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TITRE DE LA THÈSE - TITLE OF THE THESIS

Perception of Risk to Health from Environmental Factors amongst the
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SUPÉRIEURES ET POSTDOCTORALES

DEAN OF THE FACULTY OF GRADUATE
AND POSTDOCTORAL STUDIES

Perception of Risk to Health from Environmental Factors

Amongst the Mohawks of Akwesasne

By

Maxine A. Cole

Thesis submitted to
the School of Graduate Studies and Research
in partial fulfillment of the requirements for the
Master of Science degree in Epidemiology

University of Ottawa

August 2004



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395 Wellington Street
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Your file Votre référence

ISBN: 0-494-01447-4

Our file Notre référence

ISBN: 0-494-01447-4

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ABSTRACT

A survey of perceptions of health risk was conducted on 297 randomly selected residents of Akwesasne, a Mohawk community of approximately 13,000 citizens, straddling the border between Canada and the United States. The survey was conducted to understand how residents of Akwesasne perceive different types of health risks, and how attitudes about such risks are formed. Survey questions focused on association to the words risk and health, ranking of health hazards present in the community, sources of information on health risks, confidence in organizations and agencies responsible for health risk management, and a series of questions on risk related attitudes and behaviours. The survey demonstrated higher perceptions of risk among older as compared to younger respondents, and among women as compared to men. The media represented the primary source of information on risk, followed by traditional healers, although traditional healers were perceived as being more credible than the media.

ACKNOWLEDGEMENTS

To Dr. Daniel Krewski, Dr. Robert Spasoff, and Dr. Louise Bouchard thank-you for your patience in seeing me through this project, complete with constructive critiques and gentle nudges to continue the work, and whose presence and insight provided encouragement for me to accomplish my task.

To the community of Akwesasne and the Akwesasne Task Force on the Environment for your participation, encouragement and continuous support, and constant reminders that my efforts would benefit risk management strategies for the community.

To Katsi Cook, for your words of encouragement and vision for which I cannot express enough appreciation, and to the following Akwesasronon who actually took on the task of interviewing people: Jaz Benedict, Jari Thompson, Chichi Papineau, Valene King, Brittany Benedict and Jessica Roundpoint. I am forever in your debt for a job well done and will provide baked ziti whenever asked.

To Lee Thomas, for your words which provided ka'sastensera tanon sken:nen which helped me to work towards ka'nikonri:io.

To Tim Ramsay, who provided time and guidance for statistical analysis, along with entertaining stories of his trips overseas and his many outdoor adventures.

Niawen:kowa sewakwekon (a great big thank you) to all of you!

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Chapter One

1. Introduction

Central to this thesis is the assessment of the perception of risk for First Nations and Aboriginal Peoples, specifically, the Mohawks of Akwesasne. It is anticipated that the results of this research will enable Akwesasne's local governments and health policy makers to effectively address environmental factors that greatly impact the community by communicating potential risks to health and developing effective risk management strategies.

The 1992 Canadian Risk Perception Survey, administered by Krewski et al. (1995) was used for comparative purposes. As First Nations and Aboriginal Peoples do not participate in the Canadian census, this and other populations such as military-based personnel were excluded from the national risk survey. Previous Canadian-based risk perception research studies have included various segments of the population, such as scientists, students, and white males. Few of these studies, however, have included the perceptions of First Nations and Aboriginal Peoples in Canada (Barke et al, 1993; Der-Kerbetian et al, 1996; Finucane et al, 2000). More recently, though, two Canadian qualitative risk perception studies included First Nations peoples. Gibson (2001) described the perception of risk among neighboring First Nations when the Swan Hills incinerator in Alberta exploded. In a separate study, Osedowsk (2001) discussed risk perception regarding health issues for First Nations Peoples.

By comparison, in the United States, risk perception studies that included aboriginal people focused on the consumption of fish and animals (Stoffle & Edwards, 1990), siting a nuclear waste storage facility (Hine et al. 1997), risky behavior (Han et al. 1994), mining (Harris & Harper, 1997), and environmental pollution in general (Vaughn & Nordenstam, 1991; Han et al. 1994; Harris & Harper, 1997; Hine et al. 1997; Hild, 1998; O'Neil et al. 1998; Gowda & Easterling, 2000; Burger et al. 2001). These U.S. studies, based on convenience sampling, found similar results to the Canadian studies regarding the dimensions that shape an individual's perception of risk. Furthermore, these studies asserted that the attitudes and perceptions of people regarding risks to their health and their community's health from environmental factors are heavily influenced by their experiences and values. Characteristics of trust and optimism were found to be influential as well. These life qualities were found to be correlated with gender, age, and ethnicity (Flynn et al. 1994).

The 1992 Canadian Risk Perception Survey questionnaire was modified for Akwesasne and included questions on health and environmental issues of a global, national and local nature. Results of the Akwesasne 2003 survey will be compared to the Canada 1992 survey to identify differences, if any, in perception of risk from various health and environmental conditions. Through additional analyses, it is anticipated that two factors influencing or affecting Akwesasne's perception of risk will emerge. These two factors include geographic proximity to the Superfund¹ sites (the General Motors Power Train Division, the ALCOA West

¹ The United States Congress created a Hazardous Substances Trust Fund to pay for removal and remedial action of toxic chemical dump sites. The funds are derived from special corporate

and the ALCOA East (formerly known as Reynolds Metal Company) Plants), and Mohawk cultural values and beliefs. The lack of information on perception of risk on First Nations and Aboriginal Peoples provides a supplementary motivation to conduct research at this time within the Akwesasne Mohawk community.

1.1 Objectives of Thesis

The objectives of the risk perception survey for the Mohawks of Akwesasne are:

1. to describe Akwesasne residents' perceptions, attitudes, knowledge, values and beliefs pertaining to environmental health issues;
2. to assess the perception of risk to health from environmental factors (e.g., nuclear waste transport, fish consumption, etc.) and perceptions of risks from other activities (e.g., smoking, drinking alcoholic beverages, etc.);
3. to provide information for policy makers to appropriately address public attitudes and concerns of the Mohawk people regarding environment and health issues; and
4. to promote awareness and consideration of the issues surrounding perceptions of environmental risks to health to the Mohawks of Akwesasne.

and excise taxes and the state and federal governments decide on the remedial action plans. Findley, R.W. & Farber, D.A. (2000). Control of Toxic Substances. In Environmental Law in a Nutshell. (Fifth ed., pp. 169-238). St. Paul: West Group.

1.2 The Setting

The Mohawk Territory of Akwesasne is located along the St. Lawrence River and borders Canada and the United States. Within the portion located above the international boundary, Akwesasne territory is divided by the Ontario and Quebec provincial boundary. Below the international boundary, Akwesasne territory is located in what is now the State of New York and the County of Franklin. In total, the population of Akwesasne is estimated to be about 14,000.

Traditionalism in terms of lifestyle and cultural practices are well embedded in the daily practices of the Mohawk Peoples. Consumption of fish and waterfowl are some of the continuing cultural practices and livelihood of the Mohawks of Akwesasne. Other traditional practices include the gathering and use of plant medicines and healing ceremonies that use other natural resources. These activities are recognized as critical to maintaining both individual and community health in an interdependent and reciprocal society. The persistence of the toxicants in the environment then endangers traditional land usage, subsistence lifestyles and ultimately, the existence of the Traditional Society of the Mohawks.

Within the community of Akwesasne the cultural perspective becomes important when controversial issues are discussed, such as chemical toxicants in the environment (Dake, 1991). According to Langford et al. (1991) a layperson's perception of risk is 'subjective' therefore the discussion of risk perception must also take into account the individual's perspective on the world, placing the risk in a historical, political, and social context. Only when risk is placed in a cultural and

specific context can we begin to understand who is at risk, what is at risk, and why it is at risk.

In 1995 Akwesasne was identified as an environmental justice² community because it is in close proximity to hazardous waste sites and point sources of pollution while the community continues cultural land-based activities (Grinde & Johansen, 1995). The concept of environmental justice has been an emerging issue in the last ten years as evidence has suggested that toxic landfills, incinerators, dumping, mining and other environmentally damaging activities more often impact minority communities (Grinde & Johansen, 1995; Sexton & Johnson, 1993; Wigley & Shrader-Frechette, 1996; Jianguang, 1993). This is the case in Akwesasne.

Over a 50 year period, Akwesasne had become virtually surrounded by industry. The completion of the St. Lawrence Seaway and the St. Lawrence-FDR Power Project in the 1950s provided a resource of cheap hydroelectric power that attracted several industries to the area. These industries have since polluted the Traditional Territories that include current and potential land claim areas of the Mohawks. Between 1954 and 2004, Akwesasne experienced some of the worst pollution in the Great Lakes, and was one of 43 Areas of Concern (AOC)³ identified

² The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or a socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local and tribal programs and policies.
[<http://www.epa.gov/compliance/environmentaljustice/index.html>]

³ These are geographic areas within the Great Lakes Basin that have been severely degraded by environmental contamination that has caused or is likely to cause impairment of beneficial use of an area's ability to support aquatic life. Canada and the United States have been directed to cooperate with provincial and state governments to develop and implement remedial action plans.

by the International Joint Commission (NYSDEC, 1994). The community is located adjacent to the General Motors Power Train Division and is downwind, downstream and down gradient from ALCOA East and West, all large federal or state Superfund sites.

The General Motors plant was declared a Superfund site in 1983 by the United States Environmental Protection Agency (EPA). The declaration by the EPA resulted from research that identified highly toxic levels of polychlorinated biphenyls (PCBs)⁴. The highly toxic levels led the EPA to place the industrial site on the National Priority List (NPL)⁵ for cleanup. Toxicants such as PCBs, dibenzofurans, dioxins, volatile organic compounds (VOCs)⁶, poly-aromatic hydrocarbons (PAHs)⁷, fluorides, cyanide, aluminum, arsenic, chromium, copper and styrene have been released into the air and water and have contributed to the contamination of the St. Lawrence River, its tributaries, Mohawk lands, air and water. Furthermore, the stability and persistence of these toxicants in the environment, suggest they are lipophilic in character. The lipophilic toxicants bio-accumulate in the food chain

This directive comes from the Great Lakes Water Quality Agreement, which was amended by Annex 2 of the 1987 Protocol. [<http://www.great-lakes.net/envt/pollution/aoc.html>]

⁴ Polychlorinated biphenyls (PCBs): First introduced in 1929 as an oily fluid to reduce heat in electrical transformers, but also found in pesticides, carbonless copy paper, and small electronic parts. This chemical is currently banned from use in the United States and Canada but resides in landfills, toxic waste dumps and sediments. Steingraber, S. (1997). Trace Amounts. In Living Downstream (pp.1-13). New York: Vintage Books.

⁵ National Priority List (NPL): The President of the United States is required to employ a Hazard Ranking System in determining the hazardous waste sites or facilities to be added to the list for remedial action, which is required for use of Superfund monies. Findley, R.W. & Farber, D.A. (2000). Control of Toxic Substances. In Environmental Law in a Nutshell. (Fifth ed., pp. 169-238). St. Paul: West Group.

⁶ Volatile organics compounds (VOCs): Synthetic contaminants, which are carbon-based compounds, that are suspected carcinogens, that vaporize more readily than water. Steingraber, S. (1997). Water. In Living Downstream (pp. 189-211). New York: Vintage Books.

⁷ Polycyclic aromatic hydrocarbons (PAHs): A chemical by-product from the burning of fossil fuels which is linked to several types of cancers. Steingraber, S. (1997). Air. In Living downstream (pp. 173-188). New York: Vintage Books.

resulting in potential human exposure and harm from the consumption of fish and waterfowl.

This survey will describe the perception of risk from various health and environmental factors and risk-taking activities and assess other aspects of health-risk perception for the respondents – the Mohawks of Akwesasne. The other aspects to be investigated will be the available sources of information about health risks and the degree of confidence that individuals have in those sources of information. Another component of the survey will ask respondents what people and agencies are responsible for and the degree of their effectiveness in addressing environmental health protection.

Relevant literature was found through computerized literature searches on MEDLINE (MEDLINE Database, National Library of Medicine, Bethesda, MD) and the ORBIS catalogue at the University of Ottawa. The search strategy involved the usage of keywords such as 'risk', 'perception', 'environment', 'hazards', 'Native American', 'Aboriginals' and 'First Nations' and took place between 1985 and 2002. In addition, articles were traced through references listed in previous reviews. All papers found in this manner were published in journals available through the University of Ottawa or interlibrary network. Attendance at academic meetings resulted in the identification of additional reports that were subsequently researched and reviewed. A total of 135 papers and reports were reviewed for this thesis.

1.3 Review of the Key Literature

Essential to the comprehension of this research, is the clarification of important terms and an understanding of the interpretation of these terms.

1.4 Concept of Risk

Risk is the probability of an adverse outcome from exposure to a hazard or occurrence of a harmful event and the consequences of that exposure or event (Personal Communication with Krewski, 1999). The probability of occurrence is the chance of a given effect happening, and depends on the potency of the agent, susceptibility of the host, and the level of exposure. Exposure can cause an adverse health effect, property loss or damage, loss of life, environmental consequences or loss of expected benefit. The nature, severity and degree of reversibility of a risk influence the seriousness of the consequence.

1.5 Risk Perception

Risk is further conceptualized as the probability of an adverse outcome from exposure to a hazard or a harmful event occurring and the consequences of that event plus a factor called outrage (Sandman et al. 1989). The laypersons perception of risk is influenced by outrage factors as people formulate their 'subjective' judgments about a potential hazard. While it is important to consider

the public's perception in risk management decisions, it is recognized that a variance may exist in perception between experts and laypersons. The underlying difference in perception is based on differing assumptions, conceptions and values of the specific hazard. Scientists and policy makers often view the public as irrational when their expert opinion is not agreed with or listened to. What is missing from the scientists and policy makers decision-making is the more qualitative aspects of risk, such as values, emotions, power relations and the need for action. These 'outrage' factors include those qualitative aspects of risk that scientists fail to recognize or tend to ignore. It is these factors that underlie the variance in perception of risk not only between experts and laypersons but also between for example, men and women.

Various methodologies for the study of risk perception have been used, however the psychometric model of studying risk perception has wide ranging application (Fischhoff et al. 1978; Slovic, 1987). The psychometric scaling method has been used in conjunction with numerous technologies, products, lists of hazards and risk-taking activities. Such studies have occurred in the U.S., Canada, and other countries such as, the United Kingdom, Hungary, Norway, Sweden, and Japan. These studies were successful in identifying factors that characterize risk and contributed considerable knowledge to the understanding of the layperson's view of risk and their acceptability of a risk.

The research went on to further demonstrate that the characteristics that decrease perceived risk of a hazard include: voluntary exposure, control, fair, ordinary, not dreaded, natural, certain, familiar, morally acceptable, and a

trustworthy source. Equally demonstrated were factors that increase perceived risk associated with imposed (involuntary) exposure. These factors include lack of control, unfair, catastrophic, memorable, dreaded, technological, uncertain, unfamiliar, morally unacceptable, and risk being generated from an untrustworthy source (Slovic, 1997; Bird et al. 1997). These studies further noted that when a risk is perceived, people make subjective judgments about the hazards. Their judgments in part are reliant on intuition rather than facts alone (May & Burger, 1996).

Risk as defined by the layperson does not involve any quantitative assessment, either with regard to the likelihood of the threat becoming a reality, or with regard to the actual magnitude of the consequence (Bouyer et al. 2001). Just as certain factors influence risk characterization, correlations also exist between risk perception and gender, age, educational attainment, and ethnicity (Krewski et al. 1995; Dosman et al. 2000).

Earlier findings of studies on risk perception pointed to a large variation in the type, number, and quantity of factors that influence the individual's perceptions and assessments of risk. This work was further developed, both in scales used and number of respondents, by several researchers. The research results identified and confirmed earlier research, that the individual does use additional dimensions to characterize risk (Kasperswon et al. 1988; Morgan & Lave, 1990; McDaniels & Gregaory, 1991; Eyles et al. 1993; Chapman et al. 1997; Adams & Smith, 2001).

1.6 Correlates of Risk

In addition to Sandman (1989), research by Slovic et al. (1997) noted that an individual's perception of risk is defined by factors related to the hazard, with dread being one of the most influential of all factors. The use of DNA technology and nuclear weapons is perceived as dreadful and translates into a potential catastrophe from the hazard; the lack of control over the situation will increase risk perception. These and other technological risks were studied by Starr (1969) who reviewed the relationship between technological risks and social benefits. For the layperson, technological risks are unnatural and man-made, so there exists inherent danger if these are imposed, regardless of the benefits to be gained from the technology.

Other factors that govern the perception of risk are the number of people affected by various hazards, such as food preservatives, pesticides and motor vehicle accidents. As the affected number of people increases, the perception of risk becomes larger. It has been found that greater anxiety increases the assessment of potential harm from an undesirable situation that in turn increases the perception of risk of a hazard.(Der-Kerabetian et al. 1996; Cull et al. 2001).

May and Burger (1996) and Fiandt et al. (1999) found that optimistic bias has important consequences in risk perception that reduces an individual's motivation to engage in risk-reducing behaviors. For example, when people believe that signs of susceptibility will appear early and the absence of such signals means

no risk in the near future, then they perceive the risk as less and may engage in risky behavior, such as smoking.

Research to understand risk perception has expanded from the above listed variables to include social trust (Seigrist et al. 2000). Social trust is defined as an individual's willingness to rely on those responsible for management of a risk to make the right decision. When people don't have the interest, time, ability, knowledge, or other resources to make decisions and to take actions, they depend upon those responsible for that task to make the best decisions for their safety. Decisions that remain with risk managers are those related to management of technology, the environment, medicine, or other realms of public health and safety (Siegrist et al. 2000).

Conversely, social trust can become distrust of an agency, government, or industry and can influence an individual's perception of risk. For example, if a community vocalizes a concern over a hazard, the manner in which the health agency responds to the initial report will set the tone for future interactions. Distrust can be heightened if the agency doesn't respond to a request for information. The lack of response by the agency may be viewed as an effort to minimize or discount potential threats to community health and safety. In addition, the concerned individuals may view the agency as 'in league' with business and industry (Graber & Aldrich, 1993).

Since 1983 several surveys have shown that women's perception of risk is greater than men's when assessing environmental exposure to pollutants and risk-taking behavior, particularly for women with children less than 18 years of age

(Slovic et al. 1985; Kraus et al. 1992; Slovic et al. 1995). Flynn, Slovic and Mertz (1994) found that the percentage of 'high-risk' responses was greater in women for a variety of hazards. Research also identified an increased perception of food and safety-related health risks, which was correlated with the number and age of children in the household (Dosman et al. 2001; Davidson & Freudenburg, 1996; Eyles et al. 1993). Women were found to be consistently more concerned about chemical risks than men in a research study of members of the U.S. Society of Toxicology (Kraus et al. 1992). A study of toxicologists in different countries showed that female toxicologists used moderate to high-risk ratings more frequently than male toxicologists (Slovic et al. 1997; Slovic et al. 1995). Similarly, Barke et al. (1997) found that women perceived greater risk from research on gene technology than men. One possible explanation is that males are more supportive of technology in general, and women are less accepting because they have less trust in institutions (Beck, 1992). As a result of increased perception of risk among women, Ostry et al. (1993) and Greenberg et al. (1995) found that women exhibit pro-environment behavior as a strategy to deal with hazards.

Slovic et al. (1995) noted that the layperson's perception of risk differed from the expert's perception of risk. Experts may perceive a risk as low while the public perceives the same risk as high (Lazo et al. 2000). In assessing a risk, the layperson takes a multidimensional approach that considers many qualitative factors that have been identified earlier: uncertainty, dread, catastrophic potential, controllability, equity, lack of knowledge to those exposed and risk to future generations. In contrast, the expert's concept of risk tends to be one

dimensional and focused on quantitative assessments of likelihood and consequences. Overall, in consideration of the factors that the 'expert' and the layperson use in judging risks, Blake (1995) identified the need for scientists to acknowledge and understand the public's perspective and to facilitate the process of understanding the risk to hazards. While some studies noted marked differences in perception of risk between the two groups, Wright et al. (2001) found that the experts and non-experts in the oil and gas production industry shared similarities in risk perception. Rowe and Wright (2001) further supported this after an evaluation of nine empirical studies, and recommended further research to gain additional empirical evidence that the perceptions between the two groups were similar.

In a survey of expert and lay views of chemical risks, Kraus et al (1992) found that toxicologists working for industry saw chemicals as less of a risk than their counterparts in academia and government. Barke et al. (1993) found similar results among groups of scientists and noted that the physicists' risk perception of hazardous items was less than that of life scientists. In their study of expert and lay perceptions Slovic et al.(1995) identified a difference in perception of risk within groups of experts. For example, depending on their field of expertise, scientists may view different hazards with varying degrees of risk perception. Osei et al. (1997) found that less risk is perceived by scientists of federal agencies and laboratories than by scientists in state and local government. The scientists who work in state and local government were more likely to view their responsibility as one of protecting public health and safety, and therefore had a higher perception of

risk. In addition, accepted practice, group research, and peer review shape the scientists' perception based on their institutional affiliations, fostering distinct belief systems (Garvin, 2001).

