature on the use and effectiveness of behavior change and communication approaches in clean cooking interventions, highlighting potential impacts and opportunities for scale-up, as well as key knowledge gaps that require future work. Beltramo, Blalock, Levine, and Simons (2015) focus on the potential impact of peer influence on the uptake of improved stoves in Uganda, and Shankar, Onyura, and Alderman (2015) examine an agency-based empowerment training strategy as a method for capitalizing on the skills of women in cookstove promotion programs. In a study of cookstove acquisition in Uganda, Namagembe and colleagues (2015) tested the effect of several behavior change interventions, which included integration with health volunteers, cooking demonstrations, and flyers. Although the interventions showed some positive impacts, the relatively high price and the need for processed fuel limited demand for the improved stove.

Two additional articles in this special issue cut across the three pillars by suggesting important research methods that will provide critical evidence for promoting cookstoves on the basis of the framework. Stanistreet and colleagues (2015) reflect on the value and challenges of mixed methods research for the clean cooking sector, using examples from a study of effectiveness and acceptability of clean cookstoves in Kenya to demonstrate how quantitative and qualitative methods can be integrated. Clarke, Heiderscheidt, and Peel (2015) present a useful multilevel framework, grounded in behavior change theory that can inform the design, implementation and evaluation of clean cooking technology interventions. The framework provides a basis for considering how individual, community, and systems-level factors drive readiness, intentions, and behaviors related to stove adoption.

Taken together, the studies in this issue confirm findings from previous studies by highlighting, for example, the role of pricing, product features, communication channels, stove stacking, and context as important factors in the acquisition and use of clean cooking technologies in resource limited

contexts. However, the studies also build on the existing literature in two noticeable ways. First, there is a stronger theoretical orientation compared to previous studies. For example, social marketing, stages of change/diffusion of innovation, value expectancy, socioecological and other theories have a prominent place in many of the studies. Second, the studies have a stronger methodological focus than what has been represented to date. Research techniques such as mixed methods, formative research, small-scale pilots, and randomized control trials (a method that has been noticeably absent in the behavior change and household air pollution literature) provide a strong base from which to develop evidence and inform the design of interventions.

An increasing focus on implementation research and delivery science calls for a more widespread sharing of findings and lessons learned to inform policy development and program delivery. Through this supplement, we hope to synthesize and communicate knowledge on what strategies work and how interventions can be best designed to help foster innovation and overcome obstacles to reaching our goals of reducing household air pollution globally.

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