

CONTAMINANTS IN THE CIRCUMPOLAR NORTH: THE NEXUS BETWEEN INDIGENOUS REPRODUCTIVE HEALTH, GENDER AND ENVIRONMENTAL JUSTICE

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INTRODUCTION

Contaminants, which primarily originate from industrial activities conducted in areas remote from the North, may pose a threat to the short- and long-term health of Arctic environments. These contaminants bio-accumulate in the fatty tissues of marine mammals and other species and biomagnify as they move up the food chain. Contaminants are then consumed by humans in some traditional foods (Cameron and Weiss 1997, Arctic Monitoring and Assessment Programme 1998, Indian and Northern Affairs Canada 2003). Studies on the impact of contaminants on human health are often linked to the use of traditional foods by Indigenous peoples (Egan 1996, Arctic Monitoring and Assessment Programme 1998, Duhaime 2002). These foods represent the mainstay of the Indigenous diet in many communities across the circumpolar North and provide more substantial nutrients including protein, iron and zinc than do imported foods. Traditional foods also feature significantly in the cultural and spiritual lives of many Northern Indigenous communities (Kuhnlein et al. 1996, Kuhnlein et al. 2001, Blanchet et al. 2002). As quoted in Egede (1995: 72):

Inuit foods give us health, well-being and identity. Inuit foods are our way of life... Total health includes spiritual well-being. For us to be fully healthy, we must have our foods, recognizing the benefits they bring. Contaminants do not affect our souls. Avoiding our food from fear does.

Researchers cannot state definitively that contaminants are the sole cause of specific ailments in the North or even that they are significant contributors. This is due to many factors. For example, a conflicting body of evidence exists highlighting both the benefits and risks of consuming traditional foods; other variables (genetic disposition, whether an individual smokes, consumes alcohol, etc.) must be taken into consideration when assessing the effect of contaminants. Moreover, the population of most Northern communities only allows modest sampling sizes (Dewailly and Furgal 2003, Indian and Northern Affairs Canada 2003). However, scientific results detecting elevated levels of contaminants in tissue, blood and breast milk samples cannot be ignored.

Since the 1970s, scientists and political decision-makers have addressed the impact of contaminants on Northern Indigenous communities reliant upon a traditional diet (Kuhnlein et al. 2001, Kuhnlein et al. 2003, Blanchet et al. 2002). Extensive studies have been conducted on the effects of persis-

tent organic pollutants (such as PCBs, DDT, chlordane and toxaphene), heavy metals (including mercury, lead and zinc) and radionuclides (radioactive isotopes of all elements) on Arctic human and environmental health (Arctic Monitoring and Assessment Programme 1998, Indian and Northern Affairs Canada 2001, Indian and Northern Affairs Canada 2003). Some contaminants recognized as carcinogenic agents are potentially harmful to women and children of the Arctic. Research indicates that women, and consequently children, are the first to experience the effects of environmental degradation (Egan 1996, Ohanjanyan 1999, Sims and Butter 2000). Environmental justice and the contamination of Arctic communities intersect in several areas because of the threat contaminants pose to both reproductive and ecosystem health, and the powerlessness of Northern communities to control the sources of these pollutants.

REPRODUCTIVE HEALTH

Epidemiologists suggest that contaminants including PCBs and lindane may cause reproductive disorders in women including fertility and pregnancy complications (Arctic Monitoring and Assessment Programme 1998, Indian and Northern Affairs Canada, 2003). According to the Arctic Monitoring and Assessment Programme (1997: 173):

Reproductive effects cover an array of different problems, and the connections between the contaminant and the effects are not always clear. A major concern is that some substances interfere with or mimic sex hormones.

Additionally, contaminants such as DDT may cause reduced sperm count and thus, reduced fertility in men (Arctic Monitoring and Assessment Programme 1997). The effects of contaminants on reproductive health vary both culturally and geographically. Table 1 illustrates that the maternal blood of Inuit women in the Canadian Arctic demonstrates higher levels of PCBs than that of Caucasian, Dene, Métis or women from other groups. Inuit women from the Baffin region demonstrate the highest levels of PCBs (Muckle et al. 2001a, van Oostdam et al. 2001, Walker et al. 2001). Table 2 illustrates that the maternal blood of Inuit women displays higher levels of lead and mercury compared to women of all other studied groups, with women from Nunavik and the Baffin region displaying higher levels of mercury than women from the Kitikmeot, Kivalliq and Inuvik regions. These differences may be attributed to a variety of factors including varying consumption rates of tra-

