Monitoring Mother Earth *by* Monitoring Mothers' Milk

BIOMONITORING,

the analysis of human fluids and tissues for the presence of environmental chemicals and their by-products, indicate that all inhabitants of the globe carry hundreds of environmental chemicals within their bodies. Breastmilk biomonitoring, when implemented with sensitivity and a profound sense of responsibility for the health of infants and mothers, can create data indicating how levels of toxic chemicals in human bodies may rise or fall in response to public health policies. Breastmilk monitoring implemented in the absence of consultations with those individuals and communities being tested and without substantive support measures for breastfeeding may turn breastfeeding mothers away from breastfeeding. Governments, researchers and communities of concern need to determine how to best craft the complex message that will ensure breastmilk data will be used to decrease levels of toxic chemicals in all our bodies rather than decrease the number of women who breastfeed.

Breastmilk

When a baby is given breastmilk from its mother, she or he learns for the first time that this world can be a source of nourishment and comfort. Breastfeeding can create a profound relationship, rich in caring and trust, between the mother and her child. Babies seem to sense that breastfeeding provides everything they need to flourish.

Breastmilk contains all the nutritional components required for a healthy baby during the first six months of life. Breastmilk contains fatty acids that support the development of a healthy brain; babies who are breastfed have a higher IQ than babies who are not breastfed.[1] Breastmilk also provides enzymes and antibodies that protect the health of the baby until its body's immune system has grown strong.[2] Breastmilk has the capacity to assess a baby's needs, adjusting its contents to supply what is required at a particular time of development.[3]

In general breastfed babies around the world are healthier than those fed milk substitutes.[4] Worldwide, according to the Bellagio Study Group, 1.3 million children die each year who likely would have survived had they been breastfed as recommended by the World Health Organization.[5] WHO suggests breastfeeding exclusively for the first six months of life, with continued breastfeeding for the first year of life.[6]

Four young mothers from the Philippines, Kenya, Mexico, and the Czech Republic have chosen to have their breastmilk tested for the presence of toxic chemicals because they are concerned about the health of their families and their communities. The chemicals tested for include PBDEs, lindane, endosulfan, DDT, and other POPs chemicals. Detectable levels of many of these chemicals were found in all samples.

Each young mother is deeply committed to breastfeeding, and each is discussing with her family, her community and her lactation consultant or pediatrician, how she might choose to speak publicly about her own individual results documenting the presence of toxic chemicals in her breastmilk. Some have begun to make healthier choices in food and products, and others are planning to join efforts to halt the tide of toxic chemicals all our bodies experience each day.

The story of each young mother as she makes these decisions will be presented on the Moms and POPs Project website.

www.momsandPOPsproject.org

But breastmilk carries toxic chemicals as well as nutritional components. Measuring levels of toxic chemicals in breastmilk can be accomplished by biomonitoring. This safe and relatively simple public health tool can help us understand trends in chemical use and the effectiveness of regulations in lowering exposures to environmental chemicals, Biomonitoring also helps us learn whether the unmatched benefits of breastmilk, nature's perfect food, is being threatened by the presence of toxic chemicals.

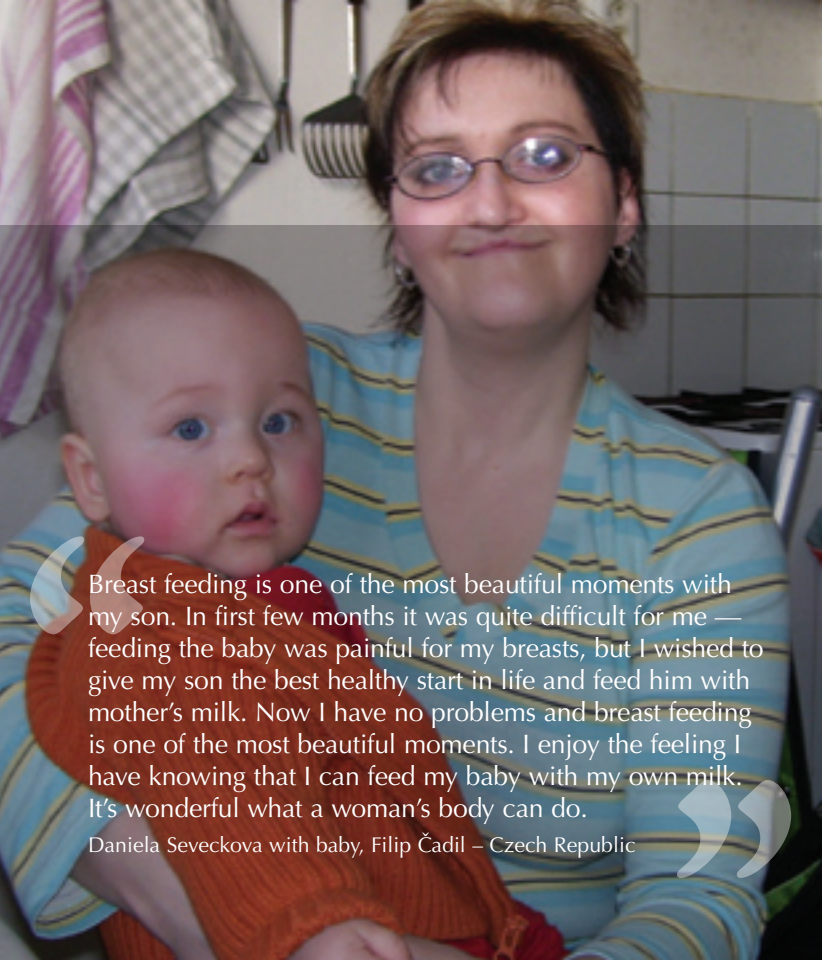
Biomonitoring breastmilk needs to be done in ways that will not discourage nursing mothers, will apprise us of the levels of toxic chemicals in breastmilk and that ultimately, will help lower the levels of environmental chemicals in all our bodies. Preliminary observations[7] indicate that biomonitoring data can support both continued breastfeeding and chemicals policy reform when: biomonitoring studies provide information about the critical importance of breastmilk for the health of the baby and the mother and discuss the disadvantages of breastmilk substitutes; studies provide opportunities for women to discuss concerns, ask questions and learn about personal and political choices that may lower exposures; and full support is given within the context of community for breastfeeding. Well-crafted breastmilk monitoring studies can move communities, mothers and policy makers away from the despair, perplexity or denial concerning the grim message that breastmilk contains toxicants, towards concrete measures that not only will protect breastfeeding and the integrity of breastmilk, but the health of future generations as well.