Proximity to geographically located risks can also influence perception of risk. The location of residential areas in relation to highly contaminated industrial sites, landfills, and hazardous facilities has been found to be highly influential to perception of risk (Williams & Florez, 2002). Perception of risk is greater for populations that are close to a site than for populations whose residences are further away from a site (Eyles et al. 1993; Burger, 1999). Since the early 1990s research has identified that undesirable hazardous facilities and waste dumps are more likely to be located near low-income communities and communities of color, thus increasing the exposure of minority individuals to toxic substances (Vaughn & Nordenstam, 1991; Cvetkovich & Earle, 1992). In contrast to low-income communities, Cole and Foster (2001) found that more affluent communities have had greater attention paid to cleaning up waste sites near their communities, thus lowering the reduction of the influence of proximity to risk perception.

1.7 Risk Communication

Since the passage of the U.S. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)⁸, the industries near Akwesasne, ALCOA East and West and General Motors have been involved in remediation of

⁸ Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Also known as the 'superfund' law, was enacted in 1980 and revised by the Superfund Amendment and Reauthorization Act of 1986. Its primary purpose is the cleanup of leaking hazardous waste disposal sites. Findley, R.W. & Farber, D.A. (2000). Control of Toxic Substances In Environmental Law in a nutshell. (Fifth ed., pp. 169-238). St. Paul: West Group.

the designated Superfund sites. Remediation of a site receives considerable media attention (Chapman et al. 1997; Adams & Smith, 2001; Burger et al. 1997; Kone & Mullet, 1994). The media attention is derived in part from the ongoing debate amongst agencies managing risk, policy makers and the public about clean up of Superfund sites and how much clean up is enough. The ongoing debate causes exposure to conflicting information over an extended period of time and enhances risk perception among the interested parties (Blake, 1995). In contrast, rare events or acute hazards, which involve single incidents over a brief period of time, don't provide enough information to stimulate increased risk. For example, Rogers (1997) found in a Texas study that a siting controversy in LaPorte showed greater impact on risk perception than evacuation of residents after a fire in Odessa. The Odessa incident was a rare occurrence, which resulted in the immediate action of evacuating the town, and the residents' perception of the risk was not increased.

Another factor that shapes perception of risk from a hazard such as a Superfund site is trust or mistrust of the source of information, specifically technical information from the government regarding the site (Kunreuther & Slovic, 1996). It is incumbent upon agencies to be viewed as trustworthy and credible so that the public perceives the information as believable. If individuals have trust in the source, then this information is used when making a judgment about the hazard and lessens the risk perceived. The converse is true if the information source cannot be trusted. In addition, if industry or government risk managers have not been forthcoming about information releases this inaction can damage industry's

credibility, and any information provided later might increase risk perception (Gison, 2001).

If a history of mistrust exists between internal or external agencies and community, this distrust influences the perception of risk when information regarding a hazard is provided. Therefore, agencies issuing information about a hazard or event must improve their credibility in the public's eye (May & Burger, 1996). Peters et al. (1997) found that reversing a negative stereotype is key to improving perceptions of trust and credibility. For example, in response to the Tylenol tampering incident of 1982, the Johnson and Johnson Company removed all its Tylenol products from retail shelves. This follow-up action to the event cost the company \$100 million, however Johnson and Johnson gained public trust and credibility, helping it to regain market share and limit further losses.

The communication of all risks to the public regardless of the degree of risk associated with the hazard is yet another way industry can rebuild public trust. When participants were told that zero risk was impossible to achieve regarding an event, the evaluations of trust in the risk management agency did not lessen. The announcement of zero risk being impossible to achieve emphasizes to the community that industry is a reliable party when there is risk from a hazard. Industry has an obligation to communicate accurate information about an environment and health hazard. "It is the establishment of trust and mutual respect that plays the most important role in risk management in the long run" (Nakayachi, 1998).

Some researchers have found that more information generates an increased perception of risk. Flynn et al. (1993) found that a well-financed campaign promoting a high nuclear power facility was forced to close because it did not gain support for the initiative as the campaign enhanced hostility toward the project. The manner in which information is communicated and its affect on perception of risk is influenced by more than the current hazard. Other factors also play a role in the determination of a risk. Technology influences the perception of risk based on the uncertainty of the hazards and delegation of decision-making to risk managers.

As individuals formulate a decision about a hazard, their cultural views and experiences also influence their judgment about the hazard (Dake, 1991; Dake, 1992; Bontemp et al. 1997; Grendstad & Selle, 2001). Societies selectively choose the risks that they wish to have addressed, based on their beliefs, values, and social institutions, and not necessarily on knowledge of the actual dangers (Fernandes et al. 2000). In response to the occurrence of an environmental event, individuals make judgments and develop coping strategies based on their knowledge, and feelings, and their beliefs (Der-Kerabetian et al 1996). Der-Kerabetian et al. (1996) and Syme et al. (2001) found that the British and Germans, when compared to U.S. respondents, had a greater perception of environmental risk; in part an outcome of their pro-environmental behavior. Although cultural theory has been the focus of much research, in a critical review of cultural theory studies Sjoberg (2000) argued that, "the correlations between the hazards and the scales are so low that cultural theory needs to be further investigated before

generalizing to the larger population.” For the moment, however, existing research on risk communication emphasizes full disclosure by the industry to maintain the public’s trust and its’ subsequent perception of risk.

1.8 Aboriginal Perceptions of Risk

Given their view of cultural and natural resources, the Mohawks of Akwesasne consider any threat to the environment as a threat to them and their culture. Natural resources are viewed as elements of a single whole, and people are an essential part of the natural elements. The foundation of cultural values and beliefs comprises a knowledge base that is embedded and connected to both physical and spiritual worlds. For this reason, relationships within the environment must be sustained (Arquette et al. 2002; HETF, 1999; Alfred, 1999).

Since time immemorial, hunting, gathering and other traditional activities have been practiced throughout Mohawk Territory. These activities in concert with spiritual practices help to sustain the relationship with the land and the overall environment. As a result of the relationship with all lands of the Traditional Territories, including historic use areas beyond the boundaries of the ‘reservation,’ a special value is placed on the land based. It is not surprising then that threats to the land are considered serious matters.

Burger (1999) found that the special consideration given to the environment by the Shoshone-Bannock, a tribal nation in the northwestern U.S., was demonstrated by the increased interest in ecological resources and future land use. This increased interest may have influenced how individuals from this tribal nation

perceived hazards (Burger et al. 2001; Schell et al. 2003). Gibson (2001) found that the concern of First Nations' with regard to the transportation and treatment of PCBs was the result of their increased risk perception for the environment and ancestral lands. Ostry et al. (1993) identified additional determinants of perception, such as ethnic backgrounds, cultural values, and beliefs, that were taken into account when coping strategies were developed for environmental hazards.

In addition, the perceived responsibility for future generations, a cultural value and belief of Aboriginal People, may influence the perception of risk (Hine et al. 1997). Gowda et al. (2000) found that Tribal peoples in the southwestern U.S. had strong opposition to the siting of a nuclear waste storage facility and that increased perception of risk from the facility was related to their felt responsibility for future generations. The estimated persistence of nuclear waste exceeds recorded human history, so intergenerational effects influence the risk of this technology (Burger et al. 1997; Aherne, 2000). Cultural values then play an important role in the perception of risk among aboriginal peoples. "The responsibility for future generations is [based on the belief] that no future generation should have to bear the burden any greater than that borne by the present generation" (Shrader-Frechette, 2000).

This cultural responsibility implies that the perception of risk is based on not only the scientific evidence, but also the individual's rights, obligations and loyalty to the community, and in some respects, to a society. Burger et al. (1997) noted that nuclear waste is perceived as a greater hazard than nuclear production because the public must be convinced that nuclear waste storage will be a minimal risk to

themselves and future generations. Regardless of the storage of nuclear waste, nuclear power is proclaimed as a low probability hazard yet associated with great public fear (McDaniels et al. 1992). Again, this fear may be the result of a technology being imposed and dread of a radioactive leak. Furthermore, the concept and technology of nuclear power while a continuing controversy, is frequently discussed in the media. Such media coverage serves to sustain a high perception of risk.

1.9 Limitations of Current Knowledge

A critical review of the literature regarding perception of risk to health and environmental factors shows that research has advanced the use of psychometric scales. This form of quantitative assessment defines more precisely the differences between groups of respondents to a variety of hazards and risk-taking behaviors. Advancements in research have also identified factors that correlate with risk and how cultural theory influences the judgment of risk perception. Some of the results have restricted use, however, as the methodologies used in the studies limit the ability to generalize findings. A discussion will highlight some of these limitations.

Research has identified what hazards and risk-taking activities are perceived as more risky, but data are lacking to describe the underlying reasons for the differences. Specific socio-demographic characteristics correlate with perception of risk, for example, gender, race or ethnicity. Socioeconomic status and educational attainment correlate with increased or decreased perception of

risk. However, socioeconomic status and educational attainment are also closely associated with ethnicity. Past research has used homogeneous populations and has taken these correlates of risk perception into consideration. However, within any country the diversity of the population impacts the level of homogeneity. Consequently, the studies that use homogeneous populations may not identify variability in perception of risk as a result of the lack of diversity of that population. Studies need to investigate beyond these correlates to find the underlying reasons for the differences in what is considered less or more of a risk.

Differences in perception of risk between the expert and layperson must be cautiously generalized to the population. Understanding of the public's perception of risk is essential to effectively communicate risk. When the public perception of risk is taken into consideration, the management of risk is more successful. It's known that individual attitudes and opinions can influence perception of risk to health and environment hazards and, moreover, can also influence public policy about the hazard. While it is important to consider the public's perception in risk management decisions, it is recognized that a variance may exist in perception between experts and laypersons. The underlying difference in perception is based on differing assumptions, conceptions and values of the specific hazard. Although a difference does generally exist between expert and layperson, the public trusts that the experts are in a better position to decide what is the best management decision for the hazard. The public allows the expert to proceed as a surrogate in the decision-making and to make the best decision based on

experience and interpretation of the limited data available. Expert opinion may provide a truer picture of the actual risk versus the public who is heavily influenced by many factors when perceiving a risk.

A concern regarding the study by Slovic et al. (1995) in Canada, regarding expert versus non-expert perception of risk, is that the study population had a higher proportion of male than female respondents. In studies involving expert samples the diversity of the group is evidenced in the wide range of disciplines. Without prior knowledge of individuals' previous risk-taking activity, such as mountain climbing, conclusions must be prudently drawn regarding differences between the expert and layperson's assessment of these types of risk. In some of the research that compared the two groups, the characteristics of the expert groups and lay groups being studied were poorly defined, if at all (Wright et al. 2000). In earlier studies of the two groups, for example, the researchers were criticized for not controlling for the demographics of the expert and lay samples in the analyses.

Research conclusions have to be cautious because of the use of convenience sampling and the small sample sizes of some of the expert groups. The use of convenience sampling makes it impossible to estimate sampling errors. Therefore, the validity of inferences to a population cannot be established. The use of small sample sizes prevents the detection of differences or correlations between the expert and lay samples, or within the expert samples, if present. At this time, the evidence for greater validity of expert judgments of risk is weak. In addition to the reasons mentioned, the expert groups have been male, older, well educated, and more often white than non-white - all factors correlated in past studies with

decreased perception of risk. Consequently, the discussion should not be about expert-lay differences, but rather differences between older, richer, better-educated men and younger, less-rich, and less-educated men.

To date, the majority of research has focused on individuals and has shown that the individual's assessment of risk to hazards is subjective. Consequently, perception of risk varies from person to person, and from hazard to hazard. Most studies, however, are not based on individual responses but on aggregated information across all subjects. As a result, it is difficult to identify the individual and collective factors that might affect responses of group members to perception of risk (McDaniels & Gregory, 1991).

Beyond describing the differences between groups of people, few studies have investigated how perceived risk changes when an environmental event is happening or has happened. Considerable research has focused on an assessment of risk perception to a variety of hazards, but has not been specific to an event. The event would have to be controlled, but nevertheless would simulate a real life event with the goal of measuring the changes to perception. Rogers (1997) attempted to describe the perception of risk for two different events in two communities. One community had an on-going controversy for siting a facility and the other community had a rare event occur. The perception of risk for both communities was assessed at different time intervals. Rogers (1997) concluded that additional research was needed to further describe the on-going relationship between a facility siting, for example, and the perception of the community and acceptance of the facility.

Additionally, the characterization of risk as a process of continuing change requires assessment. Rogers (1997) looked at subjective thoughts on risk perception but examined risk from a static point of view, in which assessment of perceived risk is done at a particular time and place. This suggests that the perception of risk stayed the same. On the contrary, people do not continue to hold fast to views of risk in the face of new and possibly contradictory information, especially when faced with risk events that have potentially life threatening consequences.

While some investigators have focused on attitudes toward a narrowly defined or specific risk issue, others have measured risk perception or environmental concern in a broad manner. Broad measures have included a list of hazards, such as health and environment factors, risk-taking activities and risky behavior. A limitation of broad-based studies is that groups of people may share beliefs about one subset of issues and display dissimilarities for others. However, the results have been based upon an assessment for a variety of hazards and not an assessment of a subset of issues. Any inferences from the results of the broad list of hazards will lead to inaccuracies when comparing across studies and among ethnic groups.

Finally, the use of psychometric scales to describe the underlying relationship between cultural theory and risk perception has been able to explain a significant but modest proportion of variance among the study population (Marris et al. 1998). Further research using quantitative methods, however, is needed to describe the relationship between cultural theory and risk perception.

Moreover, some researchers criticize cultural theory because it construes social context in a very abstract, far-fetched manner, in which social context per se is not simply stated and is by no means the sole determinant of risk perception (Sjoberg, 2000). It may be feasible to use qualitative methods to analyze worldviews at a collective level. Perhaps focus groups might allow the analysis of dimensions of cultural theory and risk perception that is not found in quantitative methods of analysis.

1.10 Contributions of this Thesis

From a population health perspective, the differences between First Nation/Aboriginal people and mainstream health scientists pertaining to perceptions of risk have not been adequately investigated. This research will open the doors to risk management, assisting Community Health and Environment Boards and their respective departments and programs to develop risk management guidelines. Additionally, it is anticipated that this research will have a sustained impact on the community based on the cultural relevance of the questions and the cultural competency of the researcher. It is also anticipated that this assessment of the perception of risk of various health and environmental factors among the Mohawks of Akwesasne will highlight on a community level, the relationship between the perception of risk and health and environmental exposures. Risk communication scientists have noted that attitudes and judgments about environmental hazards are influenced by the experiences and values of individuals (Slovic, 1997). Marris et al. (1998) noted that the content of a

series of communications relaying information about a risk also influences individuals and groups. Consequently, to effectively communicate the risk of an environment or health issue it is fundamental to tailor the message to the public's perception. These insights regarding the community's perception of risk will assist in the development of strategies for risk communication and risk management, not only for local governments, but also for regional and national agencies.

The findings of this research will be presented and reviewed with the community of Akwesasne, specifically the Traditional and Elected governments, the Departments of Environment and Health, and the community-based environmental task forces. A multi-pronged approach will be used when informing the general community about the results, because conventional channels do not work to convey this information. The communication approach will build on existing mechanisms within this First Nation, such as Elders, community meetings and health fairs. In addition, key community members who play a critical role in the exchange of information will be engaged in discussion to deliver results to the community.

To manage and communicate risk, risk managers and environmental health policymakers must understand the individual's level of knowledge and awareness. If we understand the factors that shape public attitudes and opinions about risk versus the true risk, it will be possible to design new effective risk communication strategies. As the interviews took place within the community of Akwesasne, a direct benefit of the research was that the actual questions stimulated awareness of the hazards. After the questionnaire was completed, the interviewees wanted

more information about specific local and national hazards and how to reduce or avoid risk to the hazard. Also, the proposed thesis was accepted by the Research Advisory Committee of the Akwesasne Task Force on the Environment with the understanding that the candidate would schedule presentations of the results with the three local governments within Akwesasne after the thesis was successfully defended. In addition, a date would be scheduled to present the results on the local radio during the regularly scheduled "Tetewataron." This is a one-hour live broadcast that airs local issues within the community. Therefore, a positive contribution of this thesis would be the successful education of the community through these activities resulting in its respective acknowledgement, encompassing a greater awareness, knowledge and understanding that a potential risk exists affecting the Mohawks of Akwesasne.

Chapter Two

2. Methods

2.1 Sampling Frame

The Territory of Akwesasne borders the United States and Canada and is physically located in the state of New York and the provinces of Ontario and Quebec. The U.S. and Canadian governments have designated the 'boundaries' of the 'reservation,' and all roads within those boundaries were included in the household enumeration list compiled by the Akwesasne Task Force on the Environment's (ATFE), a non-profit community-based organization. In collaboration with the State University of New York at Albany (SUNY at Albany), the ATFE had constructed the household enumeration list for the community of Akwesasne between 1995 and 1996. The research staff of ATFE created the household listing by mapping all roads within the community and listing all residential buildings. Two multi-dwelling residences are located external to the 'reservation boundary' but have been included in the household listing and include the residents of Iroquois Village and Mohawk River Trails. These two residential areas previously had been included in health studies, and it was recommended that they be included for this research study as well.

The research staff of the First Environment Research Project (FERP), an earlier project of the ATFE, verified the household enumeration list in 1998 by

driving throughout the community of Akwesasne to ensure all livable houses were enumerated. Where necessary the list was updated. Other research projects sponsored by the ATFE in collaboration with the SUNY at Albany have used the household enumeration list in their health studies. The listing was updated for this research study in the fall of 2000. The revised household list was then used as the sampling frame to select the study sample. There was an attempt to prevent omissions and/or duplications of the households but this commonly occurs with any sampling frame.

2.2 Exclusion Criteria of Dwellings

The definitions of household and dwelling for the purpose of this research project are the definitions used by Statistics Canada for census surveys, as recorded in the 1991 Census Dictionary. A household refers to a person or group of persons who occupy the same dwelling and do not have a usual place of residence elsewhere in the community (Statistics Canada, 1991). The household may consist of a family group with or without other non-family persons, or of one person living alone. A dwelling is defined as a set of living quarters in which a person or group of persons resides or could reside (Statistics Canada, 1991).

There were exclusions from the household list of specific multi-dwellings within Akwesasne such as the Tsiionkwanonhso:te Adult Care, Sweet Flag Estates, Akwesasne Adolescent Group Home and the Women's Shelter. The Adult Care is a chronic care facility that has an Aboriginal and non-Aboriginal population, so some residents would not have met the eligibility criteria.

Furthermore, both the Adult Care and Sweet Flag Estates have clients that have medical problems severe enough to prevent them from participating in the survey. The Adolescent Group Home and the Women's Shelter were excluded because both dwellings house transient populations. All other multiple dwellings within Akwesasne were included.

2.3 Eligibility Criteria

The following criteria were used to specify the eligibility of individuals to participate in the survey. The participants of the study population must:

1. be at least one-quarter Mohawk descent (eligibility criteria of the St. Regis Mohawk Tribe for membership);
2. be at least 18 years of age;
3. be a resident within the 'reservation boundaries' or the stated exceptions;
and
4. be a resident of the household selected for the survey.

The interviewer attempted at different times of the day, weekdays and weekends, to approach potential participants to complete the survey. The interviewers approached the potential participant/household and introduced themselves and the survey. There was a knock on the door and if the individual was selected as the respondent, the respondent was asked either to complete the survey or to schedule an appointment at their convenience.

The potential respondent (within the household) was selected randomly using a chart that had random permutations of the numbers 1-15 that were completed for 500 households. The number 15 was chosen to ensure large

families would be accommodated in the random selection of an individual within a household. For example, if the first household contained 8 individuals then the household members were enumerated in a list on the cover page of the questionnaire. The first set of random permutations was examined to decide which individual would be selected. Keeping in mind that there were 8 household members, only numbers 1-8 were considered. Referring to the chart, the first number equal to or less than 8 was selected, and the corresponding individual listed on the cover page was identified. The interviewer continued down the list of sets of random permutations, 1-15 for the next household, etc. and followed this process for each additional household.

Once the individual was identified within the household and the criteria met, an introduction to the survey was provided with a request to sign a consent form (see Appendix A). Respondents were given the option of conducting their interview in the Mohawk or English language. No substitutions were allowed in the selection of the household or individual.

2.4 Sample Strategy

Akwesasne is located in Canada and the U.S., and the two elected governments, the Mohawk Council of Akwesasne and St. Regis Mohawk Tribe, each have an office that maintains vital statistics. My request for demographic information was approved by only one government office, so I was unable to acquire a complete census listing for the community. It was not the intent of the research to complete a census of the population, but to sample a subset of the target population. As a result, I updated the ATFE household listing to use as a

sampling frame. The total number of households in the fall of 2000 was 2,112 for the community of Akwesasne.

The sample size calculation was based on a dichotomous response variable, yes or no. The calculation resulted in a sample size of 400 individuals (see Appendix B). The calculated sample size was multiplied by a correction factor $(1 - n/N)$ to adjust for sampling from a finite population. The finite population correction (fpc) reduces the magnitude of the variance of the mean by the sampling fraction from what it would be if the population were infinite. The study population consisted of 500 individuals who were approached to achieve the proposed response rate of 80%, or 400 completed one-to-one interviews.

