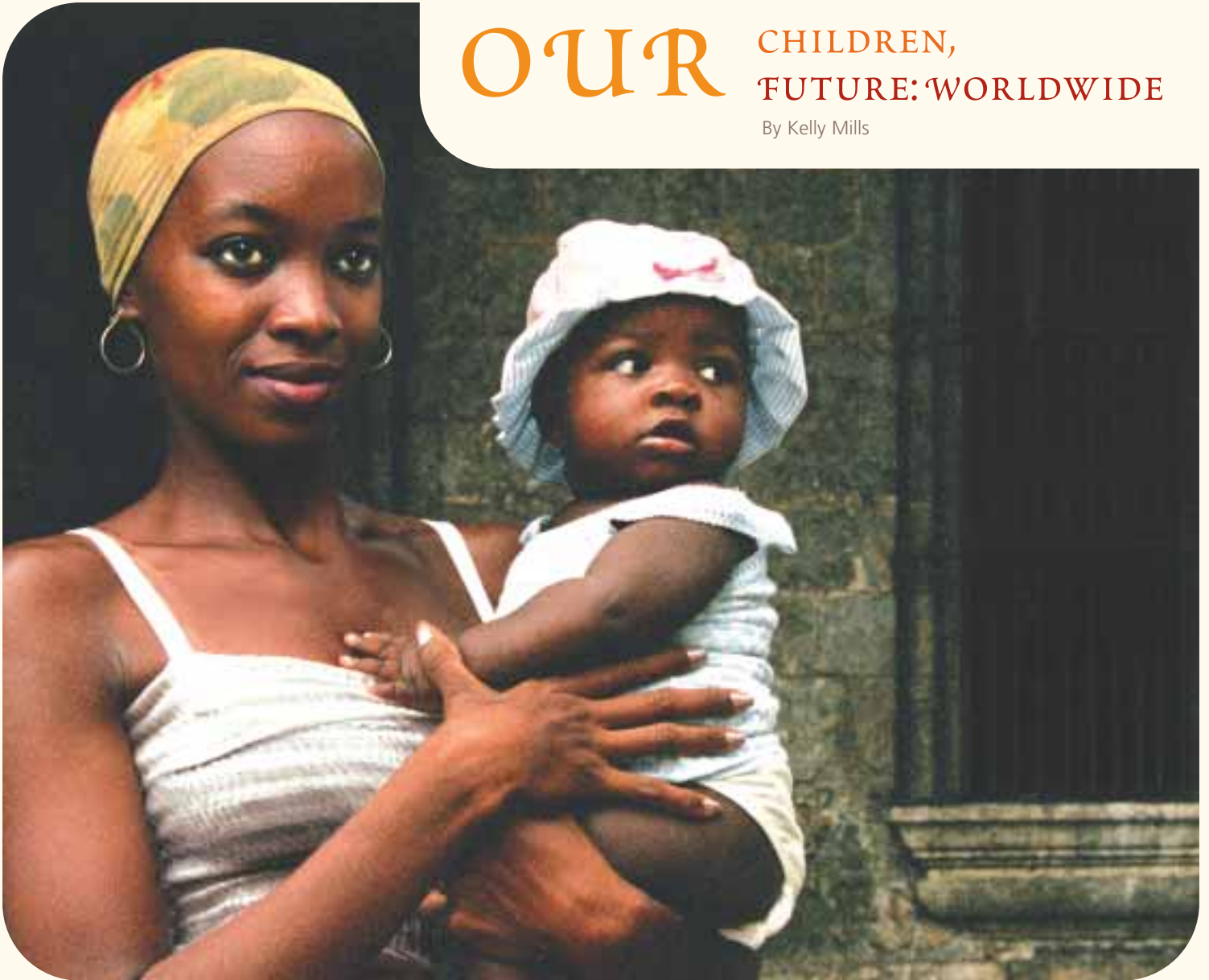


OUR CHILDREN, FUTURE: WORLDWIDE

By Kelly Mills



The survival of human beings as a species depends on oxygen, food, water, and the ability to bear children. What happens when the things we need in order to live turn out to be the very things that can sicken, incapacitate, and even kill us? For much of the world, the fight to survive means depending on contaminated water, breathing toxic air, and facing death in childbirth. Researchers at the School are finding ways to protect mothers and children from these threats to their health.