Table 1.
Mean levels of PCBs in maternal blood, by region and ethnic group [geometric mean (range), µ g/L plasma]

<i>Ethnicity/region</i> <i>(Studies conducted in the Canadian Arctic between 1994-2000)</i>	<i>Levels of aroclor 1260</i>	<i>Sum of 14 PCBs</i>
Caucasian (n=134)	1.3 (0.24-5.7)	0.52 (0.11- 2.2)
Dene and Métis (n=93)	1.3 (0.26-14)	0.52 (0.12- 5.5)
Other (n=13)	1.1 (0.31-3.7)	0.43 (0.13- 1.4)
Inuit		
Baffin (n=30)	8.0 (2.0- 27)	2.7 (0.70-9.4)
Inuvik (n= 31)	2.4 (0.62-7.9)	0.82 (0.23-2.7)
Kitikmeot (n= 63)	4.5 (0.20- 27)	1.6 (0.12-9.4)
Kivalliq (n= 17)	5.6 (0.41- 60)	1.9 (0.17-22)
Nunavik (n= 159)	6.0 (0.10-48)	2.3 (0.17-16)

Adapted from Muckle et al. (2001a), Walker et al. (2001)

Table 2
Mean concentrations of metals in maternal blood by ethnicity and region [geometric mean (range), µg/L whole blood]

<i>Ethnicity/region</i>	<i>Levels of lead</i>	<i>Levels of mercury (organic)</i>	<i>Levels of mercury (total)</i>
Caucasian (n= 134)	21.2 (2.1- 58)	0.69 (0.0-3.6)	0.9 (not detected- 4.2)
Dene and Métis (n= 92)	31.1 (5.0- 112)	0.80 (0.0- 4.0)	1.4 (not detected- 6.0)
Other (n= 13)	22 (5.0- 44)	1.2 (0.0- 3.0)	1.3 (0.20- 3.4)
Inuit			
Baffin (n= 31)	42 (5.0-120)	6.0 (0.0- 29)	6.7 (not detected- 34)
Inuvik (n= 31)	19 (2.1- 102)	1.8 (0.0- 21)	2.1 (0.60-24)
Kitikmeot (n= 63)	36.1 (6.2- 178)	2.9 (0.0- 11)	3.4 (not detected- 13)
Kivalliq (n= 17)	29 (12- 64)	2.7 (0.40- 9.7)	3.7 (0.60-12)
Nunavik (n= 162)	50 (5.2- 259)	n/a	10.4 (2.6- 44)

Adapted from Walker et al. (2001b), Muckle et al. (2001).

ditional foods, lifestyle (smoking, alcohol consumption, etc.), socio-economic conditions and genetic variability. Dewailly and Furgal (2003: 9) state:

It is important to recognize that human genetic variability may affect susceptibility to the effects of such pollutants. Gene-environment interactions might explain why some populations or individuals are more susceptible than others to exposure to organic contaminants. Since few genetic studies have been conducted in the Arctic, and considering that Aboriginal people have a distinct genetic background, the impact of genetic differences needs to be evaluated.

Indigenous women also bear an additional burden as contaminants may be transferred intergenerationally through the placenta and breast milk and this may result in diverse prenatal and postnatal conditions (Dewailly et al. 1996, Odland et al. 1996, van Oostdam et al. 2001). As reported in Dewailly and Furgal (2003:8):

Although much larger quantities of PCBs are transferred to nursing infants by breastfeeding than prenatally across the placental barrier, virtually all of the adverse neurobehavioural effects reported to date have been linked specifically to prenatal exposure. This indicates that the fetus is particularly sensitive to these substances and therefore the period of development in the womb is perhaps the stage at which humans are most vulnerable to the effects of organic contaminants.

Ongoing maternal/cord blood research conducted in Nunavik suggests that higher concentrations of PCBs in cord plasma are associated with lower birth weight and smaller head circumference (Muckle et al. 2001b; Dewailly and Furgal, 2003). This corroborates the findings of earlier studies conducted in southern Quebec. Work conducted by Dewailly et al. (1996) confirmed that the breast milk of Nunavik Inuit women was five to ten times higher than that of women living in southern Quebec. Testing in communities in the Canadian Arctic and around the circumpolar North indicates that babies nursed by mothers with a high contaminant burden develop acute otitis media (middle ear infection) and immune dysfunction (Gladden and Rogan 1991, Klopov et al. 1998, van Oostdam et al. 2001).