A classical two-stage sampling technique was used to randomly select the primary unit (the household) and the secondary unit (the individual within the selected household). From the household list of 2,112 households, 500 were selected by simple random sampling using a computer-based random-number generator. The computer sequentially identified the population units (households) with integers from 1 to N, and selected units corresponding to n random integers, which were chosen without replacement. To randomly select the individual, random permutations of the numbers 1-15 were completed for 500 households. The interviewer listed all residents of the household who were 18 years of age and older and randomly selected the potential respondent from the list. The interviewer assessed the selected individual to ensure compliance with the eligibility criteria, and no substitutions for the household or individual were considered. The 500 households selected for study yielded 277 completed

interviews or a response rate of 57.3% of eligible individuals. The acquisition of data took place between March 2001 and January 2003. The sampling strategy for the population had unequal selection probabilities because of differences in gender, age, and household size. Therefore weighting for these three factors was accounted for in the analyses of the data.

2.5 Development of The Survey

2.5.1 The Questionnaire

The purpose of the study was to implement a descriptive survey that would illustrate the target population's perception of the impact of various environmental factors on health. The questionnaire for Akwesasne was a partial replication of the 1992 national risk perception survey by Krewski et al. A full description of the 1992 Canadian survey can be found in various publications (Flynn et al. 1994; Slovic et al. 1995; Krewski et al. 1995). The Canadian survey was designed to assess many different aspects of health risk perception. A variety of question formats were used, including word association, ratings of perceived risk, attitude and opinion questions, and questions about actual risk-taking and risk-avoiding behaviors in which the respondent was engaged. Goldfarb Consultants conducted the survey by telephone to a representative sample of the Canadian adult population, between February 14 and February 24, 1992. A stratified random sampling method produced 2,765 contacts from which 1,506 completed interviews were obtained, for a response rate of 54.5%.

The Canadian survey was modified for use in the Mohawk community at

Akwesasne (see Appendix C). The questionnaire was designed to assess different aspects of health risk perception. There were approximately 160 questions for the respondent to answer. A variety of formats were used, including word association with two stimuli, and a four-point Likert scale (including a don't know/no opinion category) to collect information on ratings of perceived risk, attitude and opinion statements, sources of health and environment information, and responsibility for health-risk protection. The final section of the survey asked questions pertaining to demographic information. Respondents were not asked questions about income because previous surveys in Akwesasne showed that individuals were reluctant to answer this question. If necessary, education can be used as a partial surrogate for income information. In general, the administration of the survey to one individual took between thirty to sixty minutes to complete. The length of time to complete the survey varied with each individual because some people had more time to commit to the interview.

The interviewers captured the responses on the questionnaire and after the interview quickly scanned the survey for unanswered questions. Once the completed surveys were received, the candidate reviewed the document for errors, such as unanswered questions and missing information. Any errors were reviewed with the interviewer and if necessary, the interviewer contacted the participant for the additional information. The data was entered into a database that was created from the MS-EXCEL program and the completed surveys were secured in a locked file cabinet.

2.5.2 Focus Groups

The modified questionnaire for Akwesasne addressed questions of knowledge, behavior, attitudes, beliefs and values of the study population. The health and environmental hazards were local, national and global issues. Focus groups were identified and selected to review and comment on the questionnaire. A list of twenty people were identified and invited to a focus group, and four people attended. The purpose of this first focus group was to ensure clarity of the questionnaire and relevance of issues to the community of Akwesasne. The focus group found that the survey was understandable and the length was satisfactory. However, many issues specific for Akwesasne had not been covered and people were unsure of local government activity and could not predict how other people would respond to those questions. Also, the attendees thought individuals 75 years of age and older would be able to understand all questions but recommended translation if requested by the individual. To assist the respondent in answering the questions, it was suggested to write the four-point Likert scale on flash cards for the corresponding questions. The interviewers used flash cards to relieve the respondent of the burden of remembering the different scales thereby lessening fatigue. This procedure helped the respondent to focus on the question.

Due to the lack of attendance of males at the first focus group, a second focus group was scheduled specifically for males. To encourage participation of men, the second meeting was scheduled at the home of one of the focus group volunteers. Ten individuals were invited but only four men attended, ranging in age

from 45 to 65 years. The purpose of this second focus group was to review the amended questionnaire and provide recommendations for further change regarding the flow, length, and language of the questions. One suggestion was to change 'biotechnology' to 'genetically modified foods or crops'. In addition to the focus groups, the Research Advisory Committee of the ATFE reviewed and commented on the survey and recommended changes to the list of environmental issues. The revised survey was pilot tested with six people from three different age groups; one male and one female from 18-24, 25-35, and 36 plus years. The purpose of pilot testing was to assess the length and word changes for the final draft of the questionnaire.

Four people and myself implemented the survey in the community. Each interviewer was trained prior to conducting interviews, and the final phase of the training component was actual observation by the candidate of the first few interviews for each trainee. The intent of the mock interview was to create an awareness of the language, length and flow of the questionnaire.

2.5.3 Non-Response

The administration of the questionnaire was plagued by a low response rate. To enhance the response rate the callbacks or returns to the household were changed from three to seven. In addition to more returns, the callbacks were completed at different times of the day including weekends.

The non-response category of selected individuals included those people that the interviewer was unable to find at home and refusals to participate.

Those individuals that chose not to participate in the survey stated reasons such as no time for the interview, did not want to do 'another survey,' children need to be taken care of, or too busy, and questioned the importance or relevance of the survey. Also, the people who refused were concerned about the interviewers' credibility, level of confidentiality of the individual responses, and survey length. At the end stages of data collection, the interviewers attempted to collect demographic information from the non-respondents, but unfortunately not enough data was gathered from the non-respondents to characterize this group of individuals.

2.5.4 Missing Values

There were no cases with missing values for the 'independent variables,' such as age, gender, and education. There were missing cases for specific variables throughout the questionnaire spread across many respondents. It was a random sample of individuals who did not provide the information and not an error in entering the data.

The section of the questionnaire that used word associations revealed the largest number of missing values, 2.5% for 'risk' and 3.2% for 'health'. The list of hazards showed one missing value for several variables and two missing values for one variable. Throughout the remaining parts of the survey there were missing cases appearing randomly. The exception were the two parts of the survey that didn't have any missing cases which asked what were the sources of health risk information and how much confidence the respondents had in those sources. The number of missing cases (0.4% for the majority of the variables

and 3.2% for the word association) was small and appeared to be random. As a result, the missing cases remained in the analyses but were addressed in different ways depending on the questions and the type of analyses. In consideration that the missing data appeared to be randomly distributed across all cases, these values were replaced with the means of the remaining observations for that variable. Statistics may be biased when missing values are replaced with means of a variable and can lead to the variance being underestimated. A decision to delete the cases with a missing value on any variable would have lowered the sample size significantly from 277. If the percentage of missing values were too large, this would not allow the results to be inferred from the sample data collected to the larger population of Akwesasne.

2.6 Statistical Analysis

Because our primary interest in engaging perception of risk among the Akwesasne population, descriptive statistics were generally adequate for this purpose. However, multivariate analyses (specifically, Factor Analysis) were conducted in order to explore underlying relationships shaping perception of risk. In addition, the chi-square test statistic, using the DEFF to take into account the complex survey design were used to make formal comparisons between Akwesasne and Canada as a whole.

2.6.1 Descriptive Statistics with Weights

An exploratory analysis of the data using descriptive statistics illustrated particular characteristics of the data set, such as the sample mean or median

that provided estimations of central tendency in the population and the sample variance for each of the variables. The descriptive statistics also explored the degree to which the data were skewed, and checked for extreme or outlying observations that contributed to the problem.

As a result of not stratifying the target population for gender, number of people in a specific age group and household size prior to calculating the sample size, the data were weighted for analyses (see Appendix D). Descriptive statistics were completed using weights that resulted in proportions and standard errors for all variables of the questionnaire excluding the word associations.

2.6.2 Nonparametric Statistics

A four-point Likert scale was used to collect the responses, for example, "almost no, slight, moderate, high health risk," and "don't know/no opinion" was also a potential answer. These Likert scale values are comparable only in relative terms and not absolute in magnitude as the difference between almost no health risk and slight health risk is not measurable. The median, and not the mean, is a more appropriate estimate to summarize Likert scale data because it conveys a position on the scale and provides more meaning to the estimate. As a result of the data being ordinal and not normally distributed (as shown by inspection of the normal probability plots and confirmed by the Lilliefors test), nonparametric statistics were used for analyses of the data.

2.6.3 Word Association

The first question reads, "When you hear the word 'risk' what is the first word or image that comes to mind? When you hear the word 'health' what is the first word or image that comes to mind? The respondents were asked to provide one word that they associated with two different stimuli. The first stimulus was, 'risk' and the second stimulus was 'health.' The most common responses were used to summarize word associations in the first question.

2.6.4 Chi-square Test Statistic

The chi-square test statistic was used in the analyses of similar variables of the 2002 Akwesasne and 1992 Canadian surveys. This nonparametric method uses actual numbers and does not require specific assumptions about the parameters of the population from which the samples were taken. The chi-square test statistic was calculated to test the null hypothesis that a comparison of the observed frequencies would show similar findings for both populations – Akwesasne and Canada - regarding the perceived high health risks to the family and to the community. The chi-square test statistic showed whether the observed distribution of frequencies is sufficiently different from the expected distribution of frequencies between the two populations to be unlikely to have occurred by random sampling.

Once the chi-square was calculated and if the null hypothesis was rejected, sub-tables were created to determine which responses (almost no, slight, moderate, high or don't know/no opinion) accounted for the difference between the Akwesasne and Canadian populations. The grouping of responses

would provide the most useful information to identify how the responses were different between the two populations. The creation of sub-tables followed specific conventions that determine the number of allowances for sub-tables and how they are made (Glantz, 1981). For example, the 2 X 5 contingency table for the variable AIDS and the family resulted in a significant chi-square test statistic that identified a difference in perception of risk to AIDS between the two populations. Accordingly, four sub-tables were created and the almost none and don't know responses were identified as the responses that differed significantly between the Akwesasne and Canadian surveys.

In consideration of the comparison of the two populations using the chi-square test statistic, the variance of the population totals may have been affected by the cluster sampling designed used. The Akwesasne survey used a two-stage cluster sampling design, therefore the variance of the populations may not be as accurate as it would be with simple random sampling (SRS). The use of the design effect (DEFF) with the chi-square test statistic has provided a more accurate estimate of the variance between the two populations.

A limitation of using this approach for ordinal data is that the chi-square assumes no ordering among the categories and treats the data as nominal therefore in this situation information is lost. When using chi-square, it is necessary to include every possible category into which cases may fall, therefore including where necessary, the category called 'other' or one that records absence of a characteristic was included.

2.6.5 Exploratory Factor Analysis

The goal of the exploratory factor analysis was to reduce a large number of observed variables to a smaller number of factors. The variables selected for the factor analysis included the health and environment variables listed in questions 2.a. and 2.b. Specific to this research, factor analysis was used to evaluate the notion that there were underlying relationships amongst these variables that would be useful in characterizing Akwesasne's perception of risk. Correlation coefficients are constructed between items, or variables, and across participants and then the resulting correlation coefficients are factor analyzed. The factor loadings are estimates of the relation between each item and a factor. Some variables were common to one factor, and some variables were common to two or more factors. The factor loadings were examined to determine which of them were meaningfully correlated with a factor. Overall, the higher the factor loading, the more meaningful or greater the impact of the item on the factor. In this application of factor analysis, factor loadings exceeding .311 were treated as meaningful. This value was taken from the literature regarding how to identify which variables load on what factor. If there was a missing value for a variable, for the factor analysis, the mean value for that specific variable replaced the missing data point.

The factors are constructed using weights, in which the first factor explains the maximum amount of variance among the individual responses. The second factor is constructed based upon the maximum amount of the variance remaining

after the first factor has been defined. The third factor is constructed based upon the maximum amount of the variance remaining after the second factor, and so on. Empirically, the more factors extracted the better the fit, which explains the maximum amount of variance. To attain the best fit, however enough factors must be retained, keeping in mind that the goal is to use the least amount of factors that will explain the underlying concepts (Tabachnick & Fidell, 2001).

The survey asked specific questions regarding risk perception of a list of hazard items for 'you and your family' and 'community'. The analysis resulted in forced three-factor solutions for 'you and your family' and for 'community'. A varimax rotation was completed which is an orthogonal rotation method that maximizes the variance explained by each factor.

The three factor solutions that were retained were based on two criteria, the eigenvalue-one criterion, which is computed by the SPSS software program and visual inspection of the scree plot. An eigenvalue represents the total variance explained by a factor. The eigenvalue-one criterion eliminates any factors with an eigenvalue of less than 1.0 because it accounts for less variance than is generated by one variable. In addition, inspection of the scree plot demonstrates which factors explain the maximum variance, and therefore which factors to keep. The eigenvalues are plotted for each of the variables, and visually see a change in the slope of the curve or a break in the curve. Factors are retained prior to the break in the slope. A cut-off value (CV) was used to determine which variables loaded highest on each factor, therefore contributing to its interpretation. These values were computed using the equation:

$$CV = 5.125/(N-2)^{1/2}$$

where N denotes the size of the study population. The cut-off value for the analysis was set at 0.311 for both 'you and your family' and 'community' (Tabachnick & Fidell, 2001).

Three components each for 'you and your family' and 'community' were retained from the factor analysis. There were cross loadings of variables on two or all three factors from the analysis. For example, one variable achieved the criterion loading for a factor and loaded over .40 on 2 factors. Another variable loaded over .35 for two factors. The highest loading for that specific variable was considered and used to determine which factor it was related to. The researcher also must consider if the specific variable is related to the underlying concept of the factor.

The two criteria used to determine the number of factors to retain depend on the researcher, so the selection process can be very subjective. If too many or too few factors are retained, the results from the rotation of factors may be skewed. The eigenvalue criterion uses a value of 1 to choose which items to keep, and there is no leniency for values $1/100^{\text{th}}$ less or more than 1. If the study were to be replicated, the numbers may change and the factors retained will also change. The eigenvalue criterion is subject to the number of actual variables and more than 50 variables results in too many factors and fewer than 20 variables results in too few factors. There were 28 variables for 'you and your family' and 49 variables for 'community'.

Use of the scree plot to decide the number of factors to be used is also subjective because it is inspected visually and the researcher decides how many factors should be retained. A significant break in the slope as it descends may not always be obvious on the plot, and there isn't a significance test for the scree plot. Therefore, due to these uncertainties inherent in the method, the final decision rests with the individual reporting the results of the analyses.

2.6.6 Cronbach's alpha (α)

Cronbach's α was used to measure the inter-item reliability of the variables that contributed to the factors or components that were derived from the factor analysis (Pedhauzer & Schmelkin, 1992). This was to ensure that the items, which demonstrated high factor loadings or showed high positive correlation in the factor analysis, were related specifically to that component. Cronbach's α may range from 0 to 1 and the higher the score, the more reliable the generated factors. Values higher than 0.7 is an acceptable reliability coefficient but lower thresholds are sometimes used in the literature (Pedhauzer & Schmelkin, 1992). Each of the 3 factors generated for both 'you and your family' and 'community' was assessed by reliability analysis. If there was a missing value for a variable, the mean value for that specific variable replaced the missing data point.

2.6.7 Test/Retest

The respondents were asked to volunteer to take a retest (see Appendix E) of seven attitude and opinion statements within 4 weeks of the original survey.

Twenty participants agreed to take the retest but only eighteen could be found for follow-up within the 4-week time frame. The Wilcoxon signed ranks test, a nonparametric measure, was used to determine if the test and retest responses were similar. The null hypothesis is that the median of the first population (test) is equal to the median of the second population (retest). The alternative hypothesis is that the medians of the two tests are different. The observations are ranked based on the magnitude of the changes without regard for the signs, positive or negative. A two-tailed test of significance was used with $p < 0.05$ as the acceptable level of significance. This test does not require that the population is normally distributed but does assume that the measurements are symmetric about the median. There were no missing values for the variables.

Chapter Three

3. Results

3.1 Response Rate

Of the 483 individuals approached to participate in the survey, 277 consented to be interviewed, which resulted in a response rate of 57.3%. Initially, 500 households were selected but the interviewers found 17 households in which the individuals had deceased or moved temporarily, or the houses were vacant or dismantled. About halfway through administering the survey, callbacks were increased from 3 to 7 in an attempt to increase the response rate. With approval from the University of Ottawa Research Ethics Board (REB), individuals who refused to participate were asked why they did not want to answer the survey. They were also asked questions pertaining to age and educational attainment, but the majority of the respondents would not volunteer this information either. Only a small amount of information was collected on the non-respondents and so I was not able to characterize this group, but it is obvious that men were much less likely to respond than women.

3.2 Demographics

The demographic characteristics are displayed in Table 1. The respondents' age in years and level of educational attainment were re-coded into two separate categories. Of the people who participated in the survey, two-thirds

were female and 40% were less than 40 years of age. Nearly half had less than post-secondary education.

Table 1 Age, Sex, and Educational Attainment of Respondents

Variable	Number of Respondents	% of Total
Age		
Less than 40 years of age	110	39.7
40 or more years of age	167	60.3
Total	277	100.0
Sex		
Male	97	35.0
Female	180	65.0
Total	277	100.0
Education category		
Less than post-secondary	120	43.3
Post-secondary or greater	157	56.7
Total	277	100.0

The respondents were also grouped into age categories similar to those used in the 1992 national risk perception survey (Table 2). The largest group of respondents was the 30-44 years of age for both genders. The smallest group of respondents was the 18-24 and 25-29 years of age for the females and 25-29 years of age for the males.

The age-sex distribution of adult residents of Akwesasne is shown in Table 3. The Territory of Akwesasne straddles the international border, and for the year 2000 the number of residents was derived from the New York State Census and the Office of Vital Statistics, Mohawk Council of Akwesasne. Based on this information, the largest segment of the population is the 30-44 years of age for both genders (37.3%). The other age groups are similar in percentages

across both genders, except for the females who are 65 plus years of age that number slightly more than the males.

Table 2. Age - Sex Distribution of Respondents

Age (years)	Males		Females		Total	
	Number	%	Number	%	Number	%
18 - 24	13	13.4	15	8.3	28	10.0
25 - 29	6	6.2	15	8.3	21	7.6
30 -44	37	38.1	68	37.8	105	37.9
45 - 54	24	24.7	36	20.0	60	21.7
55 - 64	9	9.3	25	13.9	34	12.3
65 plus	8	8.2	21	11.7	29	10.5
Total	97	100.0	180	100.0	277	100.0

Table 3. Age - Sex Distribution of Adult Residents of Akwesasne

Age (years)	Males		Females		Total	
	Number	%	Number	%	Number	%
18 - 24	563	16.4	540	14.8	1,103	15.6
25 - 29	384	11.3	390	10.7	774	10.9
30 - 44	1,326	39.0	1,312	35.8	2,638	37.3
45 - 54	524	15.4	554	15.1	1,078	15.3
55 - 64	308	9.1	396	10.8	704	10.0
65 plus	298	8.8	470	12.8	768	10.9
Total	3,403	100.0	3,660	100.0	7,065	100.0

3.3 Word Associations

Risk means different things to different people and Figure 1 illustrates the variety of responses from the word association on the questionnaire. The first stimulus, "risk" resulted in the following responses: danger, chance, and health. The 'other' (44%) category contains the remaining answers.