Biomonitoring As A Public Health Tool

Human biomonitoring, the testing of human fluids and tissues for the presence of environmental chemicals, chemical by-products, or other evidence of chemical exposure, provides us with a snapshot in time of individual histories. An individual's own biomonitoring data can indicate to some extent the choices made by individuals, by regulatory agencies or by chemical and manufacturing industries. If an individual has eaten food grown with pesticides, some of those pesticides or their residues may well remain in the tissues and fluids of the body.

If an individual earns her or his living working in the ship-breaking industry, an industry that dismantles ships to recover reusable parts, analysis of her or his blood and urine might well indicate higher than average levels of lead or mercury. If an individual bathed in the morning using a shampoo or lotions containing phthalates, her or his body will carry a quantifiable chemical memory of those products through the afternoon and into the following day.

Breastmilk substitutes (formula) may be necessary in some cases, but formula itself can be made from substances containing toxic chemicals. Cows' milk also carries environmental chemicals,[8] although usually at lower levels than human milk. Formula derived from soy may contain pesticides, and many researchers are concerned that the estrogenic properties of soy-based formula may not be healthy for a nursing infant. Formula may be sold in containers containing toxic chemicals, may be prepared using contaminated water when clean water is unavailable, and may be given to babies in bottles that leach toxic chemicals. Formula companies have used information about chemicals in breastmilk to sell their products, especially in the Global South.[9] The use of formula is not the answer to the presence of toxic chemicals in breastmilk.



Although it is difficult to predict individual adverse health outcomes from individual toxic chemical body burdens, exposures measured over a population can provide information linking environmental chemical exposures to adverse health effects. And because scientific advances now allow researchers to test for very small exposure levels, new data is available linking low-level exposures to health outcomes. This data is especially poignant for exposures during in utero development, when the rapid proliferation and differentiation of cells creates a window of vulnerability.

Critical Windows of Development, a database compiling hundreds of lab and human studies, documents the health effects of low level exposures to dioxin, phthalates and bisphenol A during the gestational period. www.endocrinedisruption.com[10] According to Dr. Theo Colborn, co-author of "Our Stolen Future," and originator of this database, "The unprecedented global increases in endocrine-related disorders such as autism, other learning and developmental disabilities, reproductive problems, diabetes, obesity, thyroid problems, breast, prostate, and testicular cancers and more signal the need for a crash program in "inner-space" research. The roles of contamination in the womb must be addressed before it is too late."[11]

Regional Biomonitoring

In addition to providing a "snapshot" of individual histories, biomonitoring studies can reveal a history of decisions governments have made about the use and production of toxic chemicals. For example, biomonitoring data from the Netherlands indicates that levels of dioxin have decreased after regulations were put in place controlling dioxin emissions from incinerators.[12]

Biomonitoring data in the United States indicates that children's blood lead levels have decreased by 84% between 1988-1991 and 1994-2004, and this decrease is linked to a series of regulations restricting lead exposure beginning in 1971. Biomonitoring studies indicate that lead levels continue to be highest among non-Hispanic black children relative to Mexican American and non-Hispanic white children, and that there is a need for further regulation to lower lead levels in these populations.[13]

Biomonitoring for Global Baseline Levels of POPs Chemicals

On the international level, biomonitoring data is being compiled to determine whether global efforts are successful in lowering levels of persistent organic pollutants (POPs) in the bodies of the Earth's inhabitants. In the first years of the 21st century, governments around the world met to consider biomonitoring data documenting that all humans, wherever they live, carry hundreds of toxic chemicals in their fluids and tissues. After intense and fruitful deliberations, these governments joined together to launch a landmark global initiative, the Stockholm Convention, a legally binding treaty that bans or severely restricts the use of an initial list of 12 POPs. The Convention provides a process for including other POPs, as chemicals are so identified, onto the list of POPs targeted for action under the mandates of the Convention. For the first time the world has the capacity to halt the tide of POPs contamination.

The Stockholm Convention also mandates a process for evaluating progress in POPs reduction and elimination. This program, the Effectiveness Evaluation Program, calls for periodically monitoring levels of POPs

around the globe and presenting a first report indicating baseline levels of exposure at the fourth Stockholm Conference of Parties in May 2009. [14]

Because air can carry POPs chemicals thousands of miles from points of origin, air monitoring is a useful tool in determining the ebb and flow of POPs across the face of the Earth. The Arctic Monitoring and Assessment Programme, the Global Atmospheric Passive Sampling Survey, the Integrated Atmospheric Deposition Network, the Research Center for Environmental Chemistry and Ecotoxicology and others have committed resources to measuring POPs in air as part of the Stockholm Convention's global monitoring work being implemented by the United Nations Environmental Program's Global Monitoring Program. However, the monitoring of human biospecimens such as breastmilk can measure the movement of POPs chemicals into human bodies, providing definitive proof of human exposure.