Some scientists link contaminant levels in breast milk and health disorders in women and infants while many health practitioners contend that the benefits of breastfeeding currently outweigh the risks of contaminant exposure.

Breast feeding has great benefits including enhancing the bond between mother and child, providing nutrients, and helping the child's immune system get a good start. Breast feeding also reduces the risk that children will get intestinal upsets from contaminated water used to prepare formula. At this time, the studies that have evaluated the potential effects of persistent organic pollutants in breast milk are limited and not conclusive. (Arctic Monitoring and Assessment Programme 1997: 177)

Most research on the connection between contaminants and traditional foods has focused on the potential negative ramifications for human health. Less research has been conducted on the considerable benefits of consuming these foods. According to Blanchet et al. (2002), traditional foods such as animal products and marine mammal and fish fat provides an adequate supply of essential nutrients such as vitamins A, D, iron and zinc. Consuming the stomach contents of the caribou as well as specific plants, berries and meat provides vitamin C. As quoted in Blanchet et al. (2003: 47):

In addition to providing significant amounts of essential nutrients for the living body and its functions, the Inuit diet, rich in fish and marine mammals, has also been linked to a lower incidence of thrombotic disease in Greenland and Japan.... Death owing to ischemic illnesses is a rare event in Nunavik....

Omega-3 type fatty acids found in oil and meat may offer some protection against some conditions including arteriosclerosis, diabetes, high blood pressure and breast, colon and prostate cancers (Arctic Monitoring and Assessment Programme 1998, Dewailly et al. 2001). Elevated levels of selenium, also associated with a traditional Northern diet, may assist in counteracting the adverse effects of methylmercury exposure. However, this role of selenium is being investigated further (Arctic Monitoring and Assessment Programme 1998, Indian and Northern Affairs Canada 2003). It is possible that the presence of both Omega-3 type fatty acids and selenium have a beneficial effect.

It has been suggested that selenium is a protective factor in the development of atherosclerotic lesions and ischemic heart disease (IHD). However, essential fatty acids of the n-3 series have also been suggested as protecting against this disease. Because selenium and n-3 fatty acids are both present in large quantities in marine food, it is difficult to conclude definitively the role of selenium in the protection against IHD. It is possible that selenium acts as an

important co-factor, contributing to the oxidative defense system. (Arctic Monitoring and Assessment Programme 1998: 792)

ENVIRONMENTAL JUSTICE

Environmental justice is questionable in many areas of the circumpolar North that may be contaminated by pollutants released through remote industrial activities. The effects of these activities are rarely distributed equally. Persistent organic pollutants, heavy metals and radionuclides affect the health of men *and* women but the disproportionate impact of contaminants on women's reproductive health raises questions about environmental justice. According to Hofrichter (1993: 4):

...environmental justice is about social transformation directed toward meeting human needs and enhancing the quality of life – economic equality, health care, shelter, human rights, species preservation and democracy – using resources sustainably.

Based on this definition, environmental justice includes gender equality and identifying and meeting the needs of all people. Jiggins (1994: 3) states:

One of the key principles underlying the organization of human interaction is gender. The form of relations between the sexes changes over time and varies from place to place, but there is no society, class, age group or household that is not structured by the different and distinctive experiences of men and women in their relationships to each other and to the material world.

Within the Arctic environmental contaminant arena, gender equality must be secured through recognizing that women and men are impacted differently by contaminants and that women *and* men must be involved equally in decision-making processes. Preliminary research suggests that women offer innovative solutions to complex environmental problems (Seager 1993, Rocheleau et al. 1996, Bouvard 1996).

The environmental justice movement within the United States is dominated by women who focus on issues emerging from their own experiences. In most cultures of the world, women are associated with family and community health and it is women who often establish links between contaminant exposure and health concerns. The involvement of women in human and environmental health issues extends their involvement in community life – an activity in which women have traditionally been engaged. For ex-

ample, during the 1980s and 1990s, Elizabeth Penashue and other community leaders successfully galvanized the Innu Nation in opposing low-level military flight training over Goose Bay, Labrador, Canada. This prolonged and disruptive military activity resulted in harmful socio-cultural and environmental impacts for the Innu people and their traditional territory (Wadden 1991, Maillhot 1997, Byrne and Fouillard 2000).