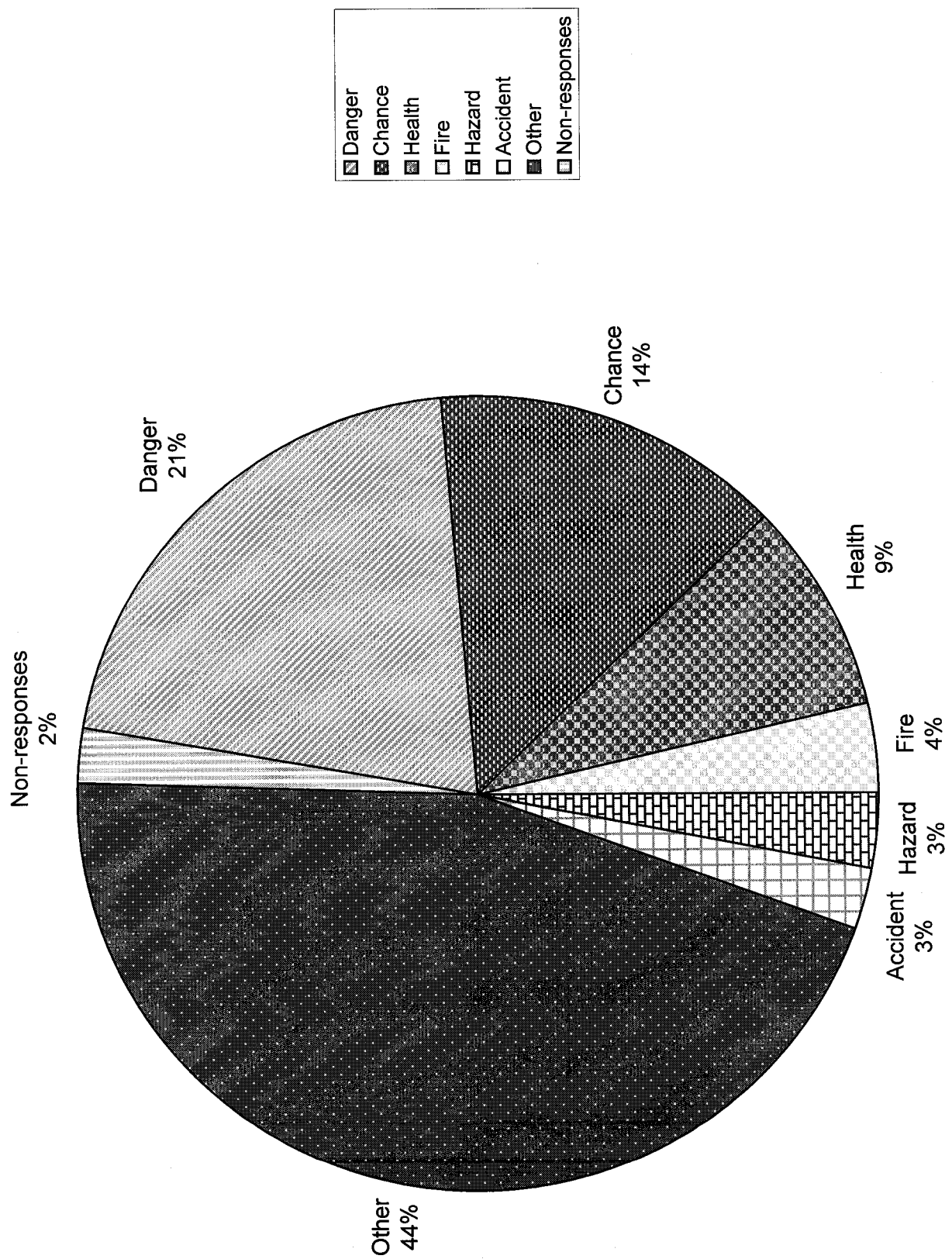


Figure 1. Associations to the Word "Risk"

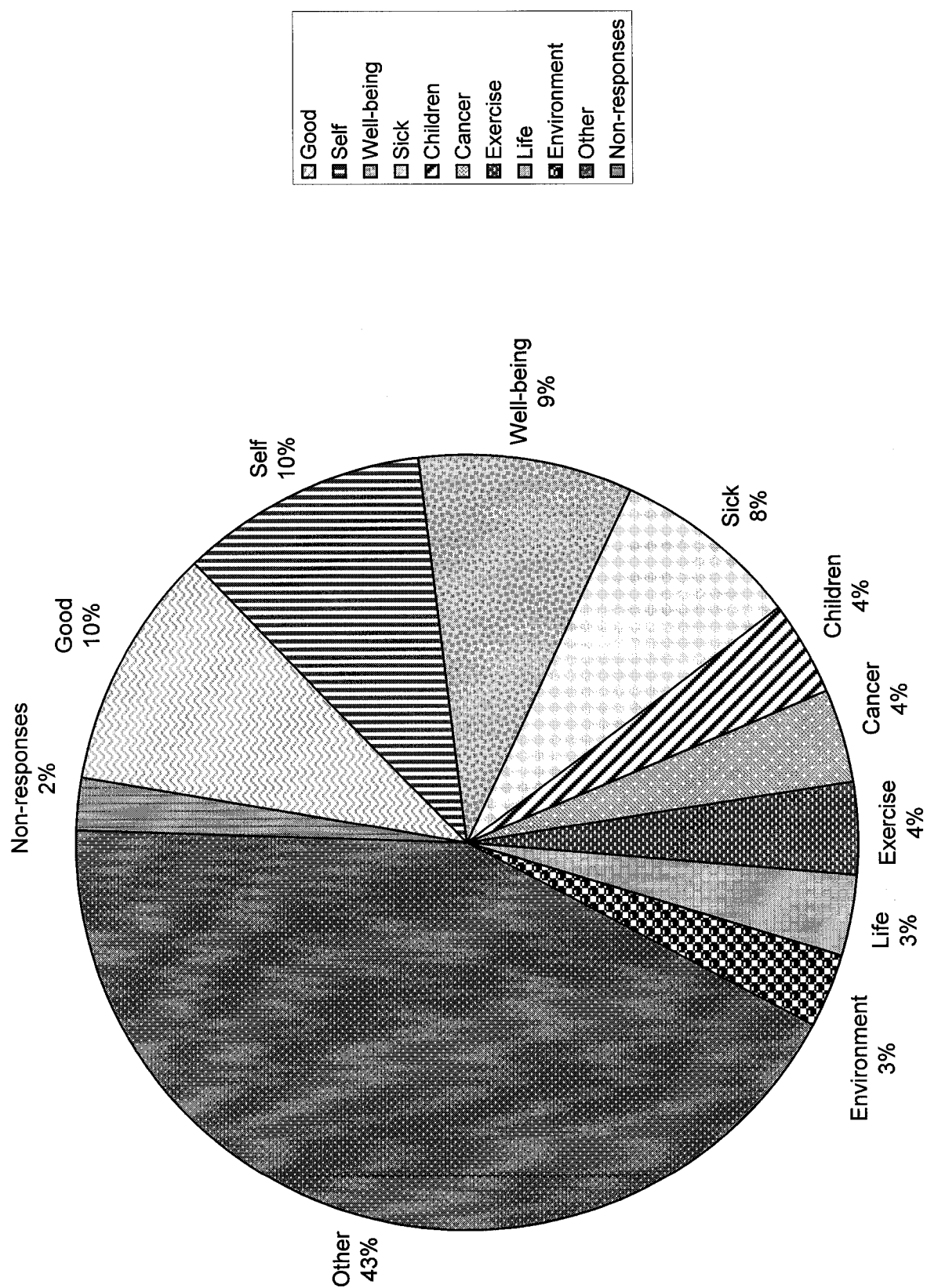
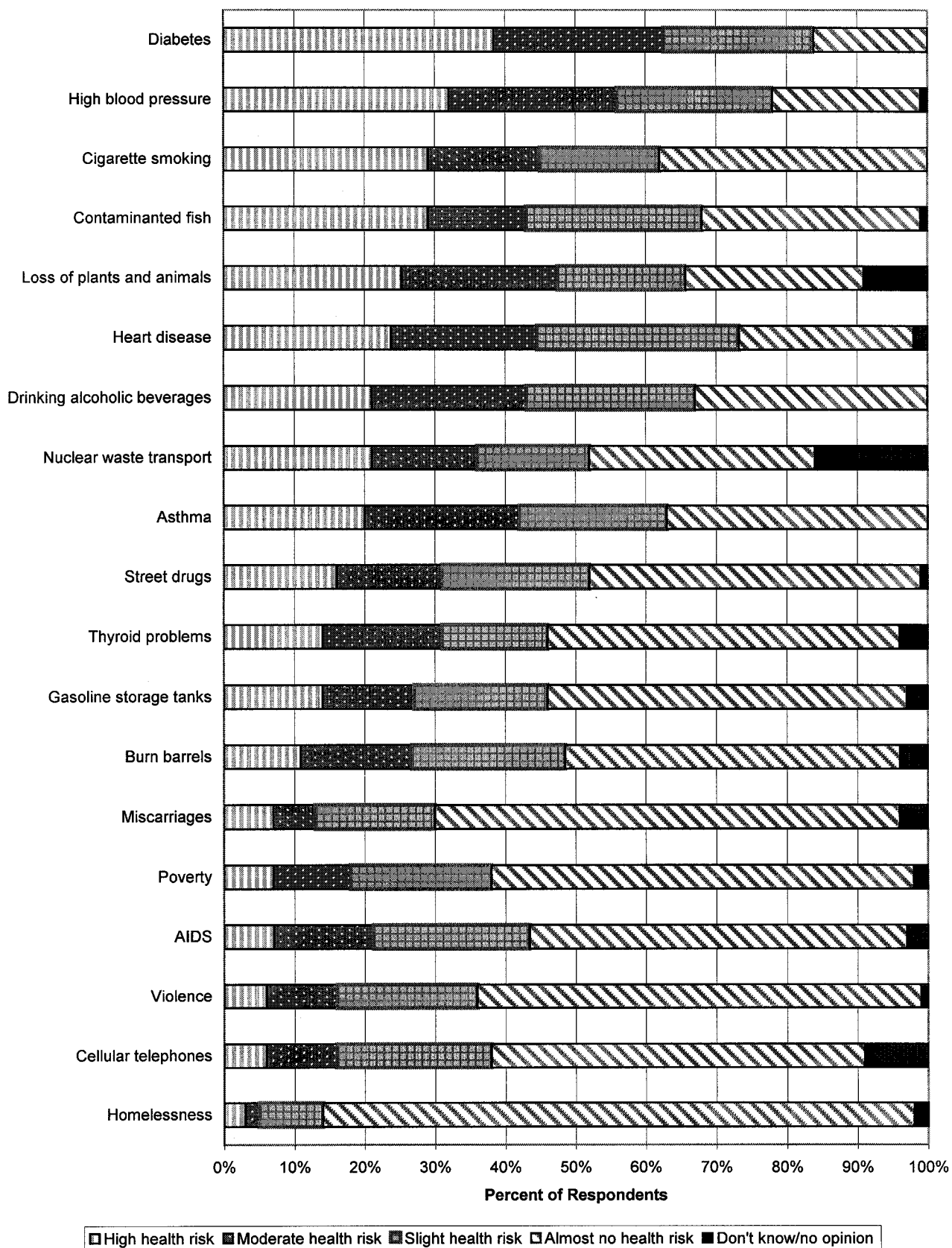


Figure 2. Associations to the Word "Health"

Figure 3. Perceived Health Risk of Selected Hazards to Families of Akwesasne for All Respondents



Associations to the stimulus, "health" also resulted in a variety of responses as seen in Figure 2. The most common responses were good, self, well being and sick. The 'other' (43%) category that contains the remaining answers.

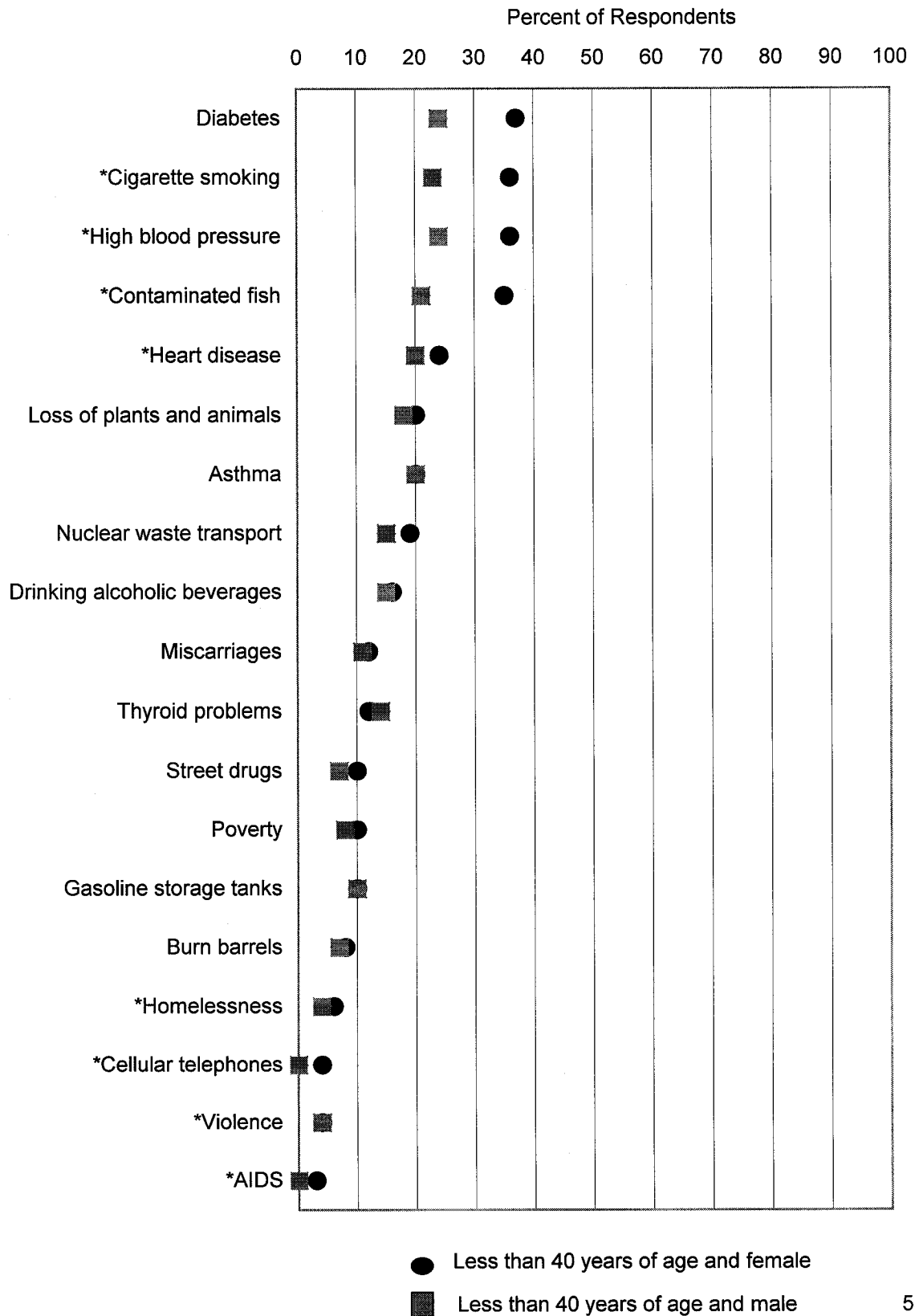
3.4 Perceived Health Risk to the Families of Akwesasne

Figure 3 represents the perceived health risk to the community of Akwesasne for all respondents (N=277). Health concerns and risky behavior are perceived to be the highest health risks for the community, for example diabetes, high blood pressure, and cigarette smoking. Environmental concerns were perceived as the next highest health risks, such as contaminated fish and loss of plants and animals. Perceived health risks for environment hazards were moderate for nuclear waste transport, gasoline storage tanks and burn-barrels.

Nuclear waste transport (18%) was the hazard that respondents answered 'don't know/no opinion' to the most. In comparison, loss of plants and animals and cellular telephones was less than 10% in this response category.

Figures 3a to 3d (see Appendix F) presents the major concerns of high-risk for sub-groups, which are similar to the perceived health risk for all respondents. Men in the less than 40 years age group perceives contaminated fish as the highest concern (Figure 3b). Cellular telephones and poverty were rated as the least of their high-risk hazards. Responses of 'don't know/no opinion' were more noticeable for men in this age group.

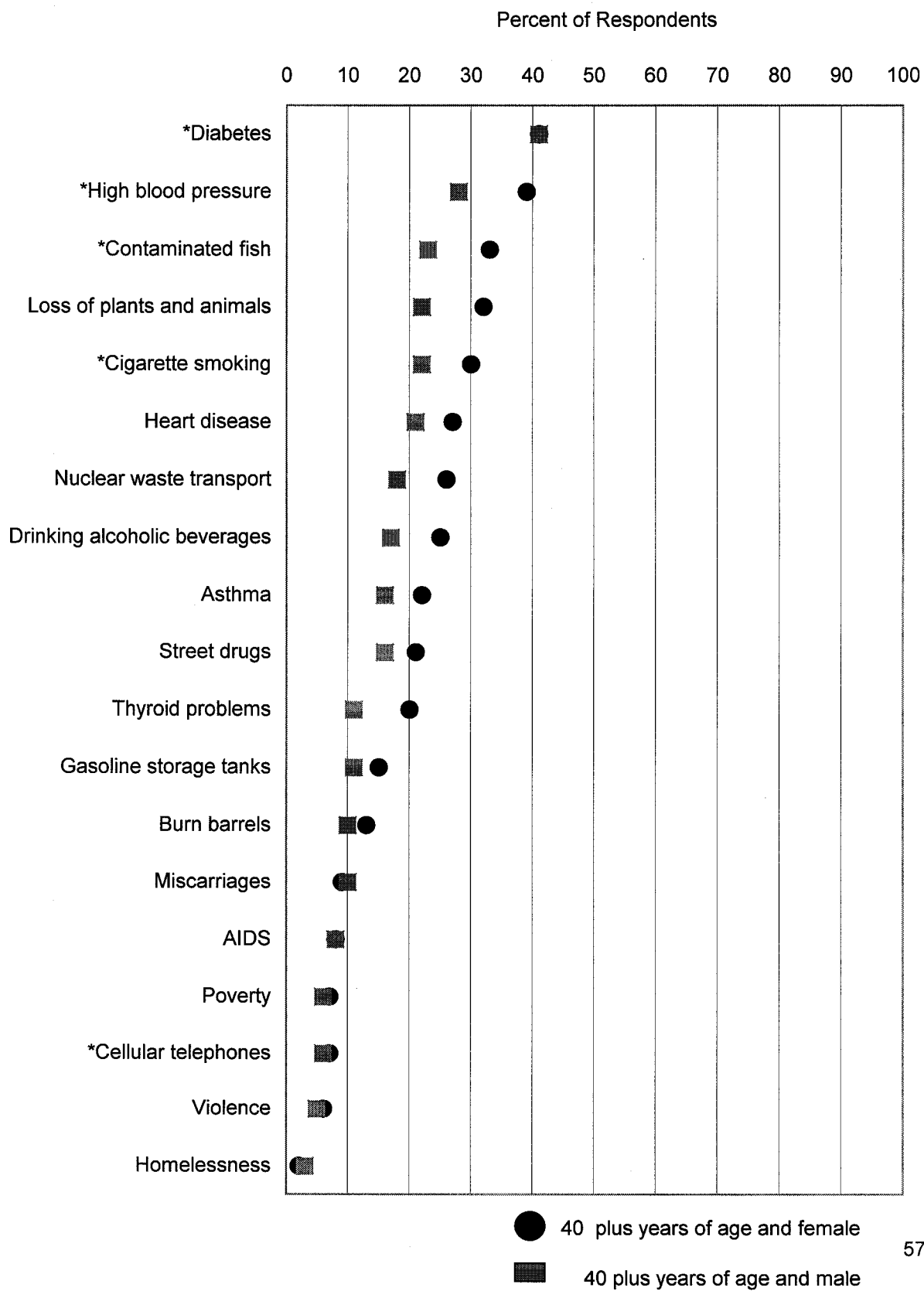
Figure 4a. Perceived High Health Risk of Selected Hazards to the Families of Akwesasne Based on Respondents Less Than 40 Years of Age, by Gender



Perceived high health risk for the families of Akwesasne, are summarized in Figures 4a and 4b. Figure 4a shows the responses of persons less than 40 years of age, by gender. Both men and women rated diabetes, cigarette smoking, high blood pressure and contaminated fish as high health risks, but women were more likely to rate these selected hazards higher than men were. Using 2 X 5 contingency tables the following variables are not independent of gender as shown by the chi-square test statistic (> 9.48 , $p = .05$ with 4 d.f.): cigarette smoking, high blood pressure, contaminated fish, heart disease, homelessness, cellular telephones, violence and AIDS (these variables are highlighted with an asterisk).

Figure 4b shows results for perceived high health risk to families based on respondents 40 plus years of age, by gender. The results are similar to less than 40 years of age in that women than men rated nearly all items higher. Using 2 X 5 contingency tables the following variables are not independent of gender as shown by the chi-square test statistic (> 9.48 , $p = .05$ with 4 d.f.): diabetes, high blood pressure, contaminated fish, cigarette smoking and cellular telephones (these variables are highlighted with an asterisk).