The World Health Organization, a partner in the UNEP Global Monitoring Program, is continuing its work in the biomonitoring of breastmilk for POPs. The resulting data will provide a more accurate picture about POPs trends and the effectiveness of the Stockholm Convention. The WHO has provided leadership in developing benchmark protocols for biomonitoring breastmilk, and the resulting data has been enormously useful for establishing a baseline of human exposures to POPs in many countries.[15]

Biomonitoring Breastmilk

Breastmilk, a matrix for POPs measurement

Breastmilk is considered an ideal matrix for measurement of levels of POPs chemicals. POPs chemicals are lipophilic, or fat-soluble, and tend to sequester in the fat found in the body's tissues or fluids. About 60 % of the fat in breastmilk is drawn from the fatty tissue of the mother, with 30% coming from her daily diet. The remaining 10% is produced within the breast.[16] POPs chemicals and other environmental chemicals that have taken up residence in the mother's fatty tissue may be carried along in the blood stream inside molecules of the body fat being mobilized in the creation of breastmilk.

The use of breastmilk as a matrix for POPs body burden monitoring is ideal because POPs, upon entering the body, tend to equilibrate at roughly similar levels in terms of fat-weight among adipose tissue, breastmilk and blood.[17] Breastmilk levels of POPs therefore provide a good indication of levels of POPs to be found in fat throughout the body. POPs body burdens tend to increase with age, although levels are decreased through

breastfeeding. However, breastmilk monitoring of first-time mothers can provide a baseline of exposures to POPs. Data also can be used to identify new POPs of emerging concern.

Breastmilk monitoring—community promotion of breastfeeding

One significant advantage of biomonitoring breastmilk is that collection requires relatively simple sampling procedures. It does not necessitate a surgical procedure, as does fatty tissue sampling, or blood collection, which requires professional phlebotomists and medical equipment such as syringes, needles and/or centrifuges. Community health workers can readily collect breastmilk samples from nursing mothers. In addition, their efforts can be supported by lactation counselors who can support a mother in her commitment to breastfeed and reinforce the message that "breastmilk is best," thereby mitigating potential deterrents.

Breastmilk monitoring—women's health and advocacy groups

As awareness about the presence of toxic chemicals in everyday products and in food , air and water increases, women's health and advocacy groups are becoming more interested in learning about their own body burden levels and the levels of toxicants in breastmilk. Groups such as MOMS (Making Our Milk Safe) and other groups around the globe want to use data about toxic chemicals

"I wanted to contribute a breastmilk sample because it is important for all of us to know what is in breastmilk in general. This information will help us to be aware of what toxic chemicals are present in our food and the environment. Toxic chemicals can affect our health and it is important that women learn more about toxic chemicals so that we all can make healthier choices, especially choosing healthier food."

Karla Flores with baby, Paulo Gael – Mexico

in breastmilk to inform their communities about the need for local and global bans on all persistent and bioaccumulative toxic chemicals.

Many women feel that the presence of toxic chemicals in their bodies represents a basic violation of bodily integrity, and as such, constitutes a form of violence against women. Many POPs chemicals can damage reproductive processes and are linked to pre-term birth, shortened duration of lactation, breast cancer, genital malformations and immunological and neurological damage.[18] Our hope is that using information about women's toxic chemical body burdens, and specifically levels of toxic chemicals in breastmilk, to halt further contamination could potentially result in a decrease in related suffering experienced by thousands of women and their families worldwide.

Breastmilk Monitoring—environmental chemicals in breastmilk

Biomonitoring studies indicate that a woman of childbearing age will have encountered hundreds of environmental chemicals from the food she eats, the water and air she takes in, and the household products she uses. Many of the environmental chemicals she encounters will take up short- or long-term residence in her body, becoming part of her chemical body burden. Some of these chemicals may move from a woman's body during pregnancy through the

placental barrier where, mistakenly identified as hormones or other substances designed to regulate DNA expression, they may interfere with the developing fetus. Once erroneously welcomed into the body of the fetus, these chemicals can wreak havoc on the developing immunological, reproductive and neurological systems of the unborn child.

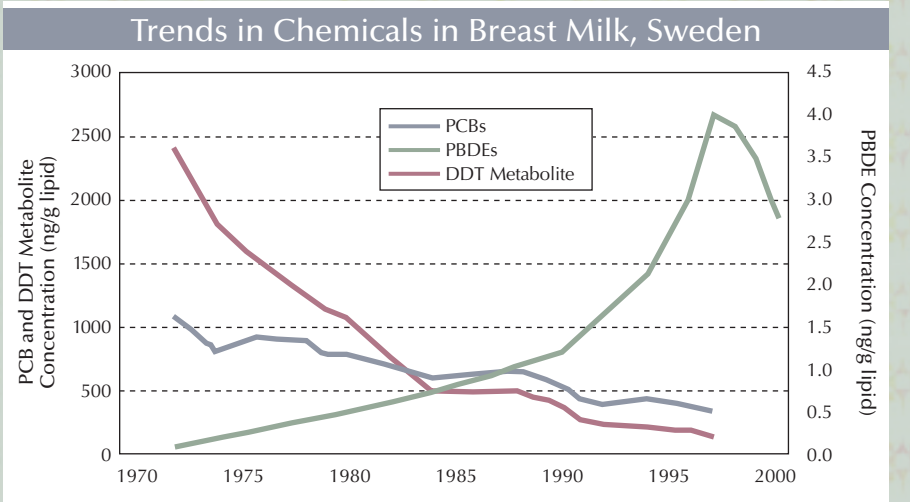
Laboratory studies indicate that damage that may occur due to toxic chemicals exposure in utero may be reversed or palliated by breastfeeding. One study reports, "Breastfeeding is an effective means to reduce infants' health risks from in utero exposures to chemicals in the mother's body.[19] In a study on PCBs and neurodevelopment,[20] scientists found that "Breastmilk appears to reduce the severity of the effects on the infant from the mother's body burdens and, to some extent, rescue the infant from these effects."