Indigenous women in Canada may also become active in issues affecting the human and natural environments because of the intimate connection between Indigenous culture, spirituality and the land. According to Sheila Watt-Cloutier (2003: 257):

We have begun to recognize what has happened in our Inuit world and we have started to understand the importance of regaining control over the health of our communities that has been lost over the last few decades. We have begun to appreciate the importance of the wisdom of the land in regaining the health of our families and communities.

Many Indigenous writers, including Watt-Cloutier, highlight the innate female nature of the land. Anderson (2000: 185-186) states:

The image of Mother Earth, Grandmother Moon and the waters speak of lifegiving cycles and these teachings are as old as we are as peoples. The earth produces and nourishes and the moon regulates. In turn, the waters of the earth are vital in that they bring on and sustain life. All of this understanding helps with female body image, and with the feminine cycles that women go through. When an Aboriginal woman begins to see her body in relation to Mother Earth, it brings a sense of sacredness.

It is likely that Indigenous women active in environmental and community health issues draw strength from a land they believe is imbued with female properties.

Wyman (1999) states that certain groups of people suffer inequities related to environmental justice more acutely because they lack the political voice necessary to address decision-makers. Indigenous literature attests to the moral strength and influence of women at various levels of contemporary Indigenous society (Monture-Angus 1999, Byrne and Fouillard 2000, Tohe 2000). This influence exists despite challenging socio-economic conditions for many Northern peoples and external stressors imposed by colonialistic attitudes and practices (Brodrribb 1984, Anderson 2000, Lekhanova 2002).

Additionally, some Indigenous women in Canada are burdened by historical precedent as the role of women was seriously undermined following contact with Europeans (Brodribb 1984, Sunseri 2002).

Most literature by Indigenous researchers asserts that women do assume decision-making roles and wield power within Indigenous communities (Anderson 2000, Byrne and Fouillard 2000, Tohe 2000). However, this may not manifest itself in a manner that is recognized by the dominant Eurocentric and patriarchal society. While Canadian Indigenous women may not be well-represented in high-profile leadership positions, they are recognized as respected advisors and their influence underpins critical decision and policy-making processes (Fox 2002, Minor 2002). Tuhiwai Smith (2001: 152) asserts:

Indigenous women across many different indigenous societies claim an entirely different relationship, one embedded in beliefs about the land and the universe, about the spiritual significance of women and about the collective endeavours that were required in the organization of society. Indigenous women would argue that their traditional roles included full participation in many aspects of political decision-making and marked gender separations which were complementary in order to maintain harmony and stability.

Within Canada, Indigenous organizations including the Inuit Circumpolar Conference, Inuit Tapiriit Kanatami, Pauktuutit Inuit Women's Association, the Arctic Athabaskan Council and the Gwich'in Council International are becoming increasingly active on the world stage. Current President of the Inuit Circumpolar Conference, Sheila Watt-Cloutier champions many critical contemporary issues including Arctic contaminants. In her former capacity as President of the Inuit Circumpolar Conference (Canada) and Vice-President of the Inuit Circumpolar Conference, Watt-Cloutier played a prominent role during negotiations leading up to and during the Global Convention on Persistent Organic Pollutants in the late 1990s.

The Inuit Circumpolar Conference (Canada) used its observer status to lobby, inform and educate participants during the international conferences sponsored by the United Nations Environment Programme (UNEP). During the various international meetings of the Global Convention, Sheila Watt-Cloutier and other female Indigenous leaders including Cindy Dickson of the Arctic Athabaskan Council successfully focused world attention on the impact of persistent organic pollutants (also known as POPs) on the Arctic

region. While the impact of POPs has largely been construed by the media as an environmental issue, Watt-Cloutier and others identified the significant negative ramifications for Indigenous cultures, health and traditional ways of life. Watt-Cloutier asserts that traditional country foods are an integral part of Indigenous culture and that they play an important role not only in nutrition and health but also in the maintenance of spiritual, social and economic values and practices.

CONCLUSION

Rarely highlighted in the contemporary discourse on contaminants, gender and environmental justice must be identified as critical variables to be investigated. In the political arena, issues of equity provide additional justification for expanding the dialogue on contaminants. Given the potential impact of contaminants on human and natural environments in the face of ongoing global change, it is imperative that the contributions of women and men at all levels in the contaminant arena are recognized. Contaminants affect women and men differently and these differences, in particular, the link between contaminants, reproductive health, gender and environmental justice, demand further exploration.

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