Figure 4b. Perceived High Health Risk of Selected Hazards to the Families of Akwesasne Based on Respondents 40 Plus Years of Age, by Gender

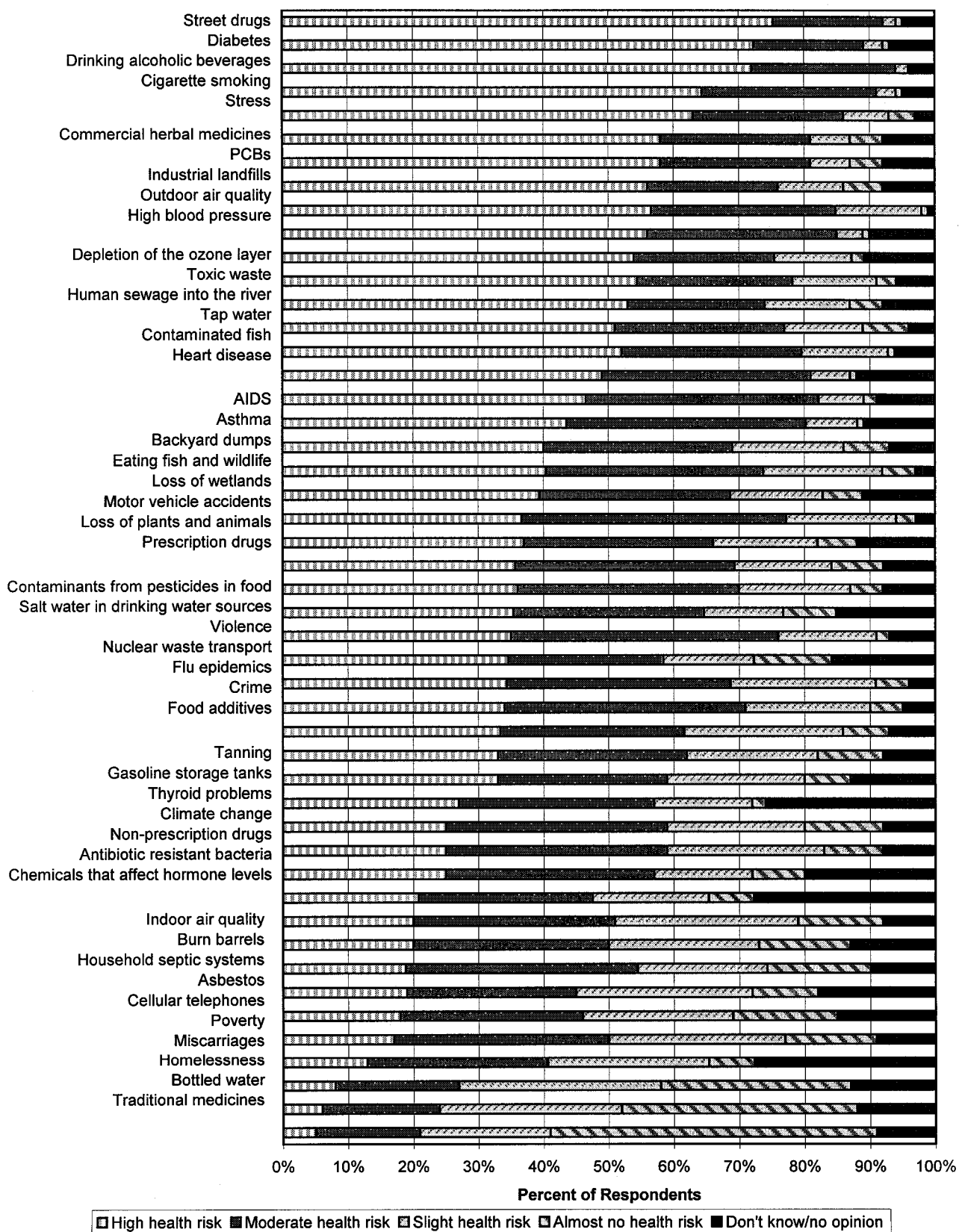


3.5 Perceived Health Risk to the Community of Akwesasne

This section moves from the respondent's family in particular to the community in general related to the perceived health risk of selected hazards for all respondents (Figure 5). The five major high-risk concerns for the community, identified by over 60% of the respondents, were street drugs, diabetes, drinking alcoholic beverages, cigarette smoking, and stress. At least 50% of the respondents identified environmental issues as the next group of highest risk to the community.

Females less than 40 years of age had similar responses to all respondents when rating high-risk concerns (Figure 5a see Appendix F). Males in the same age group identified their five high-risk concerns similar to the women but in different order, and included contaminated fish as a higher concern, than diabetes (Figure 5b see Appendix F). The men also listed environmental hazards as the next set of highest concerns. Women who were 40 plus years of age listed their five major concerns of high risk as diabetes, street drugs, stress, depletion of the ozone layer, and drinking alcoholic beverages (Figure 5c see Appendix F). The 40 plus years of age group of males identified their top five high-risk concerns as drinking alcoholic beverages, diabetes, street drugs, industrial landfills and PCBs (Figure 5d see Appendix F). The next five were a mix of health and environment hazards: stress, toxic waste, cigarette smoking, contaminated fish and human sewage into the river.

Figure 5. Perceived Health Risk of Selected Hazards to the Community of Akwesasne For All Respondents



Perceived high health risks for respondents less than 40 years of age, by gender showed that males perceived most of the hazards as less of a high-risk to health than women (Figure 6a). Hazards that they perceived a higher health risk than females were drinking alcoholic beverages and contaminated fish. Their perception of a high health risk varied considerably for all hazards. The greatest differences in perception between males (less high risk) and females were asthma, industrial landfills, high blood pressure, and AIDS. Using 2 X 5 contingency tables the variables that are not independent of gender as shown by the chi-square test statistic (> 9.48 , $p = .05$ with 4 d.f.), are noted by an asterisk on Figure 6a.

Figure 6b shows the perceived high health risk to the community based on 40 plus years of age. Overall, women rated the hazards as a higher health risk than the men. However, men reported higher health risks to drinking alcoholic beverages and industrial landfills. The greatest differences in perception (about 30%) were depletion of the ozone layer and outdoor air quality where men responded that it was less of a high risk. Using 2 X 5 contingency tables the variables that are not independent of gender as shown by the chi-square test statistic (> 9.48 , $p = .05$ with 4 d.f.), are noted by an asterisk on Figure 6b.

Figure 6a. Perceived High Health Risk to the Community of Akwesasne Based on Respondents Less Than 40 Years of Age by Gender

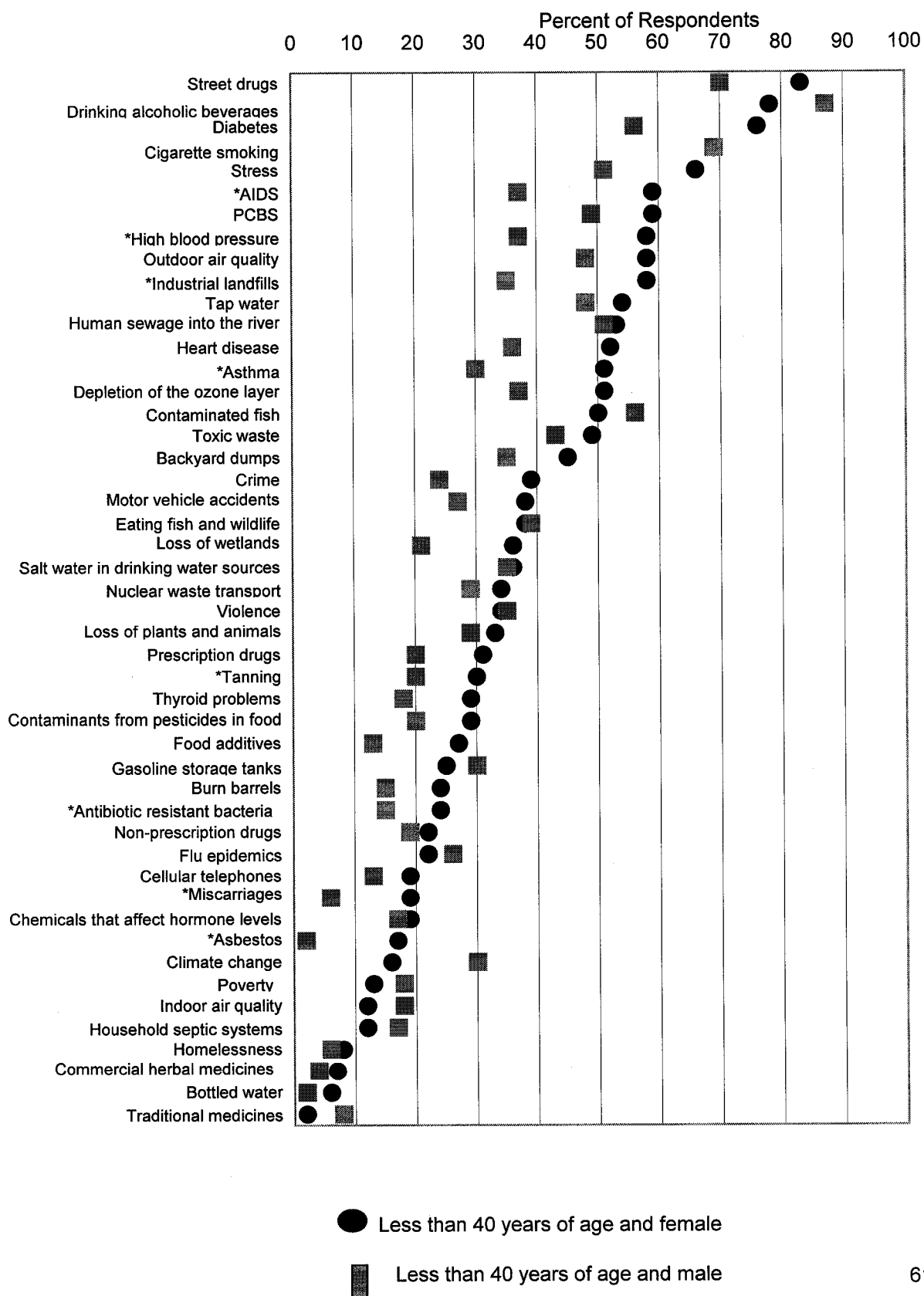
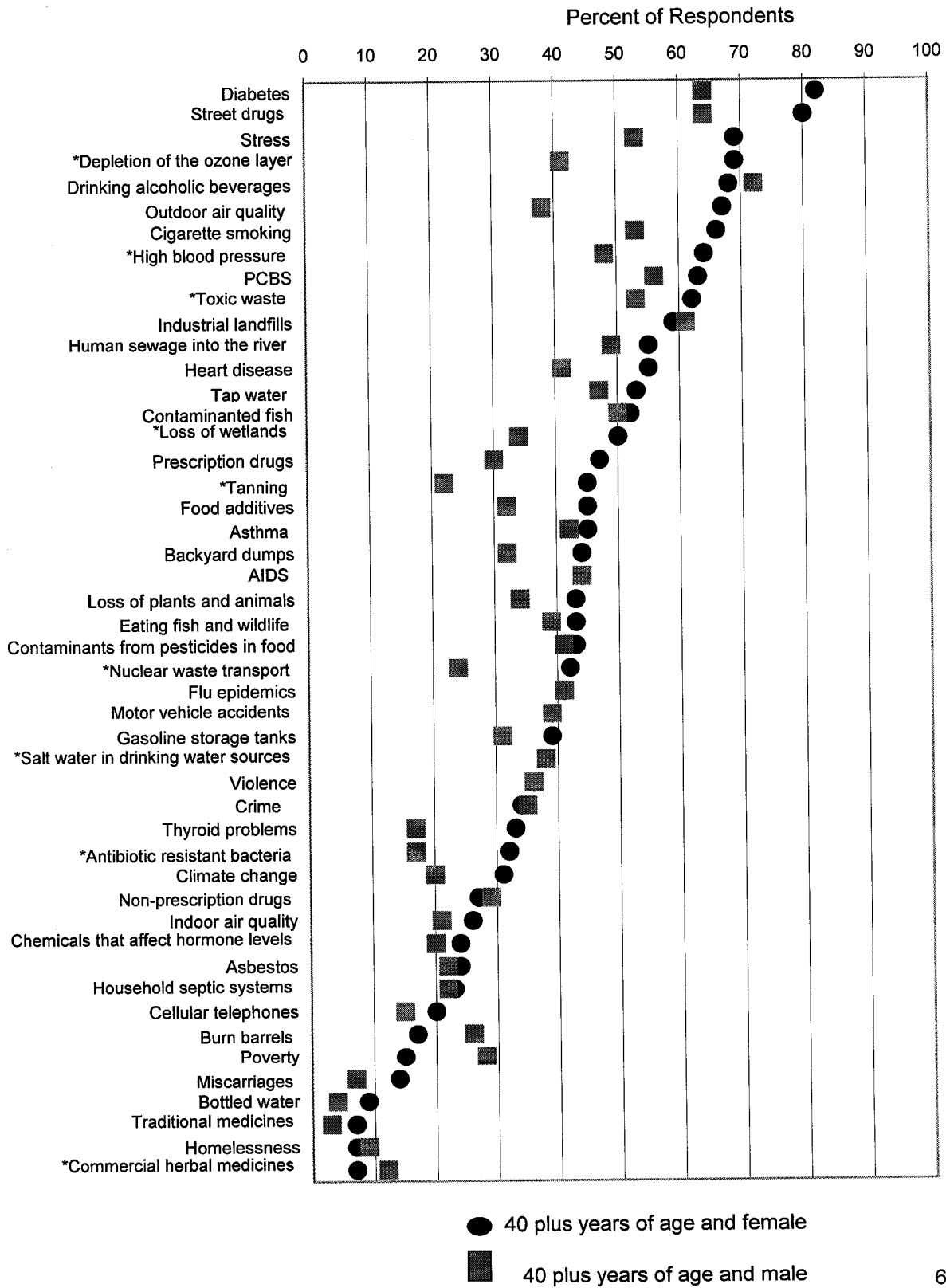


Figure 6b. Perceived High Health Risk to the Community of Akwesasne
Based on Respondents 40 Plus Years of Age, by Gender



3.6 Comparison of Family and Community Perceived High Health Risks

A comparison of selected hazards showed a much higher perceived high health risk to the community than to respondents' families (Figure 7). Street drugs were the hazard with the largest difference of perception of high health risk between community (76%) and family (17%). Less than 10% of respondents perceived the family and community to be at high-risk to homelessness but the community was perceived to be at greater risk than the family.

Figures 7a to 7d (see Appendix F) presents comparisons of the perceived high-risk of hazards to family and community based on age, by gender. Street drugs were noted as the greatest high-risk hazard for the community, which is similar to all respondents. Compared to the women less than 40 years of age, the men said that drinking alcoholic beverages was the greatest high health risk for the community (Figure 7b) and placed contaminated fish higher on the list of high health risks. Overall, men perceived health issues as less of a high health concern for the community than women. In relation to the family, this age group of men did not perceive homelessness and miscarriages as high health risks. Males 40 plus years of age, said that drinking alcoholic beverages as the number one high-risk health hazard for the community compared to family (Figure 7d).

Figure 7. Comparison of Family and Community Perceived High Health Risk of Selected Hazards in Akwesasne for All Respondents

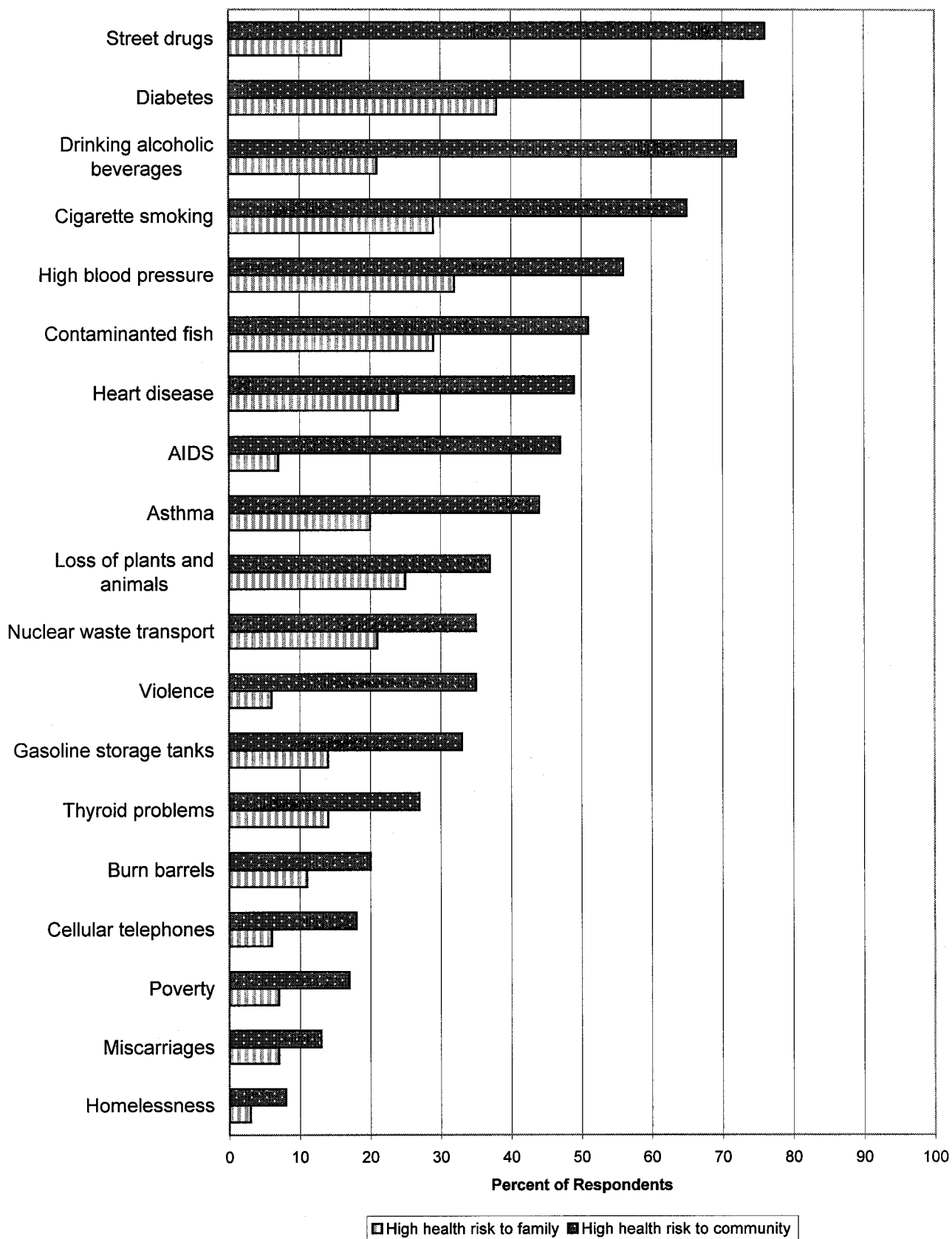
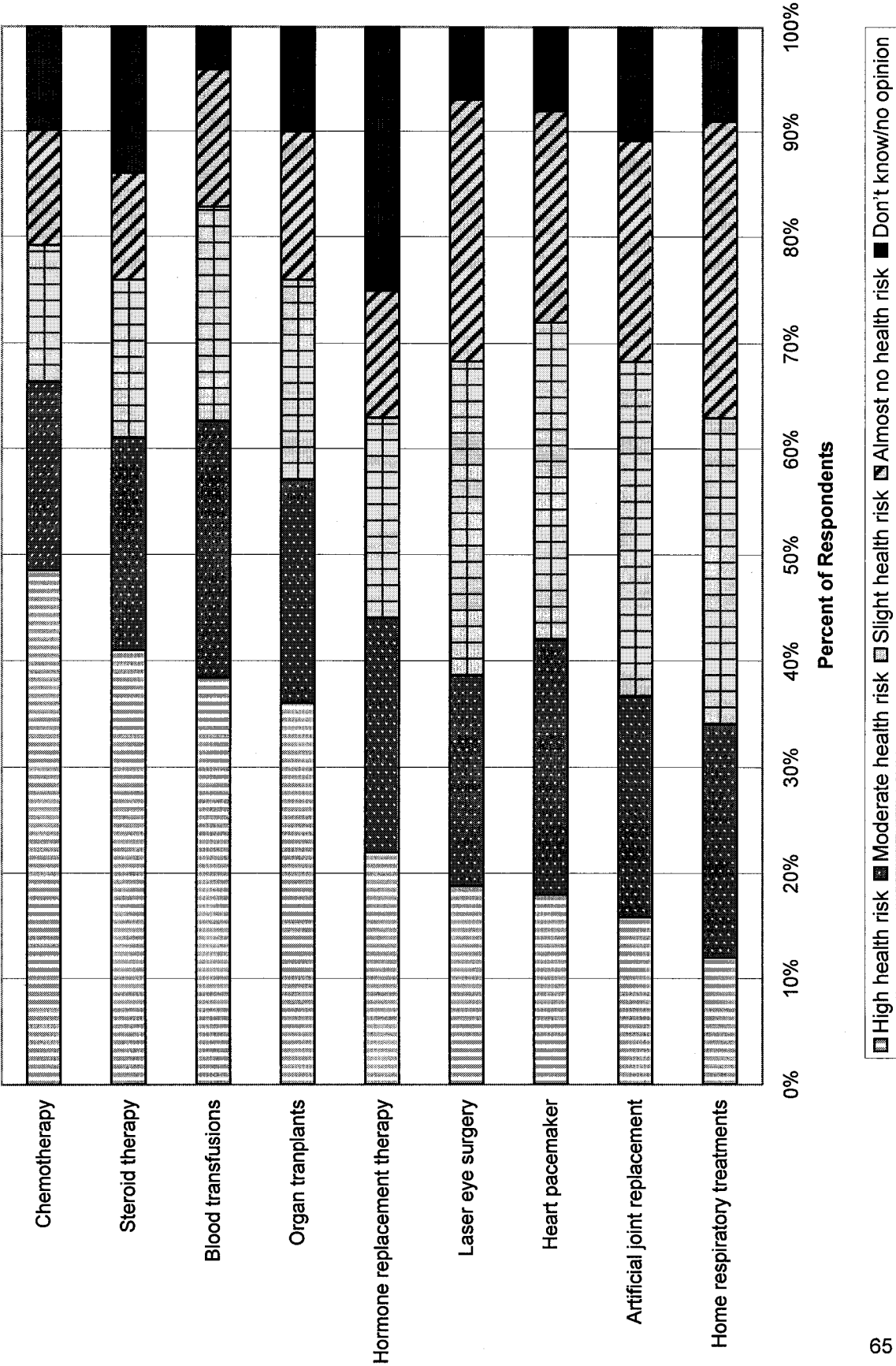


Figure 8. Perceived Health Risk to Families in Akwesasne to Medical Devices and Treatments for All Respondents



3.7 Perceived Health Risk to Families to Medical Devices and Treatments

For this section of the survey respondents were asked if they perceived a risk to families, only, from medical devices and treatments. All devices and treatments were perceived to be associated with some risk (Figure 8). For all respondents, chemotherapy is perceived to be the highest risk. In comparison, home respiratory treatments were the least of the high-risk treatments. Overall, results for the different ages, by gender (Figures 8a to 8d see Appendix F) show comparable results to all respondents.