The importance of breastfeeding seems even more critical given the number and amounts of toxic chemicals found in all environments are increasing. Dr. Kim Hooper, California Department of Public Health, has said, "The presence of chemicals in breastmilk should encourage rather than discourage breastfeeding because breastmilk appears to reduce the severity of the effects on the infant from the mother's body burden. He also emphasizes the importance of breastfeeding in communities with higher levels of POPs such as PCBs. [21]

Several toxic chemicals have been found in mother's milk, including flame retardants, solvents, plasticizers and pesticides, and can enter the baby's body during breastfeeding.[22] However, current research indicates that breastmilk may also contain elements that prevent a baby's absorption of toxic chemicals found in breastmilk.[23] Other research indicates that the body of a human infant may be able to metabolize and excrete toxic chemicals quite differently from the metabolizing processes of an adult human.[24]

However, measuring the excretions of breastfed infants and the offspring of nursing lab animals indicates that very little of the POPs chemicals taken in from breastmilk leave the body of the nursing infant. Although most studies indicate that breastfed babies are healthier than non-breastfed babies, and although milk substitutes also have been found to be contaminated with toxic chemicals, it remains critically important to continue evaluating the presence of environmental chemicals in breastmilk.

Most current research indicates that "breast is best," but without sufficient regulation, the number and levels of toxic chemicals in breastmilk may well increase. We do not know whether or when these toxicants may compromise the nutritional integrity of breastmilk, or how the levels of breastmilk-related POPs in the body of the child, combined with exposures from other food



Source: NRDC

The Swedish government has biomonitored breastmilk for decades. When data revealed that breastmilk was carrying flame-retardants called PBDEs and that levels of PBDEs were rapidly increasing in breastmilk, public outcry resulted in a governmental ban of these chemicals. Levels of these toxicants rapidly dropped in the breastmilk of women monitored. Breastfeeding rates in Sweden, among the highest in the world, did not decrease when information about PBDE levels was published; rather, women spoke out demanding a halt to further exposures. This graph also indicates a decrease in levels of DDT, a pesticide, and PCBs, chemicals used as flame-retardants, as a result of previous government bans.

sources, may affect the well being of the child. We do not know if there are levels of toxic chemicals in breastmilk above which women should refrain from breastfeeding. We do not know if women should cease breast-feeding after a certain number of months to avoid delivering higher than acceptable levels of certain toxic chemicals to her child. We do not know if there is a point at which the almost miraculous capacity of breastmilk to heal and nourish is seriously threatened. Without continued analyses of breastmilk, answers to these questions will remain elu-sive, and future generations may suffer from our ignorance.

Communicating Information About Environmental Chemicals in Breastmilk

A common concern is that information about the presence of toxic chemicals in breastmilk will be publicized in ways that will change mothers' commitments to breastfeeding. Misleading media headlines about chemicals in breastmilk may move women towards unhealthy choices, especially if media stories fail to describe the benefits of breastmilk over the disadvantages of milk substitutes, which also contain environmental chemicals. The decision to breastfeed should be made by each mother, based on her situation and on sound information from lactation consultants, health researchers and other mothers in her community.

Preliminary research indicates that women informed about toxics in breastmilk will remain committed to breastfeeding when there is strong support within their communities for breastfeeding. Participants in biomonitoring projects choose to continue breastfeeding when they are well informed about the value of breastfeeding, counseled about the significance of toxic chemicals in breastmilk, given suggestions about avoiding further exposures, and share a general sense, based on discussions with other participants and project organizers, that results from the project will be used to create positive changes in toxic chemicals policies.[25]

Key to data communication is an attentiveness of counselors to the needs of the nursing mother. Informing mothers about the toxic chemicals they may be shifting from their bodies to their infants through breastfeeding must be done in ways that are sensitive to the fact that breastfeeding is an art that mother and baby need to learn, and that breastfeeding is a time of bonding for mother and infant. Intruding upon this time of relationship development with information that can be perplexing or frightening requires a heightened awareness on the part of the researcher as well as courage and commitment from a nursing mother.

When communication is done well, many mothers have used the information to make healthier choices for their families. Some mothers have chosen to become politically active, demanding corporate and governmental responsibility in banning environmental chemicals found in breastmilk and in enacting measures that prevent the entry of chemicals into the marketplace without adequate testing for safety.[26]

Moms and POPs Project

The Moms and POPs Project (MaPP) is a gathering of organizations and individuals, including breast-feeding, women's rights advocates, health professionals, environmental health activists and scientists to review the global scientific literature to discern how to:

a. Conduct culturally appropriate, scientifically valid, ethical and respectful human milk monitoring programs in accordance with the WHO protocols and establish precedents for biomonitoring around the world.

b. Address the challenge of promoting breastfeeding in a contaminated world by embracing the responsibility for creating the messaging of human milk monitoring to prevent an anti-breastfeeding response.

c. Utilize human milk monitoring to initiate discussions about how women can organize to prevent further toxic chemical exposures to their families, whether they choose to work locally, nationally, or globally so human milk becomes toxic-free.

In a survey conducted by MaPP, several key researchers were interviewed about their methods of communicating to breastmilk biomonitoring project participants their individual or pooled results. Researchers were selected because of the integrity of their work and the diversity of situations and

cultural traditions in which the project was implemented. Because of the broad range of options and differing contexts, no one set of best communication practices applicable to all circumstances has emerged, but MaPP has developed a set of preliminary observations about effective biomonitoring communications protocols. These observations are listed following the brief descriptions of four case study biomonitoring projects below. The MaPP website, www.momsandPOPsProject.org, includes the complete report of these interviews, from which the following case studies were selected.