Preventing Death in Childbirth

“Everyone in these villages has lost someone or knows someone who has lost someone to postpartum hemorrhage,” says **Ndola Prata**, assistant adjunct professor with the School’s Bixby Program in Population, Family Planning, and Maternal Health. The villages to which Prata refers are in Nigeria, where death during childbirth is tragically common. In fact, worldwide each year more than 500,000 mothers die from postpartum hemorrhage (PPH) and many more are left weakened, vulnerable, and unable to care for their children. About 99 percent of the deaths occur in developing countries.

Misoprostol sounds like a miracle drug, and in many ways it is. The drug, which stops postpartum hemorrhage, has few side effects, is stable enough to be stored without refrigeration—an important consideration in regions where refrigerators are scarce—and can be easily administered by birth attendants and midwives. But most importantly, the drug is off-patent, and researchers have developed ways to make it affordable to the world’s poorest women.

The Bixby Group (headed by **Malcolm Potts**, Bixby Professor of Population and Family Planning) and the Center for Entrepreneurship in International Health and Human Development (CEIHD, codirected by **Martha Campbell**, **Nap Hosang**, and **Dana Charron**) have worked hard to negotiate the drug through layers of government bureaucracy and into the towns and villages where it is so desperately needed. They work with manufacturers in China and Egypt to produce the drug at a low cost, and with distributors in Africa to ensure both availability and affordability. They also collaborate with partner organizations to secure government approval of misoprostol, often aiding in local clinical trials and developing training programs for midwives and birth attendants, who will be managing the use of the drug in rural areas.

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The struggle to deliver misoprostol has faced challenges. The drug had to go through clinical trials in many countries before it could obtain government approval. Some governments have expressed concern that making misoprostol available will increase the number of abortions, since the drug causes powerful uterine contractions and can indeed be used for this purpose. However, as Prata points out, “The benefit of saving mother’s lives far outweighs concerns about the drug.” In countries where misoprostol is available, the number of deaths from abortions—the number-two cause of maternal death in the developing world after PPH—has gone down.

In March 2006, many years of work came to fruition. The first shipments of the pills arrived in Nigeria, approved by the government and available for use in hospitals and clinics. Bixby Program researchers anticipate the drug will soon be available in pharmacies and midwives’ kits around the country. Researchers continue to work with governments and agencies in Tanzania, Egypt, Bangladesh, Afghanistan, and Ethiopia to secure approval and distribution of the life-saving medication. If they are successful, women in the developing world will be able to celebrate the birth of a child as most women in industrialized nations do, without the fear and reality of tragic loss.

Identifying Damage Caused by Arsenic-Contaminated Water

“Imagine this: it is odorless, colorless, and tasteless. It looks like pure drinking water.” **Allan Smith**, professor of epidemiology and director of the Arsenic Health Effects Research Program, is describing arsenic-contaminated water, which can be found in towns, cities, and villages all over the world. Smith’s team has been conducting research for more than 15 years in countries such as India, Chile, Argentina, and Bangladesh, to

better understand the short- and long-term effects of this invisible carcinogen.

Two cities in Region II of Chile tragically provided an important population for study. For 13 years, the residents of Antofagasta and Mejillones used arsenic-contaminated rivers as a source of drinking water. In 1971, an arsenic-removal plant was completed and became operational, and the exposures to the population dramatically decreased. Smith and colleagues studied rates of lung cancer and the respiratory disease bronchiectasis among young adults who were exposed to arsenic in utero and in early childhood, and compared them with rates in the rest of Chile.

Smith found a shockingly high rate of mortality: Residents who were exposed as children had a death rate from lung cancer at the relatively young age range of 30 to 49 that was 7 times greater than other Chileans, and the death rate from bronchiectasis was 12 times greater. For those exposed in utero, the death rate from lung cancer was 6 times greater, and the rate from bronchiectasis was a stunning 46 times greater. Only active smokers have a greater relative risk of mortality from lung cancer. The research team is planning further cancer studies in Chile led by the program’s associate director, **Craig Steinmaus**.