Figure 9a compares perceived high health risk to medical devices and treatments for both genders less than 40 years. Males and females have similar perceived high health risk in this age group for steroid therapy, laser eye surgery, hormone replacement and artificial joint replacement. Using 2 X 5 contingency tables the variables that are not independent of gender as shown by the chi-square test statistic (> 9.48 , $p = .05$ with 4 d.f.): chemotherapy, blood transfusions and hormone replacement therapy, are noted by an asterisk.

Figure 9b makes the same comparison but for respondents who are 40 plus years of age. Similar perceptions of high health risk for both men and women are shown for blood transfusions, artificial joint replacement, and laser eye surgery. Also, both genders perceive hormone replacement therapy and artificial joint replacement higher as greater risks than the other age group. Heart pacemakers are considered as a smaller high health risk to families. Using 2 X 5 contingency tables the variables that are not independent of gender as shown by

Figure 9a. Perceived High Health Risk to Medical Devices and Treatments Based on Respondents Less Than 40 Years of Age, by Gender

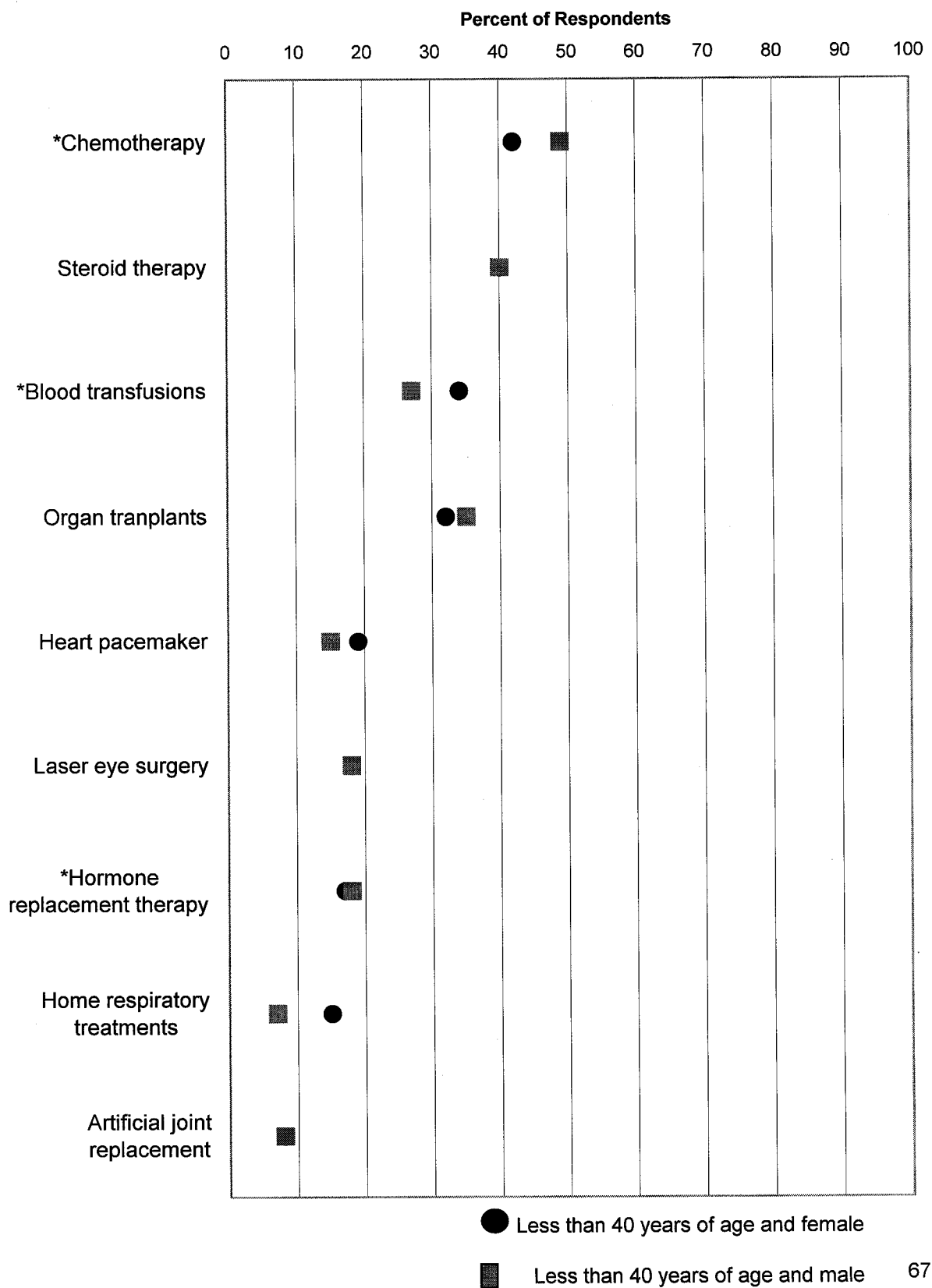
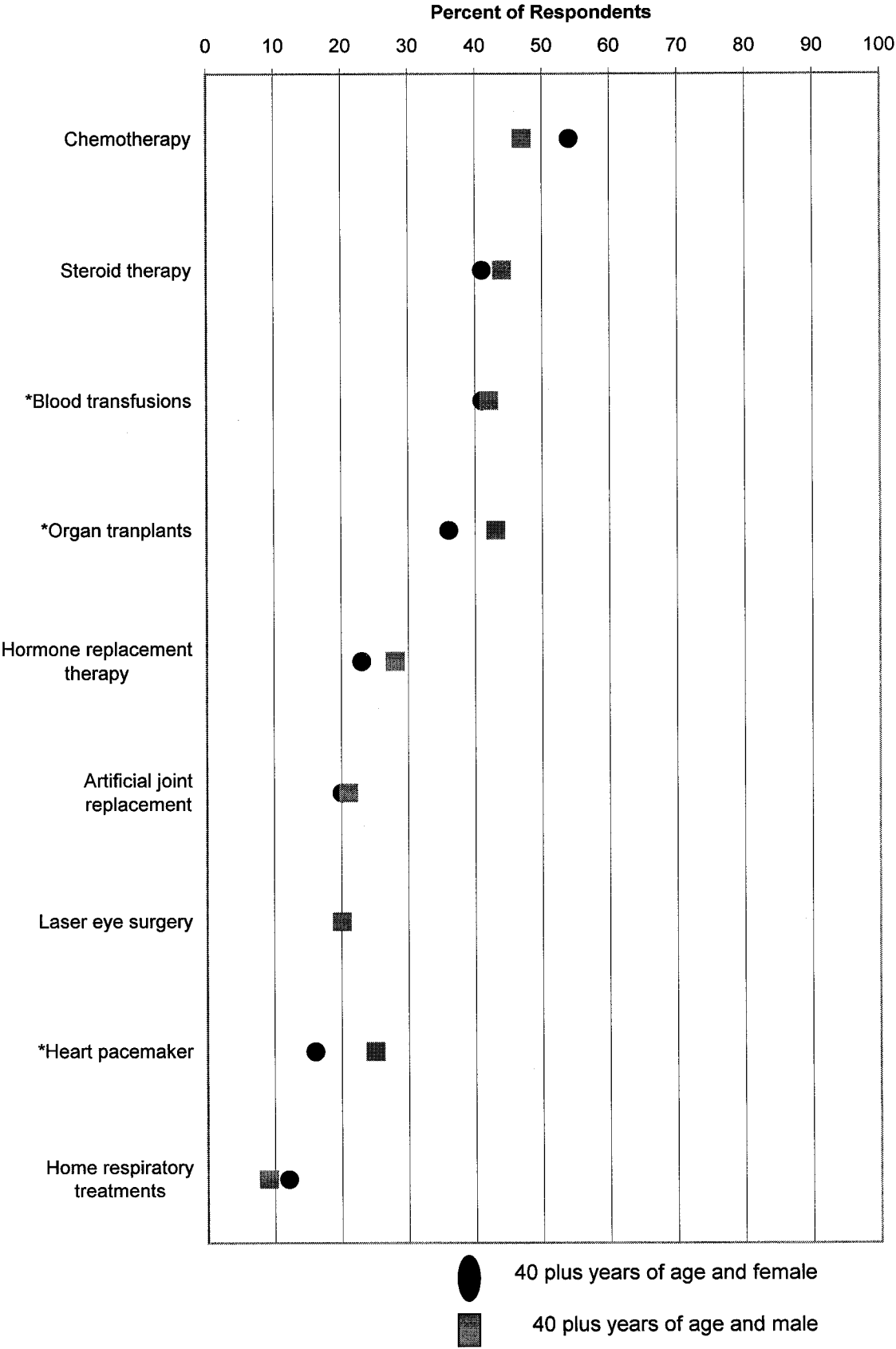


Figure9b. Perceived High Health Risk to Medical Devices and Treatments Based on Respondents 40 Plus Years of Age, by Gender



the chi-square test statistic (> 9.48 , $p = .05$ with 4 d.f.): blood transfusions, organ transplants and heart pacemaker, are noted by an asterisk.

Table 4. Sources of Information About Health Risks in the Community of Akwesasne for All Respondents

Source	Proportion of Respondents (SE)					Total
	A lot of information	A fair amount of information	A little information	Almost no information	Don't know/no opinion	
TV	.45 (.03)	.34 (.03)	.17 (.02)	.04 (.01)	.00 (0)	100.0
Newspapers/ newsletters	.41 (.04)	.35 (.03)	.17 (.02)	.06 (.01)	.00 (0)	100.0
Medical doctors	.32 (.03)	.32 (.03)	.24 (.03)	.11 (.02)	.00 (0)	100.0
Radio	.30 (.03)	.36 (.03)	.24 (.03)	.09 (.02)	.00 (0)	100.0
Friends and relatives	.28 (.03)	.35 (.03)	.30 (.03)	.07 (.02)	.00 (0)	100.0
Traditional healers	.24 (.03)	.28 (.03)	.24 (.03)	.19 (.02)	.05 (.01)	100.0
Environmental groups	.23 (.03)	.34 (.03)	.29 (.03)	.13 (.02)	.01 (0)	100.0
Internet	.23 (.03)	.19 (.03)	.13 (.02)	.41 (.03)	.05 (.02)	100.0
Akwesasne governments	.12 (.02)	.29 (.03)	.29 (.03)	.26 (.03)	.04 (.01)	100.0
University scientists	.09 (.02)	.16 (.02)	.23 (.03)	.43 (.03)	.09 (.02)	100.0
Federal agencies	.07 (.02)	.19 (.03)	.32 (.03)	.35 (.03)	.07 (.02)	100.0
State/provincial governments	.05 (.02)	.24 (.03)	.33 (.03)	.32 (.03)	.06 (.02)	100.0
Industry	.05 (.02)	.15 (.02)	.28 (.03)	.48 (.03)	.05 (.01)	100.0

3.8 Sources of Information

Respondents were asked what were their sources of information for health issues and risks (Table 4). The information source relied upon most heavily for women less than 40 years of age was the TV. Compared to women of this age group (Table 4b see Appendix G), men listed the Internet as the major source of information for health issues and risks. A comparison of the genders shows relatively the same results but women gave a higher rating for medical doctors and friends and relatives.

Women 40 plus years of age listed the newspapers/newsletters as the major source of information for health risks and issues (Table 4c see Appendix G). Compared to the women, men said TV was the primary source of information, followed by newspapers/newsletters (Table 4d see Appendix G). For men, friends and relatives were a greater source of information than for women.

For all four groups the media played a major role for sources of information followed by friends and relatives and medical doctors and the least likely sources were either industry or state/provincial governments.

3.9 Confidence in Sources of Information

The community of Akwesasne is located in Canada and the U.S. therefore the questionnaire lists state and provincial and federal agencies of both countries throughout the survey. The amount of confidence in the sources of information is presented in Table 5 for all respondents. The subgroups showed comparable results (Tables 5a to 5d see Appendix G) except for the males 40 plus years of

Table 5. Confidence in Sources of Information About Health Risks in the Community of Akwesasne for All Respondents

Source	Proportion of Respondents (SE)					Total
	A lot of confidence	A fair amount of confidence	A little confidence	Almost no confidence	Don't know/no opinion	
Medical doctors	.39 (.03)	.44 (.03)	.10 (.02)	.06 (.01)	.02 (0)	100.0
Traditional healers	.34 (.03)	.34 (.03)	.18 (.03)	.06 (.01)	.08 (.02)	100.0
Environmental groups	.31 (.03)	.35 (.03)	.23 (.03)	.06 (.01)	.05 (.01)	100.0
Newspapers/newsletters	.29 (.03)	.43 (.03)	.20 (.03)	.07 (.01)	.01 (0)	100.0
TV	.27 (.03)	.46 (.04)	.20 (.03)	.05 (.01)	.03 (.01)	100.0
Radio	.25 (.03)	.44 (.04)	.23 (.03)	.06 (.01)	.02 (0)	100.0
Friends and relatives	.23 (.03)	.43 (.04)	.27 (.03)	.05 (.01)	.01 (0)	100.0
University scientists	.22 (.03)	.26 (.03)	.24 (.03)	.14 (.02)	.15 (.02)	100.0
Internet	.18 (.03)	.22 (.02)	.20 (.03)	.24 (.03)	.15 (.02)	100.0
Akwesasne governments	.15 (.02)	.36 (.03)	.27 (.03)	.17 (.02)	.04 (.01)	100.0
Federal agencies	.13 (.02)	.26 (.03)	.24 (.03)	.28 (.03)	.09 (.02)	100.0
State/provincial governments	.09 (.02)	.32 (.03)	.27 (.03)	.25 (.03)	.08 (.02)	100.0
Industry	.08 (.02)	.16 (.02)	.30 (.03)	.40 (.03)	.06 (.02)	100.0

age (Table 5d). This group listed television as the source that they had a lot of confidence in for acquiring information about health risks. (Table 5d).

Both genders and age groups responded that the state/provincial governments and industry were sources for health issues and risk information that they had least of confidence. Akwesasne governments were viewed, by both groups, with less confidence than friends and relatives, but with more confidence than federal and state, or provincial governments.

3.10 Responsibility for Protecting People from Health Risks

Participants were asked what individuals, private groups and government agencies were responsible for protecting people against health risks (Table 6). Medical doctors were considered to have major responsibility. Table 6a (see Appendix G) presents respondents' perceptions of females who were less than 40 years of age. Medical doctors were considered to have major responsibility for this task. Also, external government agencies, provincial/state government and federal agencies and also friends and relatives were perceived as having major responsibility for protecting people's health. Males (Table 6b see Appendix G) in this age group viewed provincial/state government as the agency that had major responsibility followed by medical doctors for protecting people from health risks. The ATFE was listed as the fourth agency with major responsibility.

Table 6. Responsibility for Protecting People from Health Risks in the Community of Akwesasne for All Respondents

Source	Proportion of Respondents (SE)					Total
	Major responsibility	Moderate responsibility	Some responsibility	No responsibility	Don't know/no opinion	
Medical doctors	.73 (.04)	.20 (.03)	.05 (.01)	0 (0)	.02 (0)	100.0
Health Canada or EPA	.67 (.04)	.17 (.02)	.06 (.02)	.02 (0)	.08 (.02)	100.0
Provincial/state government	.66 (.04)	.18 (.02)	.10 (.02)	.02 (0)	.03 (.01)	100.0
Mohawk Council of Akwesasne	.62 (.04)	.22 (.03)	.08 (.02)	.02 (0)	.06 (.02)	100.0
Other health professionals (nurses)	.61 (.04)	.24 (.03)	.12 (.02)	0 (0)	.02 (0)	100.0
Akwesasne Task Force on the Environment	.60 (.04)	.24 (.03)	.09 (.02)	0 (0)	.06 (.02)	100.0
St. Regis Mohawk Tribe	.59 (.04)	.25 (.03)	.06 (.01)	.03 (.01)	.06 (.02)	100.0
Individual citizens with regard to their personal health	.58 (.04)	.25 (.03)	.10 (.02)	.03 (0)	.04 (.01)	100.0
Mohawk Nation Council of Chiefs	.56 (.04)	.23 (.03)	.11 (.02)	.02 (0)	.09 (.02)	100.0
Environmental groups	.51 (.04)	.31 (.03)	.14 (.02)	.02 (0)	.03 (0)	100.0
Private industry	.51 (.04)	.21 (.03)	.16 (.02)	.03 (.01)	.08 (.02)	100.0
Traditional healers	.43 (.04)	.30 (.03)	.19 (.03)	.04 (.01)	.05 (.01)	100.0
Friends & relatives	.32 (.03)	.33 (.03)	.26 (.03)	.06 (.02)	.03 (0)	100.0

Women 40 plus years of age perceive medical doctors with major responsibility (Table 6c see Appendix G). The second major agency was the Mohawk Council of Akwesasne followed by Health Canada or EPA. Males 40 plus years of age perceived other health professionals, for example nurses, as having major responsibility for protecting people from health risks (Table 6d see Appendix G). Provincial/state governments were perceived to have major responsibility also, followed by medical doctors.

Both genders and age groups perceive friends and relatives and environmental groups as the least people responsible for protecting people from health risks. Females 40 plus years of age were the only group to place a local government, Mohawk Council of Akwesasne with major responsibility followed by state/provincial or federal government agencies.

3.11 Fulfillment of Responsibility for Protecting People from Health Risks

Table 7 shows that for all respondents, medical doctors and other health professionals then environmental groups, were rated as doing an excellent job of health protection. Provincial/state government and private industry were the least likely to be rated excellent in fulfilling their responsibilities of health protection. The majority of respondents answered good and adequate when asked to rate individuals, agencies and government. Tables, 7a to 7d (see Appendix G) present results comparable to the ratings for all respondents. Males 40 plus

years of age (Table 7d) were the only group to give a higher rating to traditional healers and friends and relatives. Except men 40 plus years of age,

Table 7. Fulfillment of Responsibility for Protecting People from Health Risks in the Community of Akwesasne for All Respondents

Source	Proportion of Respondents (SE)					Total
	Excellent	Good	Adequate	Poor	Don't know/no opinion	
Medical doctors	.15 (.02)	.55 (.04)	.21 (.03)	.07 (.01)	.02 (0)	100.0
Other health professionals (nurses)	.13 (.02)	.61 (.04)	.20 (.03)	.04 (.01)	.03 (0)	100.0
Environmental groups	.13 (.02)	.46 (.03)	.28 (.03)	.07 (.02)	.07 (.02)	100.0
Akwesasne Task Force on the Environment	.11 (.02)	.48 (.04)	.24 (.03)	.08 (.02)	.10 (.02)	100.0
Traditional healers	.10 (.02)	.52 (.04)	.21 (.03)	.05 (.01)	.12 (.02)	100.0
Friends & relatives	.08 (.02)	.50 (.04)	.26 (.03)	.10 (.02)	.07 (.02)	100.0
Mohawk Council of Akwesasne	.06 (.01)	.39 (.03)	.27 (.03)	.18 (.02)	.10 (.02)	100.0
Health Canada or EPA	.06 (.01)	.38 (.03)	.26 (.03)	.13 (.02)	.17 (.02)	100.0
Mohawk Nation Council of Chiefs	.05 (.01)	.34 (.03)	.23 (.03)	.16 (.02)	.22 (.03)	100.0
St. Regis Mohawk Tribe	.05 (.02)	.32 (.03)	.25 (.03)	.29 (.03)	.09 (.02)	100.0
Individual citizens with regard to their personal health	.04 (.01)	.44 (.03)	.33 (.03)	.16 (.02)	.04 (.01)	100.0
Provincial/state government	.03 (.01)	.28 (.03)	.29 (.03)	.33 (.03)	.07 (.01)	100.0
Private industry	.02 (.01)	.13 (.02)	.23 (.03)	.45 (.03)	.18 (.03)	100.0

both genders and age groups rated ATFE and environmental groups as doing an excellent or good job in protecting people. Of the four groups, all rated at least one of the local Akwesasne governments above state/provincial governments or federal agencies in fulfilling their responsibility of protecting health. Overall, the respondents gave individuals and groups, higher ratings of 'good' and 'adequate'.

3.12 Attitude and Opinion Statements

There were 42 attitude and opinion statements about a variety of health-risk perception issues. Respondents were asked to disagree (strongly or somewhat) or agree (strongly or somewhat) with them and were also given the opportunity to answer 'don't know/no opinion' (Table 8 see Appendix G). The statements were placed in categories that are similar to the 1992 national risk perception survey.

Category 1 shows a series of local and global environmental health risks and shows strong agreement (90%) about the existence of health problems that are related to the environment. The other issues which respondents agreed to are: contamination in general, loss of clean fish and animals, sub-populations' health being at more risk, and global climate change causing an increasing occurrence of natural events. The respondents disagreed (64%) that Akwesasne is becoming a healthier place to live. However, people perceive that restoring the environment will resolve some health problems.