Four Case Studies

1 Breastmilk data released in Michigan, USA, after a chemical accident contaminated animal feed

MaPP interviewed Dr. Sherry Hatcher, who studied women's reactions to a biomonitoring study conducted by Michigan, USA, agencies following massive contamination of cattle feed by a toxic chemical, PBB (polybrominated bisphenol, a flame retardant considered to be a carcinogen, and linked to thyroid and immune system dysfunction). Cattle became ill from the contaminated feed and needed to be destroyed. Eventually, state officials released information stating that the general public had likely been exposed to the toxicant through the consumption of beef and dairy products. When detectable levels of the toxic chemical were found in hundreds of breastmilk samples, state officials and physicians were uncertain about the safety of breastfeeding and delivered contradictory and ambiguous messages about the significance of the toxic chemical in breastmilk.

Within this ambience of official uncertainty and confusing information, Dr. Hatcher learned that women who asked to receive their individual breastmilk results tended to express denial rather than alarm, especially those women who had the highest levels. Clearly women were caught between wanting to nurture their babies and wanting to avoid exposing their babies to the toxic chemical through breastfeeding. Dr. Hatcher was a breastfeeding mother at the time, and chose not to breastfeed her child for six months. Although there is no data about the reaction of nursing mothers to media reports of breastmilk contamination, women may have turned away from breastfeeding after reading headlines and conflicting information provided by state agencies about the safety of breastmilk.

2 Breastmilk chemicals data withheld in cases of extreme poverty and high likelihood of HIV/AIDs incidence

MaPP interviewed Dr. Henk Bouwman about breastmilk monitoring in rural South Africa where DDT is the only currently used weapon against malaria-carrying mosquitoes. Dr. Bouwman tested women who had given birth to their first child in several

rural areas where both DDT and pyrethroids have been used. Dr. Bouwman had concerns about how these chemicals might affect the health of the nursing infant. Most of the women were quite young and lived in conditions of extreme poverty.

Dr. Bouwman published his results in urban press and scientific journals, but decided not to communicate results to study participants for several reasons. First, there were few available alternatives to the use of DDT or pyrethroids, and no resources were available to develop other methods for rolling back malaria incidence. Second, the use of formula was unacceptable given lack of clean water. Third, there was little community organizing to counsel women about the importance of continuing to breastfeed, usually considered even more important in a contaminated environment, or to help women organize around ending sources of contamination. Lastly, many of the young women may have been ill with HIV/AIDS. The researcher team believed it would be unethical to add to this burden of disease and poverty information about levels of toxic chemicals in women's bodies that they could do little about.

Dr. Bouwman has spearheaded international efforts to address the issues surrounding DDT and malaria control. Researchers may decide in cases of extreme poverty to withhold project results from individuals and community members, but when information is withheld, some researchers have taken on the task of organizing against the source of contamination when biomonitoring participants may not have the capacity to do so themselves. Dr. Bouwman has been active in promoting mandates of the Stockholm Convention, which call for development and implementation of alternatives to the use of DDT.

2 Breastmilk monitoring within the context of community

MaPP interviewed tribal leader Katsi Cook about the breastmilk monitoring study she helped initiate among the Akawasne Mohawk, an indigenous people who occupy traditional lands in New York state, USA. The relationship between the child and the mother and the relationship between the Akawasne and their land are considered sacred. The tribe shares a profound sense of cultural stewardship and are committed to protecting the purity of breastmilk and the purity of their lands that have historically provided traditional foods.

Because industrial dumping has contaminated land and water sources, the Mohawk community was deeply concerned about the safety of breastfeeding and was outraged that traditional sources of food contained levels of toxicants well above levels considered safe. The tribe designed a breastmilk-monitoring project sensitive to their spiritual traditions, the results of which were used to demand remediation.

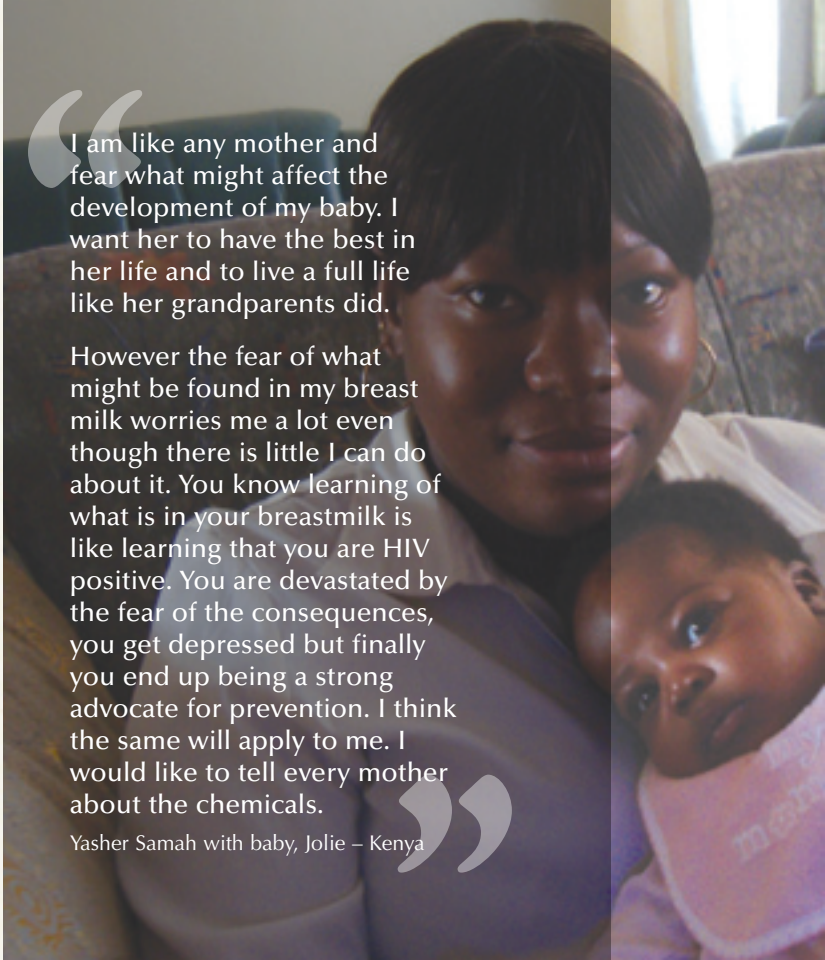
Equally important was the sense among Mohawk women that biomonitoring information would support the reclaiming of control over their bodies by using results to restore the capacity of tribal lands and waters to provide healthy food. Breastfeeding rates did not decline within the Mohawk community when data were published. The project strengthened community advocacy campaigns, community cohesiveness and women's roles as key decision makers.