The research team also studied pregnancy outcomes and infant mortality in arsenic-exposed women in West Bengal, India. The women used water from wells with high arsenic concentrations, which were dug to reduce the risk of gastrointestinal disease from drinking bacterially contaminated surface pond water. They found a sixfold increase in the risk of stillbirth among the exposed women, and women with arsenic-induced skin lesions were particularly at risk.

continued on page 8

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Villagers in Uganda receive cleaner-burning, less-polluting cookstoves.

With such clear rates of cancer and other health problems, it might seem a simple prospect to mount interventions and convince people to switch to alternative water sources. However, Smith says, because arsenic cannot be detected by taste or smell, people are often reluctant to give up what appears to be perfectly safe water. In one effort to prevent the spread of disease, Smith works with Project Well, a donor funded program that provides arsenic-free water to the residents of West Bengal. Project Well replaces the contaminated tube wells with shallow dugwells, which are maintained by residents.

Reducing Indoor Air Pollution

Air pollution is generally thought of as a problem in the developed world, in urban centers packed with cars and factories. However, the worst air pollution can be found inside homes and huts in Third World countries. “When we started this work 25 years ago, we found levels of air pollution inside homes that were much worse than in any city,” says **Kirk Smith**, Brian and Jennifer Maxwell Endowed Chair in Maternal and Child Health. The cause of this toxic air is the poor quality cooking fuels many people depend on in India, Latin America, Africa, China, and many other parts of the globe. This kind of indoor air pollution is directly linked to a host of respiratory illnesses, including childhood pneumonia, which is the leading cause of child death in the world. Women and children are most affected by the pollution, since they spend more time in the kitchen and inside the home.

Although Smith and others sounded the alarm about indoor air pollution in 1984, it took until 2001 to convince funding agencies to support the first randomized control trial. The recently concluded study, conducted in Guatemala, has found a roughly 40 percent reduction in serious childhood pneumonia in households with improved

chimney stoves compared to those using open woodfires for cooking. They are also conducting studies in India and Nepal examining the relationship between indoor air pollution and tuberculosis. This will hopefully pave the way for more studies in other countries, and create resources for interventions. As health officials from one government told Smith, "We have a budget of fourteen dollars per person to spend on health. If we are going to divert money away from vaccines and antibiotics, we need to have a study here that clearly shows the benefit of feasible interventions."

Smith points out that unlike medicines and vaccines, "environmental interventions tend to have multiple benefits." The benefits of improved cooking stoves, aside from obvious disease reduction, include reduction in greenhouse gas emissions; increased efficiency in fuel gathering and cooking, which improves quality of life for women and can even free time for girls to attend schools; decreased pressures on forests; and, since better stoves lift cooking off the floor, an improvement in hygiene and food safety, as well as fewer burns in children.

While continued research will raise awareness about the crisis of indoor pollution and ideally result in government funding for improved stoves, some organizations are addressing the problem now. In addition to its work on misoprostol distribution, CEIHD is working on ways to improve stoves using local resources. "Our goal," says CEIHD's Charron, "was to identify entrepreneurs on the ground in areas where indoor air pollution is a problem, and provide various sorts of technical assistance to enable them to successfully sell a product that provides good cooking and heating for the consumer and reduces indoor air pollution." Because the health problems of indoor pollution stem

continued on page 10

Trailblazer: LINDA BLACHMAN, M.P.H. '79, M.A.




For 20 years, Linda Blachman had been a researcher, writer, and consultant specializing in family health, particularly maternal mental health. Then a debilitating back injury altered her life path. She endured three years of disability, the loss of her job, and uncertain prospects of recovery. She also lost her mother during that time. "My world collapsed along with my spine," she says. "For consolation and inspiration I turned to the stories of others who had lived through serious illness. I began listening to mothers facing far graver circumstances than mine. Mothers with cancer, I learned, were an invisible and underserved group."

Drawing on her experience as a mother and a public health professional, she founded Mothers' Living Stories (www.motherslivingstories.org), a small nonprofit project that helps mothers living with cancer record their life stories and legacies for their children. As the project grew, she trained volunteer listeners in providing a meaningful service while exploring their own responses to illness and death.