Category 2 elicited responses to two statements about health risks from chemicals. 91% said that chemicals cannot be disposed of in their sink or

backyard and that 69% currently use fewer chemicals for pests, weed and fungi control than in the past.

Category 3 included statements about attitudes toward regulation by government agencies and responsibility of health professionals regarding risk to an individual's health. Forty-five percent of the respondents agreed that governments protect endangered species but disagreed (45%) that governments regulate high technology. Eighty-five percent said that government should encourage industry to address their environmental problems and 47% disagree that products are adequately tested prior to going to market. The majority of respondents (59%) felt that they would not be warned about a risk by government or health professionals. Fifty-two percent did not know, nor had any opinion about consumer products being properly disposed of.

Questions related to cancer were placed in category 4 and 59% of the respondents believe that regardless of healthy living they could still develop cancer. Also, 51% believe that most cancers are hereditary. Thirty-five percent believe lung cancer for women is more common now than breast cancer but 36% did not know nor had no opinion about this statement.

Category 5 were statements about willingness to entertain risk/benefit tradeoffs for hydroelectric development, high technology research, traditional medicines, eating fish, artificial hearts, air bags, and economic development in general. Seventy-eight percent said that they were not willing to live in a society with a lot of industrial development but 70% responded that economic development could be achieved without endangering health. Participants agreed

that benefit was derived from air bags (72%), high technology research (46%), artificial hearts (33%), and traditional medicines (70%) but traditional medicines must be taken with care. Thirty-three percent did not know nor had no opinion about artificial hearts being safe in the near future. Both hydroelectric development (63%) and the safe transport of hazardous materials through the community (70%) were not beneficial. Eighty-nine percent stated that warnings about not eating fish would be listened to and 79% disagreed that if the fish looks okay then it is all right to eat.

Category 6 lists statements related to proactive behavior of the respondents. Participants agreed they could help to resolve health and environmental problems by acquiring information to help themselves (83%) and participating in an environmental group (81%). Sixty-four percent disagreed that decisions for health risks should be left to the experts.

The last category (7) is a list of miscellaneous statements, for example the respondents' belief that a risk-free environment is an attainable goal for Akwesasne received 56% agreement. Respondents also believe that social (85%) and spiritual factors (83%) contribute to their health status. Individuals agreed that obesity can lead to adverse health effects (95%) and videogames increase aggressive behavior among youth (75%). Of the respondents, 62% disagree that industry is working hard to resolve health problems related to the environment.

Responses for women and men less than 40 years of age were similar to all respondents for the attitude and opinion statements (Table 8a and 8b see

Appendix G). Similar responses to the statements were given for the females 40 plus years of age (Table 8c see Appendix G). However, 70% voiced stronger agreement in this age group that a risk-free environment is an attainable goal in Akwesasne. Table 8d (see Appendix G) presents similar answers to all respondents for the statements except there is slightly more agreement for two statements: testing of consumer products prior to marketing (53%) and safe artificial hearts being widely available in the near future (81%). Both genders and age groups agreed that governments do not adequately protect endangered species.

3.13 Chi-square Test Statistic for Akwesasne and Canadian Surveys

The null hypothesis of similar findings of selected items from the 1992 Canadian and 2002 Akwesasne surveys was tested by constructing 2 X 5 contingency tables and using the chi-square statistic. The contingency tables included all response categories for each variable including don't know/no opinion. Table 8 presents comparable items from various sections of the two surveys: hazard items, sources of information, confidence in the information source, agency/person responsible, fulfillment of responsibility and attitude and opinion statements. Analyses of the contingency tables showed there were statistically significant relationships between the two surveys for all of the corresponding variables ($\chi^2_{0.05} > 9.49$ with 4 degrees of freedom), except for the source of information, "environmental groups." The italicized item in Table 8 identifies which variable the null hypothesis could not be rejected.

Table 8. Comparison of Selected Items from the 1992 Canadian and 2002 Akwesasne Survey.

	¹ Akwesasne Perception		¹ Akwesasne Perception
Selected Hazards		Sources of Information	
AIDS (family)	lower	Private industry	less
AIDS (community)	higher	Medical doctors	less
Street drugs (family)	lower	² <i>Environmental groups</i>	<i>same</i>
Street drugs (community)	lower	Friends & relatives	more
Cigarette smoking (community)	lower	University scientists	less
Contaminants from pesticides in food	lower	Confidence in the Information Source	
Prescription drugs	higher	Private industry	less
Tap water	higher	Medical doctors	less
Drinking alcoholic beverages	lower	Environmental groups	more
Motor vehicle accident	lower	Friends & relatives	more
Depletion of the ozone layer	lower	University scientists	less
Asbestos	lower	Agency/Person Responsible	
Outdoor air quality	higher	Individual citizens with regard for their health	more
Bottled water	higher	Medical doctors	less
Non-prescription drugs	lower	Other health professionals	less
Climate change	lower	Private industry	more
Food additives	lower	Environmental groups	more
Indoor air quality	lower	Fulfillment of Responsibility	
Stress	lower	Individual citizens with regard for their health	lower
PCBs	higher	Medical doctors	higher
Heart pacemaker	higher	Other health professionals	higher
		Private industry	higher
		Environmental groups	higher
Attitude & Opinion Statements			
There are serious health problems related to the environment where I live.			more agree
³ <i>The land, air, and water around us are, in general, more contaminated now than ever before.</i>			DK/NO
³ I believe my community is becoming a healthier place in which to live.			DK/NO
³ Decisions about health risks should be left to the experts.			DK/NO

¹Chi-square test statistic > 9.49, alpha = 0.05, with d.f. = 4²Italics identifies items for which the null hypothesis cannot be rejected.³ The two populations answered the same but the significant difference was the Akwesasne respondents who answered don't know/no opinion (DK/NO) more than the expected value.

The statistical analysis had been modified to include a design effect (DEFF) for complex surveys and applied to the chi-square test statistic that was calculated to compare the Akwesasne and Canadian populations. For this survey, the average DEFF value calculated for comparing similar variables between the Akwesasne and Canadian populations is 1.12. The DEFF was calculated using the probability of the respondents answering either moderate or high risk to the variable. As a result, the DEFF reflects the variance inflation induced by the sample design on an estimate of the proportion of responses that were strongly positive. The responses almost none and slight were not taken into consideration for the DEFF, but a quick review revealed that using the moderate and high risk responses would provide similar values for DEFF, close to 1.0.

Across all variables used in the comparison of the Akwesasne and Canadian populations, all values of DEFF were remarkably close to 1.0. The interpretation of a DEFF value of 1.0, is that the sample variance is the same as it would be if the survey were based on simple random sampling with the same sample size. In general, for a well designed study, the DEFF usually ranges from 1 to 3 (Shackman, 2001). While the design effect is different for each variable, experience with these surveys indicates the variables under study will have reasonably similar design effects. The chi-square values were divided by the DEFF for each variable, and as a result, the chi-square values did not change remarkably. There is more confidence that the chi-square test statistic provides a true picture of differences between the two populations.

Use of the chi-square test statistic attempts to describe a relationship between X and Y, and does not tell you the cause of the relationship. The results of the sub-tables are presented in Table 8 and were created for each of the items to determine what category of responses contributed to the statistically significant relationship when comparing the findings. The sub-tables indicate the direction of the responses for both populations for each of the variables.

The statistically significant relationships between the two surveys for all the corresponding variables was determined by establishing a critical value according to the degrees of freedom (d.f.) ($\chi^2_{0.05} > 9.49$ degrees of freedom). This is interpreted that the chi-square test statistic will exceed 9.49 less than 5 percent of the time when the difference between the observed and expected frequencies is due to random variation rather than a true difference between the two populations. The 4 d.f. is associated with the contingency table and is calculated by the formula:

$$(r-1)(c-1) = v \text{ (degrees of freedom),}$$

where r is the number of rows and c is the number of columns in the table. The critical value for the chi-square distribution can be determined once the d.f. is calculated and referring to the appropriate chi-square table.

3.14 Exploratory Factor Analysis

As a result of Factor Analysis, three components were retained for 'family' and were designated as medical devices or treatment risks, social-behavioral risks and physical environment risks, respectively (Table 9a). The three components for 'community' (Table 9b) were designated as environmental risks,

social risks, and domestic risks, respectively. The decision to retain three factors was guided by the proportion of variance explained by a factor and its theoretical interpretability. A two-factor model was initially proposed but was not easily interpretable because hazards cross-loaded on the three factors. The three-factor model was easier to interpret and explained approximately 43% (family) and 36% (community) of the variance.

For the community, the factor analysis of hazard items was not as clearly defined as for family. Hazard items cross-loaded on the factors and in some cases weren't related to the underlying concept. For example, Factor 1, Environmental Risks included motor vehicle accidents and stress. These two hazards loaded on Factor 3 but their weights were less than 0.31 (cut-off value). Therefore they could not be listed as loading on Factor 3 and were deleted from Factor 1. Also climate change had cross-loaded on Factor 1 and 3 and was placed on Factor 1 as an environmental risk.

Table 9a. Factor Analysis of Items Related to Perceived Health Risk to the Family

Item	Risk Perception Factors*		
	Factor 1 Medical devices/ treatment risks	Factor 2 Social behavioral risks	Factor 3 Physical environment risks
Organ transplants	0.777		
Heart pacemakers	0.746		
Blood transfusions	0.731		
Laser eye surgery	0.724		
Artificial joint replacement	0.694		
Hormone replacement therapy	0.672		
Steroid therapy	0.666		
Chemotherapy	0.665		
Home respiratory treatments	0.618		
Cigarette smoking		0.953	
Asthma		0.807	
High blood pressure		0.761	
Heart disease		0.715	
Thyroid problems		0.636	
Drinking alcoholic beverages		0.611	
Street drugs		0.523	
Diabetes		0.489	
Violence		0.466	
Poverty		0.405	
Nuclear waste transport			0.825
Loss of plants and animals			0.779
Burn barrels			0.566
Contaminated fish			0.558
Gasoline storage tanks			0.514
AIDS			0.496

*Forced 3 factor solution.

Table 9b. Factor Analysis of Items Related to Perceived Health Risk to the Community

Item	Risk Perception Factors		
	*Factor 1 Environment al Risks	*Factor 2 Social Risks	*Factor 3 Domestic Risks
Industrial landfills	0.582		
Eating fish and wildlife	0.579		
Salt water in drinking water sources	0.553		
Loss of wetlands	0.514		
Backyard dumps	0.513		
Tanning	0.493		
Nuclear waste transport	0.489		
Food additives	0.478		
Tap water	0.477		
Toxic waste	0.458		
Contaminants from pesticides in food	0.450		
Chemicals that affect hormone levels	0.436		
PCBs	0.427		
Depletion of the ozone layer	0.418		
Human sewage into the river	0.418		
Outdoor air quality	0.411		
Asbestos	0.395		
Flu epidemics	0.393		
Antibiotic resistant bacteria	0.356		
Climate change	0.346		
Poverty		0.625	
Burn barrels		0.623	
Gasoline storage tanks		0.540	
Homelessness		0.479	
Loss of plants and animals		0.444	
Indoor air quality		0.366	
Violence		0.349	
Crime		0.326	
Commercial herbal medicines			0.586
Prescription drugs			0.572
Non-prescription drugs			0.567
Traditional medicines			0.525
Bottled water			0.439
Household septic systems			0.382

*Forced 3 factor solution.

3.15 Cronbach's Alpha

Cronbach's alpha (or alpha coefficient) was used to measure the item-total correlation of the three factors that were retained for both 'family' (Table 10a) and 'community' (Table 10b). N represents the number of cases that were analyzed specific to the factor, the mean and standard deviation are descriptive statistics of the variable, and the item-total correlation provides an indication of how each variable relates to the other variables for that factor. The 'alpha if item deleted', measures the contribution of the individual item to the total alpha and does this by discarding one item at a time from the calculation of the total alpha. If alpha significantly increases for an item, then it is an indication to discard that item from the analysis. N or the number of cases analyzed does not include the category 'don't know/no opinion' and the missing values were replaced with the mean for that variable. Variables related to 'family' generated 3 factors and resulted in factors 1, 2 and 3 with α (alpha) = .9154, .8322, and .7135, respectively. Variables related to 'community' generated 3 factors and resulted in α = .9315, .8101, and .7703, respectively.

3.17 Test/Retest – Wilcoxon Signed Ranks Test

The Wilcoxon Signed Ranks Test assumes that the distribution of responses is symmetric about the median. A test statistic was generated and the null hypothesis cannot be rejected for each variable statement. The results show that comparisons of the two groups (before and after) have the same distribution or that people did not answer differently for the same questions.

Table 10a . Reliability Analysis of Perceived Risk of Selected Hazards to the Family*

Hazard	N	Mean	Std Dev	Item-Total Correlation	Alpha if Item Deleted
<i>Factor 1: Medical devices/treatment risks</i>				<i>Alpha=.9154</i>	
Chemotherapy	158	3.0696	1.1008	0.6239	0.9113
Artificial joint replacement	158	2.3544	1.0163	0.7398	0.9035
Steroid therapy	158	3.0316	1.0851	0.7244	0.9043
Heart pacemakers	158	2.5253	1.0387	0.7206	0.9046
Organ transplants	158	2.8987	1.1354	0.7333	0.9037
Hormone replacement therapy	158	2.6709	1.0674	0.7352	0.9036
Laser eye surgery	158	2.4177	1.0897	0.6970	0.9062
Blood transfusions	158	2.9494	1.0814	0.6792	0.9074
Home respiratory treatments	158	2.3481	1.0404	0.6822	0.9072
<i>Factor 2: Social behavioral risks</i>				<i>Alpha=.8322</i>	
Street drugs	239	1.9498	1.1328	0.5224	0.8171
Drinking alcoholic beverages	239	2.2803	1.1454	0.5600	0.8137
Diabetes	239	2.7824	1.1203	0.4352	0.8249
Poverty	239	1.6318	0.9606	0.4253	0.8251
Violence	239	1.5649	0.923	0.5328	0.8173
Cigarette smoking	239	2.2762	1.2431	0.5049	0.8192
Asthma	239	2.2092	1.1404	0.5365	0.8159
Thyroid problems	239	1.9163	1.1121	0.5544	0.8143
High blood pressure	239	2.6318	1.1257	0.5563	0.8141
Heart disease	239	2.3808	1.1271	0.5694	0.8129
<i>Factor 3: Physical environment risks</i>				<i>Alpha=.7135</i>	
Nuclear waste transport	208	2.3125	1.2132	0.5058	0.6504
Loss of plants and animals	208	1.9519	1.0846	0.4400	0.6773
Burn barrels	208	2.4712	1.1792	0.5585	0.6286
Contaminated fish	208	2.4375	1.234	0.4266	0.6840
Gasoline storage tanks	208	1.9856	1.1733	0.4262	0.6829

* Forced 3 factor solution

Table 10b. Reliability Analysis of Perceived Risk of Selected Hazards to Community*

Hazard	N	Mean	Std Dev	Item-Total Correlation	Alpha if Item Deleted
<i>Factor 1: Environmental risks</i>		<i>Alpha=.9315</i>			
Nuclear waste transport	120	2.9583	1.0564	0.5810	0.9291
Toxic waste	120	3.4167	0.7733	0.5673	0.9291
Contaminants from pesticides in food	120	3.1917	0.8530	0.6664	0.9272
Antibiotic resistant bacteria	120	2.8667	0.9696	0.5286	0.9300
Tap water	120	3.3417	0.8840	0.4900	0.9305
Asbestos	120	2.7250	0.9435	0.6244	0.9280
Depletion of the ozone layer	120	3.4583	0.7875	0.7487	0.9260
Outdoor air quality	120	3.4583	0.7658	0.6188	0.9283
Climate change	120	2.7833	0.9630	0.5478	0.9296
Tanning	120	2.8833	1.0057	0.6511	0.9275
Food additives	120	2.9000	0.9562	0.6267	0.9279
PCBs	120	3.4500	0.8682	0.5949	0.9285
Chemicals that affect hormone levels	120	2.9333	0.9050	0.6398	0.9277
Flu epidemics	120	3.0750	0.8808	0.6352	0.9278
Eating fish and wildlife	120	3.1750	0.9228	0.5981	0.9285
Loss of wetlands	120	3.1833	0.9347	0.6842	0.9268
Industrial landfills	120	3.3667	0.9161	0.6043	0.9284
Backyard dumps	120	3.2750	0.8596	0.6276	0.9279
Salt water in drinking water sources	120	3.2333	0.9325	0.6401	0.9277
Human sewage into the river	120	3.3333	0.9013	0.6514	0.9275
<i>Factor 2: Social risks</i>		<i>Alpha=.8101</i>			
Burn barrels	159	2.7547	0.9725	0.4499	0.7985
Loss of plants and animals	159	3.1195	0.9303	0.4543	0.7975
Poverty	159	2.6226	0.9916	0.5609	0.7839
Homelessness	159	2.1447	0.9469	0.5459	0.7860
Violence	159	3.2013	0.7359	0.5641	0.7871
Crime	159	3.0314	0.9169	0.6040	0.7789
Gasoline storage tanks	159	3.0692	0.8939	0.5286	0.7885
Indoor air quality	159	2.6101	0.9867	0.5298	0.7881
<i>Factor 3: Domestic risks</i>		<i>Alpha=.7703</i>			
Prescription drugs	176	3.1534	0.8713	0.5408	0.731
Bottled water	176	1.9716	0.9587	0.4084	0.7628
Non-prescription drugs	176	2.8239	0.9428	0.5753	0.7209
Commercial herbal medicines	176	2.3011	1.0000	0.5872	0.7167
Traditional medicines	176	1.8580	0.9956	0.4824	0.7449
Household septic systems	176	2.6761	0.9929	0.5013	0.7399

* Forced 3 factor solution

The test/retest was completed to check the reliability of selected questions on the survey (Table 11). Twenty participants were asked to complete the test/retest but only eighteen were completed. The other two participants although agreeable to the test/retest, could not be reached to schedule an appointment. One approach to check reliability is to administer the questions on two separate occasions based on a time interval sufficiently short and that it may be assumed that the underlying process is unlikely to have changed. In consideration of the time interval, too long a time and things may have changed and too short a time and respondents may remember their first answer. Experts regard the appropriate time interval varies from an hour to a year, depending on the task but generally speaking, a retest interval of 2 to 14 days is usual (Streiner, 1989). Table 11 presents results of 18 respondents who participated in the test/retest study, which used seven questions from the original survey

Table 11. Test/Retest for Akwesasne Survey

	N	Mean Rank Negative	Mean Rank Positive	Ties	Sum of Ranks Negative	Sum of Ranks Positive	Z Test Statistic	*Significance level
I believe my community is becoming a healthier place in which to live.	18	6	3	9	28.5	16.5	-0.749	0.454
Industry is working hard to resolve health problems related to the environment in the best interest of the general public.	18	5	2	11	20.0	8.0	-1.134	0.257
Economic development can be achieved without endangering health.	18	3	4	11	10.5	17.5	-0.632	0.527
Industry is attempting to reduce greenhouse gas emissions by building fuel-efficient vehicles, such as gasoline-electric hybrids.	9	2	2	5	6.0	4.0	-0.378	0.705
High-technology research, such as organ transplants and genetic engineering, is in the best interest of the public in the long term.	16	2	2	12	5.0	5.0	0.000	1.000
The governments adequately regulate high-technology research.	11	1	0	10	1.0	0.0	-1.000	0.317
Catching too much fish will affect the community's health.	17	3	4	10	7.5	20.5	-1.127	0.260

* Wilcoxon Signed Rank Test

Chapter Four

4. The Discussion

4.1 Demographics of Akwesasne

For the purpose of this study, census information on the community of Akwesasne was derived from two main sources: (1) the Office of Vital Statistics, Mohawk Council of Akwesasne (Canada); and (2) the New York State Census for 2000 (U.S.). The data analyzed for this research originates from the 2000 Akwesasne Tribal Census -Tract 9913. The total number of residents cited from these two respective sources is approximately 7,000. However, this number appears low in relation to other sources of information that estimates the population to be 13,000 for the entire community of Akwesasne. In an earlier study, the Agency for Toxic Substances and Disease Registry (ATSDR in the U.S.) reported a population figure of "nearly 10,000 persons" in the 1995 health study of PCBs in breast milk (ATSDR, 1995). Given the disparity of information between the census information and the 1995 study, this author contends that these figures should be noted as rough estimates and thus, should be viewed with caution.

The candidate obtained Institutional Review Board (IRB) approval prior to starting the field work and one of the guidelines states that potential benefits and risks for participants must be identified. In the consent form that the respondent signed, it was stated that one of the benefits gained by the individual would be an increase in awareness of the respondent's opinions and attitudes about perceptions of risk to health from environmental factors and other risk-taking activities. Risks to the participants were minimal involving possible stress of completing the survey. In

addition to the IRB guidelines, the Research Advisory Committee (RAC) of the Akwesasne Task Force on the Environment reviewed the proposed study. In a follow-up meeting between the candidate and the RAC, a similar discussion took place regarding potential benefits and risks.