4 Biomonitoring in support of policy reform

The United States civil society group, Environmental Working Group (EWG), has been a leader and pioneer in advocacy biomonitoring, initiating in 2002 one of the first public interest group biomonitoring projects, which included Bill Moyers, renowned television journalist, among members of the biomonitored cohort. (http://archive.ewg.org/reports/bodyburden1/es.php)

EWG maintains an innovative website where viewers can easily find descriptions of chemicals currently being tested for in their biomonitoring projects, the products that contain these chemicals and health outcomes associated with toxic chemical exposures. Also reported are proposed legislative initiatives designed to reform the US toxic chemicals regulatory system.

When EWG tested the breastmilk of 20 women in 14 states in the United States and found high levels of PBDE flame retardants, the resulting information was presented to legislators across the country in support of new regulations that would be a step in limiting further exposures. Project participants were eager to speak publicly about their commitment to breastfeeding and the need to stop PBDE contamination. Their photos and quotes can be found on the EWG website. (http://www.ewg.org/reports/mothersmilk/) Part of their message was that dismay about personal pollution should be directed towards changing policy, rather than solely attempting to avoid exposures. Choosing safer products is important, of course, but biomonitoring project participants emphasized that personal choice will not mitigate a problem ultimately solvable only by government regulation and corporate practices.



"I am like any mother and fear what might affect the development of my baby. I want her to have the best in her life and to live a full life like her grandparents did.

However the fear of what might be found in my breast milk worries me a lot even though there is little I can do about it. You know learning of what is in your breastmilk is like learning that you are HIV positive. You are devastated by the fear of the consequences, you get depressed but finally you end up being a strong advocate for prevention. I think the same will apply to me. I would like to tell every mother about the chemicals."

Yasher Samah with baby, Jolie – Kenya

A Call to Biomonitor Breastmilk

Medical monitoring is traditionally carried out with the intent of assessing whether medical intervention is required. Examples include dental x-rays or colonoscopies. Biomonitoring is different because it is usually intended to determine exposure levels of populations for the purposes of public health policy. Levels of contamination at the individual level are not predictive of individual health outcomes, and the long-term effects of a personal chemical body burden may be unknowable, given the complexities of factors linked to ill health. But what is implicit in body burden measurements may be an assessment of the health of the regulatory system; the concept of intervention, not applicable on the individual level (except in cases of very high exposure), is very relevant in "treating" a system that does not protect those it is charged with caring for from toxic contamination. And this is why breastmilk monitoring may be import.

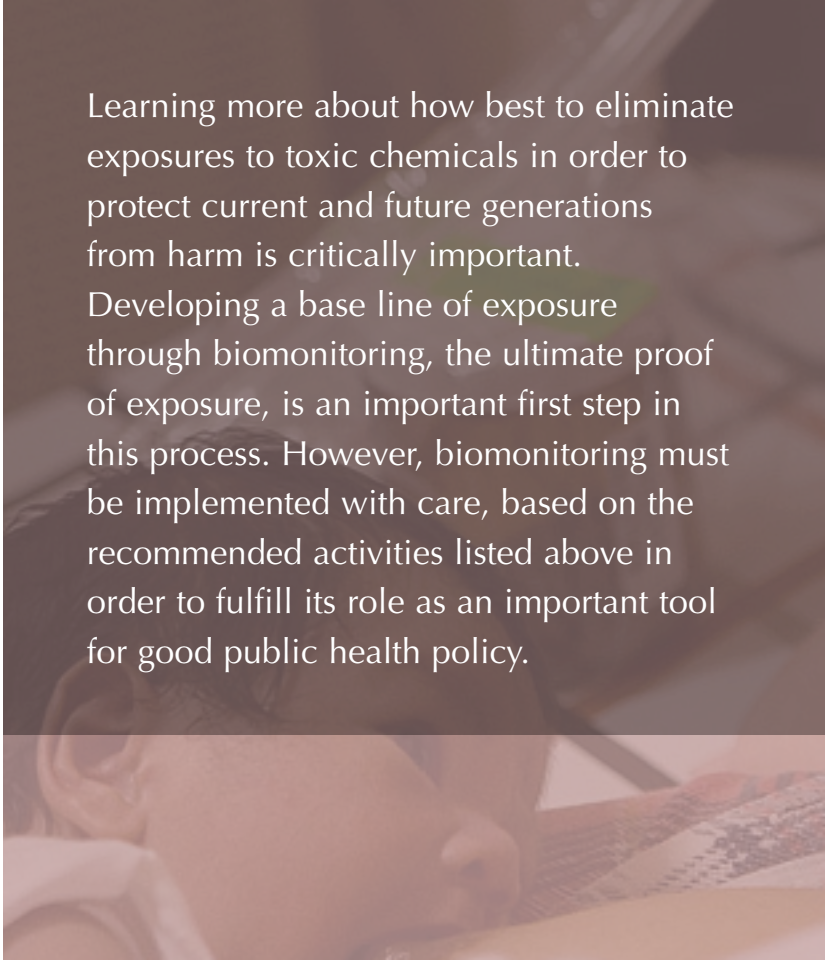
Women, often the primary family health caregivers and purchasers of most of the food and goods a family consumes, have a deep interest in toxic chemicals exposures. The power of the women's health and environment movement combined with the power of those working to maintain the integrity of breastmilk has the potential to reverse the tide of toxic chemicals in all our bodies. Such reversal, resulting from women's united efforts, may ultimately help lower the incidence of those diseases linked to toxic chemical exposures, including asthma, birth defects, learning disabilities, children's brain cancer, fertility compromise, heart disease, diabetes, and other adverse health outcomes. [27]