In 2006, she published a book based on the mothers' stories. *Another Morning: Voices of Truth and Hope from Mothers with Cancer* (Seal Press, February 2006) shows how mothers from different walks of life and stages of illness go on living and loving in the face of mortality, and how they do so in a culture that denies illness, death, and the darker side of motherhood. Their stories of mothering with cancer reveal how they found ways to live with courage, dignity, humor, and joy, and taught their children to do the same. The book also explores the healing power of telling and listening to stories, as well as of preparing legacies.

"The seventy mothers whose personal histories we recorded are women who have risen to the challenge of extraordinary circumstances by transforming their terrible experiences with cancer into offerings," says Blachman. "They not only wanted to leave a legacy for their children, but, through this book, also wished to share their hard-won wisdom in order to support other parents facing uncertain and challenging times. I promised the mothers that I would bring their voices and messages to the largest possible audience."

A personal historian, life coach, and consultant in private practice, Blachman was nominated in 2005 for UC Berkeley's Peter E. Haas Public Service Award. 

Trailblazer: CHERI PIES, DR.P.H. '93, M.P.H. '85, M.S.W.



Cheri Pies has been a leader in women's health for nearly 30 years. As director of Family, Maternal, and Child Health Programs for the Contra Costa County Health Services Department, she oversees a broad range of programs designed to improve and promote the health of women, children, adolescents, and families. Under her leadership, the county health department has developed unique ways to reach out to the community. For example, the department hosted a film screening about bullying in schools and the link to community violence. It

also presented exhibitions of community participants' photographs that capture their perceptions of community health. Pies is also actively involved in ensuring the implementation of innovative children's oral health programs in the county.

Currently a lecturer in the School's Community Health & Human Development Division, Pies has served on the faculty since 1993. Her research interests include reproductive health and ethics, contraceptive technologies, qualitative research methods and participatory action research, lesbian and gay health issues, and HIV/AIDS.

Last year, as part of its 30th anniversary celebration, the National Women's Health Network honored Pies for her women's health activism. In 2005 she won a Distinguished Teaching Award from the UC Berkeley School of Public Health, and in 1999 she received the Sarah Mazelis Award for Outstanding Work in Health Education from the Public Health Education and Promotion Section of the American Public Health Association.

Recently, Pies and colleagues have been working on applying the Life Course Perspective (LCP) to the field of maternal and child health. The LCP looks at an individual's health over her life as an integrated whole rather than as disconnected stages. It suggests that a complex interplay of biological, behavioral, psychological, and social protective and risk factors contributes to health outcomes—including birth outcomes—across the span of a person's life. Says Pies, "We must look more broadly, beyond the clinical support available during the nine months of pregnancy, to how we can influence the factors that contribute to one's cumulative life experience and an individual's health." To that end, she and colleagues have formed the Life Course Working Group, which plans to host a national conference within the next year or two to discuss the LCP's implications for maternal and child health practice, policy, education, training, and research in the United States. 🌀

OUR CHILDREN..., CONTINUED

from a basic life activity, traditional health delivery systems may not be able to address them effectively. Instead, CEIHD helps entrepreneurs create a product people want to buy, and, she adds, "they probably aren't buying it for the health benefits."

For one project, CEIHD is providing assistance to an entrepreneur in Kampala, Uganda, to build and market stoves that are superior in quality, efficiency, and health effects. However, it was also important to create stoves that are aesthetically pleasing to consumers in Uganda. "The stoves are becoming a status symbol," states Charron.

CEIHD also works to provide indoor air quality measurement instruments and systems, so that local people can determine and demonstrate the threats from pollution. These measurements may help stove greenhouse gas (GHG) reductions become eligible for carbon credits. The credits initially emerged from the regulatory framework of the Kyoto Protocol and allow developed nations to offset a fraction of their GHG emissions by funding sustainable energy development projects overseas. Most GHG reductions from biomass stoves are not currently eligible in the official market for carbon credits, but later inclusion might allow for subsidies towards cleaner-burning stoves. A private market for carbon credits has also emerged in which individuals and businesses can offset emissions voluntarily. For example, in the voluntary market, the air travel emissions from a conference at UC Berkeley can now be offset by purchasing credits from a company that is working towards planting new forests or disseminating high-efficiency cookstoves. 🌀