However, to ensure that breastmilk biomonitoring studies are well-implemented, the Commonweal Biomonitoring Resource Center calls on governments to:

1. Involve biomonitoring participants and their communities in the design and implementation of breastmilk monitoring projects, including best practices for the release of information about chemicals in breastmilk;

2. Ensure that health professionals, government agencies, and civil society health and advocacy groups work together to deliver a strong public message about the importance of breastmilk for the health of the baby and the mother;
3. Develop respectful and sensitive methods for the use of biomonitoring data to maintain the integrity of breastmilk and to support measures for lowering levels of POPs chemicals;
4. Create national dialogues about the effective use of biomonitoring as a public health tool essential for documenting the effectiveness of measures designed to lower or eliminate exposures to toxic chemicals;
5. Honor biomonitoring participants by acknowledging their courage and commitment to toxic chemicals policy reform, evidenced by their engagement in biomonitoring projects;
6. Work cooperatively with breastfeeding advocacy groups to enhance breastfeeding practices;
7. Communicate individual biomonitoring results to individuals who request this information, accompanied by appropriate contextual information that will support healthy choices.

Learning more about how best to eliminate exposures to toxic chemicals in order to protect current and future generations from harm is critically important. Developing a base line of exposure through biomonitoring, the ultimate proof of exposure, is an important first step in this process. However, biomonitoring must be implemented with care, based on the recommended activities listed above in order to fulfill its role as an important tool for good public health policy.



For more information about the importance of breastmilk, disadvantages of formula, suggestions for healthy choices, linkages between environmental threats and health, and information about policy reform campaigns, please consult:

www.momsandpopsproject.org

www.IPEN.org

www.healthandenvironment.org

www.nrdc.org/breastmilk

www.waba.org.my/resources/tenlinks.htm

www.womenshealthandenvironment.org

www.env-health.org

www.llli.org

www.ewg.org

www.chemtrust.org.uk

www.chemicalshealthmonitor.org

Endnotes

1 Caspi et al. "Moderation of breastfeeding effects on the IQ by genetic variation in fatty acid metabolism." PNAS 20 Nov 2007 vol 104 no.47

2 Phil Landrigan, "Chemical Contaminants in Breast Milk" http://ehpnet1.niehs.nih.gov/docs/2002/110pA313-A315landrigan/abstract.html/

3 LaKind J, Wilkins, Berlin C. Environmental chemicals in human milk; a review of levels, infant exposures and health, and guidance for future research.. Toxicology and Applied Pharmocology 198 (2004) 184-208

4 American Public Health Association. "A Call to Action on Breastfeeding; A Fundamental Public Health Issue policy number: 200714 11/6/2007

5 Jones G, Steketee R, Black R, Bhutta Z, Morris S. The Bellagio Child Survival Study Group. How many children deaths can we prevent this year? Lancet. 2004;362:65

6 WHO/UNICEF.WHO/UNICEF Global Strategy for Infant and Young Child Feeding. Geneva, Switzerland:WHO:2003

7 Wu N, McClean M, Brown P, Aschengrau A, Webster T. Participant experiences in a breastmilk biomonitoring study: A qualitative assessment. Environmental Health 2009: http://www.ehjournal.net/content/8/1/4

8 APHA 2007

9 http://www.breastfeeding.com/advocacy/advocacy_boycott.html

10 Barrett J. Developmental Picture Window. Environmental Health Perspectives March 2009. Vol 117/No.3 A101

11 http://www.endocrinedisruption.com/prenatal.criticalwindows.press.release.php

12 Personal interview with Dr. Janna Koppe, professor of neonatology at the University of Amsterdam; interviewer: Jessica Wellborn, Moms and POPs Project. 2008.

13 Jones RL, Homa DM, Meyer PA, Brody DJ, Caldwell KL, Pirkle JL, Brown MJ. Trends in Blood Lead Levels and Blood Lead Testing Among US Children Aged 1 to 5 Years, 1988–2004. Pediatrics 2009 Mar;123(3):e376-e385.)

14 http://chm.pops.int/Programmes/GlobalMonitoringPlan/

15 GEMS/FOOD International dietary survey: Infant Exposure to Certain Organochlorine contaminants from Breast Milk-A Risk Assessment (1998), WHO/FSF/FOS98.4http://www.who.int/foodsafety/chem/POPprotocol.pdf

16 Sandra Steingraber, Having Faith (New York:Berkeley, 2001) 262

17 Hooper K, McDonald T. The PBDEs: An Emerging Environmental Challenge and Another Reason for Breastmilk Monitoring Programs. Environmental Health Perspectives May 2000. Vol 108/No 5

18 http://www.ipen.org/ipenweb/generalpublic/whatpops.html

19 Patandan, S, Lanting CI, Mulder PG, Boersma ER, Sauer PJ, Weisglas-Kuperus N. Effects of environmental exposure to polychlorinated biphenyls dioxins on cognitive abilities in Dutch children at 42 months of age. Journal of Pediatrics 1999: 134(1):33–41

20 Hooper K, She J. 2003, January. Lessons from the polybrominated diphenyl ethers (PBDEs): Precautionary principle, primary prevention, and the value of community-based body burden monitoring using breast milk. Environmental Health Perspectives, 111(1):109-114.

21 Hooper 2003

22 http://www.nrdc.org/breastmilk/envpoll.asp

23 Berlin CM Jr, LaKind JS, Fenton SE, et al. Conclusions and recommendations of the expert panel: technical workshop on human milk surveillance and biomonitoring for environmental chemicals in the United States. J Toxicol Environ Health A. 2005;68:1825–1831.

24 APHA 2007

25 Wu 2009

26 http://www.ewg.org/reports/mothersmilk

27 http://www.healthandenvironment.org/resources/database

Special thank you to:

Making Our Milk Safe – USA

Partners of Moms and POPs Project; www.momsandPOPsproject.org

Arnika – Czech Republic

Physicians for Social Responsibility – Kenya

Pesticide Action Network – Philippines

Global Anti-incineration Alliance – The Philippines

Centro de Analisis y Accion en Toxicos y sus Alternativas –
Mexico International POPs Elimination Network

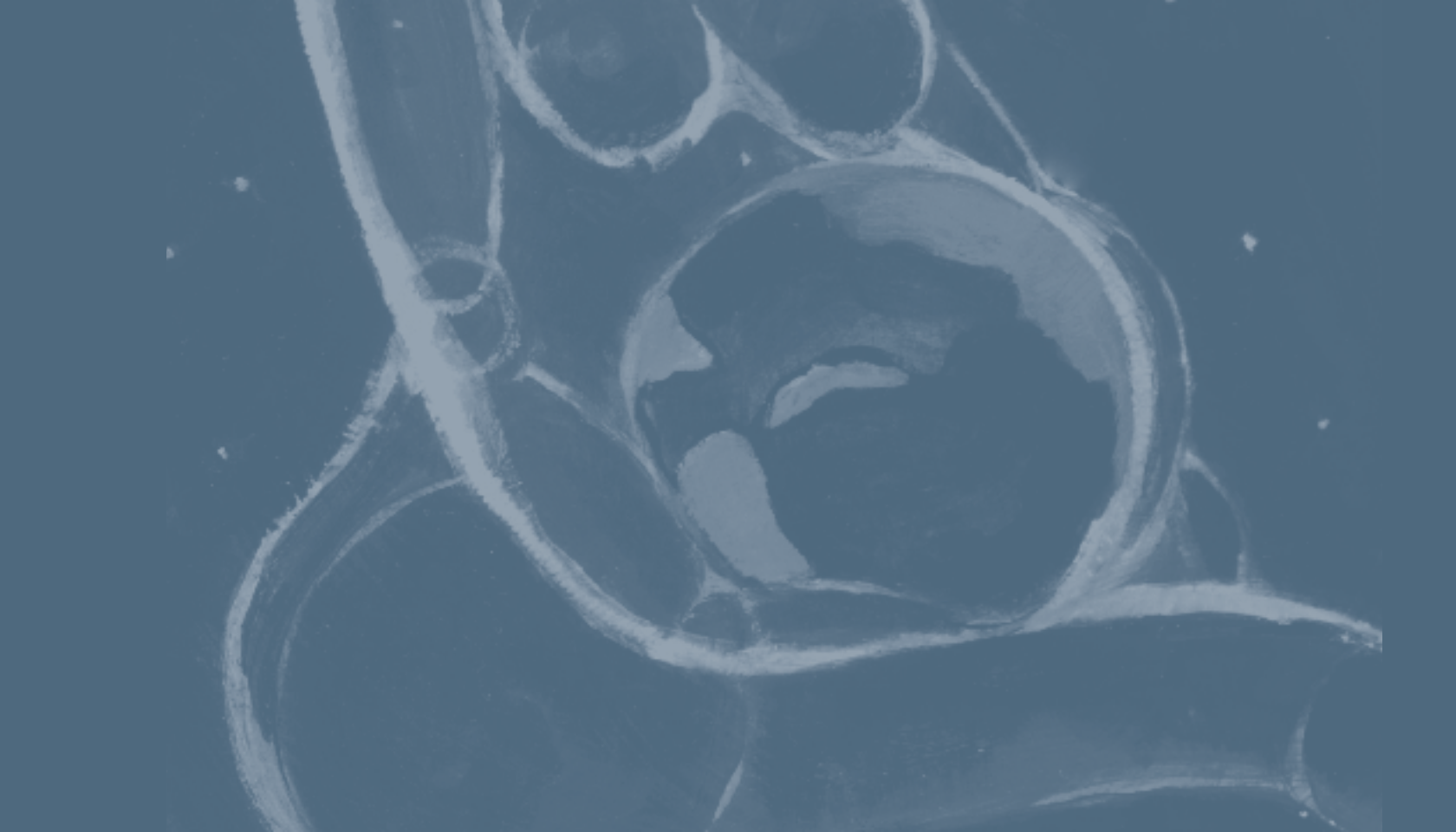
This report was supported by funding from:

The Watson Family Foundation

New York Community Trust

International POPs Elimination Network

anonymous donor



For more information, contact:

Sharyle Patton
Commonweal Biomonitoring Resource Center
P.O. Box 316 • Bolinas, CA 94924 • USA
Spatton@igc.org

Design by Winking Fish. Printing by Inkworks Press.
Printed on New Leaf Reincarnation Matte, a processed chlorine-free, 100% recycled sheet containing 50% post-consumer waste.