There were several reasons why the candidate thought 80% participation for this community was feasible. The 1992 national risk perception survey was administered by telephone and achieved a response rate of 54%. Interviewers administered the 2002 Akwesasne survey, and face-to-face interviews increase the chances of an individual responding to the questionnaire. The response rate can be influenced by a one-on-one interview because the candidate is a lifetime resident of Akwesasne. As a lifetime resident, the candidate is familiar with families, community networks, government agencies and the Mohawk culture, and is actively involved in community events and affairs. For these reasons the candidate believed that an 80% response rate, with the assistance of additional interviewers from Akwesasne, would be possible to attain. Also, prior personal experience was that personal interviews would lend to an achievable response rate of 80%.

The three most common methods to collect data are face-to-face interviews, phone interviews, and mailed questionnaires. Face-to-face interviews, which require pre-contact to schedule a convenient time for the potential respondent, results in the highest response rates (Hagar et al., 2004). One-on-one interviews generally receive the highest response rate, followed by telephone and then mail surveys having the lowest response. (Wilson et al., 1998, Borroughs et al., 2001).

With respect to the research participants, the majority of respondents were female (65%), and were 40 years of age or more with post-secondary education. The number of respondents with post-secondary education was further validated through the confirmation of a post-secondary education counselor of the Mohawk Council of Akwesasne (Personal Communication, Norma Sunday, 2001). During the research, the interviewers noted reasons for male non-participation. It was noted for example, that males were more likely to state they were too busy and suggested that the researcher interview their partners. In addition, these males worked out-of-town resulting in difficulty with scheduling interviews or in some circumstances certain males didn't view the issue important enough to warrant an interview on their day off. Similar studies noted difficulty in recruiting males, as was the case of the Men's Exposure Assessment Study, which was voiced by one of the project's personnel (Personal Communication, 2000). Research indicates that generally, females are more willing to answer surveys than males. Specific to environmental research, it's been noted that because women provide more care to the family, traditionally, women are more familiar to risks. As a result, women have greater knowledge of local issues, are more active in the community and are more willing to participate in activities associated with pro-environmental behavior such as answering a survey (Greenberg & Schneider, 1995; Fernandes et al. 2000).

4.2 Word Association

With respect to word association, the most common response (21%) to the word 'risk' was 'danger'. In comparison to the 1992 Canadian survey, 33% of the respondents affiliated chemical products to risk. Both surveys generated negative

terms for all associations. Also, responses included pollution or terms related to pollution, such as environment, industry, contamination, and exposure.

4.3 Perception of Risk from Selected Hazards to Families

The Akwesasne responses that greatly contrast with those of their Canadian counterparts may be explained by the advent of health prevention education and awareness initiatives that local governments in Akwesasne have undertaken. Participants of this study perceived a) health concerns (diabetes and high blood pressure) and risk-taking behavior (cigarette smoking) as the highest health risk for the family, followed by, b) environmental concerns (contaminated fish and loss of plants and animals). In comparison, the Canadian respondents stated environmental concerns (nuclear waste and nuclear power plants) as a higher health risk followed by risk-taking behaviors (street drugs, alcohol and pregnancy and AIDS) for 'you and your family.'

a) Perceived Health Concerns:

Under the aforementioned local governments, both health facilities in Akwesasne, through government programming, have had educational programs, screening clinics and outreach services for individuals with diabetes, high blood pressure and who smoke cigarettes. These long-term programs may account for the respondents' perception of these health concerns as a high risk for the families due to effective outreach of the programs. For example, the home health care personnel do one-to-one teaching of diabetes and self-care in clients' homes. The effectiveness of the outreach services is noted by 'don't know/no opinion' responses which for diabetes there were none. Also, asthma was another hazard without don't know/no opinion responses. In 1999, the Akwesasne Task Force on

the Environment (ATFE) sponsored a pilot project regarding indoor air quality and the incidence of asthma. Individuals' increased awareness and education of the issue of asthma may be a direct benefit of the pilot project.

For all ages, females perceived higher health risks to families from selected hazards than males. Comparable results were noted in the 1992 national survey that showed women were more likely to rate a hazard as a high risk for all items except heart pacemakers. Heart pacemakers were perceived to be a high health risk for less than 20% of the Akwesasne and Canadian respondents. Out of nine medical devices and treatments, chemotherapy was identified as the highest health risk to families in Akwesasne. The increased perception of risk may have been generated from personal experience (within families), friends' experience and exposure through media sources to the risks of the chemotherapy. Interestingly, studies that compared the perceptions of women and men showed that women have a greater perception of risk to hazards (Slovic et al. 1985; Kraus et al. 1992; Slovic et al. 1995; Flynn et al. 1994). Not only women have been identified as having an increased perception to hazards but also people with less education (Krewski et al 1995; Finucane et al. 2000). For the Akwesasne respondents, the majority have a post-secondary or higher level of education, which may result in a higher level of concern for the females and their families (Finucane et al. 2000; Flynn et al. 1994).

Street drugs and AIDS received a high rating as health risks in the 1992 National Risk Perception Study, but the Akwesasne respondents ranked them lower on the list of high health risks for families. Educational campaigns of these two issues have been on going in the community for the last five to ten years. Regardless of the attempts to increase awareness of the risks, street drugs and AIDS may not be openly discussed in families and the community. Despite being vulnerable to risks, individuals may not be willing to change their behaviors.

Homelessness and poverty are viewed as almost no health risk to the families of Akwesasne. During the interview, participants said that the support network of families and friends is an important element of the society, and ensures that these health risks are almost no concern. The following offers an explanation - about halfway through the fieldwork, the interviewers asked for a working definition of 'your family'. Participants were asked to respond to, "What does family mean to you?" As a result, the respondents proceeded with their definition of family and in the majority of cases families were defined as extended families as opposed to nuclear families. Firstly, the response to homelessness and poverty in this study lends itself to the fact that the extended family is a support and vast resource base as interdependence and reciprocity are two of the many cultural attributes of this population. Secondly, social programs of the local governments offer support for those individuals and families in need. Eyles et al. (1993) in their research stated that the ability of a population to cope with stressful situations might be attributed to several factors. These factors include social structure, lifestyle and conventional

family structure and the potential for well-developed social and community support networks.

b) Perceived Environmental Concerns:

In 1963, Akwesasne Mohawk governments joined forces addressing environmental concerns of contaminated fish, and loss of plants and animals that they ranked higher than other hazards resulting from environmental education and awareness initiatives of the Haudenosaunee Environmental Task Force (HETF) and the ATFE. Each respective local government developed and implemented a department of environment, which undertook educational outreach with a primary purpose to lobby and advocate for remediation and legislative changes regarding environmental degradation. In addition, the community is proactive as some outreach is done through local media such as a CKON radio show, newsletters, newspaper articles and community meetings. The community has been active through public meetings, which have been scheduled over the last two years regarding remediation of the ALCOA sites.

For the Akwesasronon (people of Akwesasne) the loss of plants and animals was perceived as a high health concern to families for the men and women 40 plus years of age. This may indicate that this age group, in the past and present, have hunted and trapped animals and gathered plants for medicines and are more attentive to hazards that threaten their environment (Harris & Harper, 1997; Janguang, 1993). Respondents also discussed the fact that Akwesasne is

comprised of approximately 60% wetlands and with the increased building of residential and commercial buildings in these areas, people view this habitat for plants and animals as a loss to development.

When interviewed all age groups reported that contaminated fish was one of the highest health concerns for families. Historically and currently, diets of families in Akwesasne, involved consumption of locally caught fish (Personal Communication, 2001b). Other studies have reported that Native Americans are more at risk due to reported consumption levels (Harris & Harper, 1997; Burger et al. 2001). Since the late 1980's the New York State Department of Health has posted fish consumption advisories for Akwesasne as a result of the breastmilk study that looked at exposure to PCBs from hazardous waste among Mohawk women and infants at Akwesasne (ATSDR, 1995). This was the first health study to research PCB levels in breast milk. As a result, women had to make a conscious choice to continue eating locally caught fish; fish that had the potential to increase their exposure to contaminants. Since 1988, women, men, grandparents and adolescents in Akwesasne have been involved in health studies.

In this study, participants indicated that nuclear waste transport was perceived as a high health risk but was in the middle of the list of hazards that were ranked high. The national survey respondents said it was a high risk to the family but a direct comparison of the two surveys should be made cautiously because the wording and context of the question is different between the two surveys. Notably, Akwesasne respondents (45%) stated that burn barrels have almost no health risk, which is interesting in light of the fact that the SRMT Environment Department has

had an educational campaign addressing the hazards of using burn barrels. The method of communication should be re-visited and an effort made to better understand why individuals continue the practice because the by-law prohibiting the use of burn barrels has been in existence for two years.

4.4 Perception of Risk from Selected Hazards to the Community

The Mohawk Community of Akwesasne is traditionally a matrilineal society. This implies that women are key to and heavily influence the political and social structures of the community. One of the roles of Haudenosaunee women is to nurture the earth and the children. Their responsibilities entail having knowledge of the state of environment so that resolution of environmental issues can be sought for the sake of their families. Traditional knowledge and practices are linchpins holding aboriginal communities together. When they start to disintegrate, the community is at risk in ways that are not seen in the majority culture (Harris & Harper, 1997; Hine et al. 1997).

In 1988 the women of Akwesasne initiated the first health research project in response to the threat of exposure to PCBs to their unborn children. The impetus for the study was that the consumption of locally caught (contaminated) fish by the mother would also impact their unborn child. The 1988 project found that approximately 59% of the respondents have household members that are less than 18 years of age. The presence of children in the household, it was found in subsequent studies was a factor that affected the perception of risk, specifically for issues related to food safety (Dosman et al. 2000). Similarly, it has been found that women in other countries exhibit pro-environment behavior as coping strategies in

response to the responsibilities of raising and nurturing children (Der-Kerabetian et al. 1996; Greenberg and Schneider, 1995).

Burger et al. (2001) and Gowda and Easterling (2001) found in their research that people who hunted and consumed fish and game had a higher perception of risk to health. If individuals fish, hunt, trap and gather as traditional practices, and the environment is contaminated, these factors influence judgment about perception of risk to health (Harris & Harper, 1997). For Native Americans/First Nations Peoples, any degradation to tribal lands is a threat because life is viewed holistically (Stoffle & Edwards, 1990; Gowda & Easterling, 2000).

Furthermore in her research, Gibson (2001) found that the primary concern of First Nations on the transportation and treatment of PCBs, was increased risk to ancestral lands, the environment, and most importantly, themselves. Among the beliefs of First Nations Peoples is that any risk to their Traditional Territory is a risk to the environment and health of animals. Efforts must be made to ensure that no harm is done to the Traditional Territory and every effort is made to reduce the risks (Gibson, 2001). Not surprisingly, Akwesasne respondents perceived higher health risk to the community from PCBs, drinking alcohol, tap water, and outdoor air quality than did the Canadian and Alberta surveys. The higher ranking of PCBs can be attributed to on-going health studies since 1988. Integral to these studies was a focus on PCBs, the health effects of exposure to this toxicant, and impacts to the environment. Over the years, at least one community event per year occurred that highlighted the purpose of the research and stimulated awareness of the issue of PCBs. Health professionals also attended several seminars to increase their

awareness of the issues so that they could educate their clients. The Superfund sites were highlighted in the news often and public demonstrations had taken place regarding the Environmental Protection Agency's (EPA) decision concerning clean up of the sites.

Tap water was and continues to be a high health risk for the community of Akwesasne, perhaps due to local media coverage of test results that generate questions regarding the integrity of the operations of the water treatment facility and pollution of the water source. Prior to 1985, residents had individual wells and since the operation of the various water treatment plants began, the plants have always come under scrutiny. Perhaps the lack of knowledge of plant operations, the delegation of responsibility to risk managers, the addition of chemicals to treat the water, and skepticism about test reports regarding the bacterial content have increased the perception of risk from tap water (Cvetkovich & Earle, 1992).

Notably, similar results have been found in the Akwesasne and Canadian surveys for ozone depletion, food additives, and contaminants from pesticides in food. Each of these surveys reflected the middle ranking of the respondents on hazards. The similarities in these surveys are due to increased exposure from the media and public education on these issues. Akwesasne's responses for risk to bottled water were similar to the other surveys, with less than 10% perceiving a high health risk to the communities.

Residents of Akwesasne perceive that outdoor air quality is a high health risk. This may be the result of various environmental events over the last 50 years and the persistent reminders of environmental degradation. Akwesasne is located

adjacent to the city of Cornwall, and prior to the introduction of emission standards (1970's) the paper mill and chloralkali plant emitted chemical toxicants into the river and air. The air emissions could be seen daily, and Cornwall's air has been reported in the news media as having a strong odor of sulfuric acid. In addition, the neighboring plants in the U.S., specifically General Motors and Reynolds Metal, emitted tons of chemical toxicants prior to the late 1970's when the EPA set standards for air emissions. The 1981 Dairy Cattle Study on Cornwall Island, Ontario (Akwesasne) that was completed by Cornell University showed skeletal fluorosis of the cattle that was a direct result of unregulated fluoride air emissions. After air emission standards were established, the St. Regis Mohawk Tribe (SRMT) Environment Department set up air monitoring stations that are checked weekly. These monitoring stations are located on personal property and can be seen from local roadways, and are visual reminders of the concern for outdoor air quality.

In the 1992 National Risk Perception Survey respondents perceived cigarette smoking as the greatest high-risk and ozone depletion was rated as the second high-risk to the Canadian public. Other studies that are comparable to Akwesasne and Alberta showed that lifestyle behaviors, such as street drugs, cigarette smoking, AIDS, and alcohol and pregnancy, were viewed as higher health risks than environmental hazards (Finucane et al. 2000; Flynn et al. 1994; Slovic et al. 1995). Perception of risk from drinking alcoholic beverages was higher for the community. Respondents stated that within their families there was a sense that risk from this health hazard could be controlled but that they could not control the

community's choices. Community outreach programs also may have contributed to the high perception of risk to this hazard.

It is stated that the level of education plays an important role in how people perceive the perception of risk to hazards and that higher levels of education decrease the perception of risk (Burger et al. 2001; Flynn et al. 1994). The 1992 Canadian respondents with post-secondary education were consistently less likely than respondents with high school or less education to rate a risk as 'high'. The majority of the Akwesasne respondents have a post-secondary education and in general, they perceived higher health risks for all the hazards. Many factors may contribute to this increased perception of risk to hazards. Media brings increased attention to issues and can sustain the interest for extended periods of time (Chapman et al. 1997; Adams & Smith, 2001; Blake, 1995; Kone & Mullet, 1994). Women, as heads of households and as nurturers, become more knowledgeable and feel more vulnerable to risks; this in turn may sensitize them to hazards and risks (Flynn et al. 1994; Dosman et al. 2001, Fernandes et al. 2000). Eyles et al (1993) found that households with children perceive that populations have greater susceptibility to environmental stress. The respondents' personal experience and knowledge were found to influence their judgment about the perception of risk. This is contrary to previous literature that there is increased perception of risk or concern about a hazard if individuals have higher education levels (Finucane et al. 2000; Flynn et al. 1994; Davidson & Freudenburg, 1996). Contributing to the perception of high-risk is the role of the media in its coverage of events (Chapman et al. 1997; Adams & Smith, 2001; Blake, 1995; Kone & Mullet, 1996)

For the majority of hazards, research results have showed a relatively high degree of perceived risk to the community. Respondents identified lifestyle behaviors (e.g. street drugs, drinking alcoholic beverages, cigarette smoking) and health concerns (e.g. diabetes, stress) as the top five high health risks to the community. Environmental concerns followed and included PCBs, industrial landfills and outdoor air quality. As with the perceived high-risk health and environment hazards to the family, the community awareness and education programs of these hazards may influence the individuals' perception of high-risk to the community. These health and environment issues also are presented in various media on the local, state/provincial and national levels, thus increasing the perception of risk (Chapman et al. 1997; Cvetkovich & Earle, 1992; Kone & Mullet, 1994; Burger et al. 2001). Experts as well rate these lifestyle behaviors, and health and environmental concerns as high health risks (Krewski et al 1993). This is contrary to the literature that states the experts and layperson perceive risks differently (Slovic et al. 1995).

4.5 Sources and Confidence in Sources of Information About Health Risks

Respondents were asked where and how much information they obtained regarding health risk information from a predetermined list of sources. Similar to the Canadian survey, respondents in the Akwesasne survey relied upon the media the most, then medical doctors as sources of information. For other sources of information, the provincial governments and industry were the least likely sources of information. In contrast to the Canadian survey, friends and relatives of the Akwesasne respondents were ranked higher than the remaining sources of information.

Traditional healers have a lot of respect in the community and some currently work within integrated health programs of the two elected governments. According to the program manager for the Holistic Health and Wellness Program at MCA, clients are increasingly seeing Traditional Healers as having a more important role in their health (Personal Communication, April 2001). Environmental groups were viewed as the 'watchdog' for local government and external government agencies, and have been very active in lobbying for clean up of contaminated sites and in health studies. Peters (1997) noted that ratings of confidence in government and industry had declined drastically during the past 30 years but that confidence in environmental groups had increased.

Akwesasne respondents' identified a fair amount of confidence in friends and relatives. Getting together with friends and relatives is one method of

communication and respondents remarked that although they receive a lot of information from this source, it was not always accurate information. This was reflected in the low percentage of respondents (23%) who said they had a lot of confidence in this source of information.

Many respondents said that they did not receive information from the local governments and were not aware of the various programs they had to offer for information about health risks. Regarding the Akwesasne governments, 15% of the respondents said they had a lot of confidence and 36% said they had a fair amount of confidence in these agencies. The possible explanation is that for tribal peoples, legitimate decision-making for tribes traditionally is by consensus. In the U.S., elected tribal councils were instituted with the Indian Reorganization Act, and in Canada, with the Indian Act, to provide better control of tribal affairs. This system tried to replace the traditional decision-making mechanisms – consensus-based forms of government – decisions that are made by Chiefs, Clan Mothers, and Faithkeepers who get direction from the people. Historically, as "alien" forms of government, tribal councils have failed to respond to the will of tribal members or inform members before making major decisions. Informed consent includes the traditional decision-making style, therefore for some people in the community, they were unsure if the decision making process was based on consensus (Gowda & Easterling, 2000). Taiaiake Alfred states, "The imposition of Western governance structures and the denial of indigenous ones continue to have profound effects on indigenous peoples" (Alfred, 1999). A byproduct of the imposition of Western governance structures, Alfred suggests, is the lack of confidence in elected

governments, in this case in Akwesasne as they don't acknowledge the richness of traditional governance structures. Consequently, whether it's health delivery or political activism, residents are cautious and very critical of the activities of the local elected governments.

4.6 Responsibility and Fulfillment of Protecting People from Health Risks

Medical doctors and Health Canada or the EPA (Environmental Protection Agency) were seen as having major responsibility for protecting people from health risks which was comparable to the 1992 Canadian survey (EPA was not listed as a choice on the Canadian survey). In contrast with the respondents' perception that these groups have major responsibility in protecting people from health risks, 15% stated they were doing excellent in fulfilling their job but were more likely to do a 'good' job of fulfilling their responsibilities. Other individuals or organizations that are doing a 'good' job are environmental groups, ATFE and traditional healers and friends and relatives. Less than 40% of the respondents said that the three local governments (MCA, MNCC, and SRMT) were doing a 'good' job. In comparison, more than 50% of individuals stated that the three local governments had major responsibility for protecting people from health risks.

Organizations and health professionals such as medical doctors, Health Canada or the EPA were perceived as having major responsibility but were not fulfilling their responsibilities. It has been recommended that such institutions need to interact more with the public and enhance their communication efforts to reach target audiences. Responsibility for protecting people from health risks may start

with the individual making every effort to protect their own health. A better prescription of protection from risks is for individuals and families to be pro-active in their behavior. This might include seeking information on risks to health and environment, and taking the necessary actions to ensure that the right decisions are made for themselves and their families.

4.7 Attitudes and Opinions about Health Risks

Following the 1992 national survey, the attitude and opinion statements were grouped by content category for easier interpretation. The section of the survey contained 42 statements that were designed to elicit the respondents' attitudes and opinions on a variety of health and environment risk perception issues.

The main findings of this study will be discussed with respect to the attitude and opinion statements about health and environmental risks. The first category included statements about local and global environmental health risks and the majority of respondents agreed that there are serious health problems, that the environment is more contaminated, and that sub-populations are at increased risk. More than 90% of the respondents in the Canadian and Akwesasne surveys believed that the environment has become more contaminated. In contrast to this view, however are those of the Akwesasne respondents; (80%) agreed that their community is becoming a healthier place to live. This contradictory view of the environment could be the result of the numerous health studies over the years in Akwesasne, and the remedial efforts in clean up of the Superfund sites near Akwesasne, regardless of environmental contamination.

As with the Canadian survey, the majority of respondents in the Akwesasne survey believe that a risk-free environment is achievable for Akwesasne. In addition, about 80% of the respondents said they are unwilling to take health risks to aid industrial development. At the end of the interview, individuals stated that they were not willing to take health risks, but in reality they were (and are) based on their continued residence near contaminated sites. Many people talked about treaty rights with a belief that Akwesasne is their homeland, that the onus is on industry and the government (state/provincial and federal) to ensure the environment is cleaned up, and that the environment supports Traditional practices.

Approximately 70% of the respondents agreed that pro-active behavior was in their best interests. Activities such as deciding for themselves about health risks, assisting in resolving health problems related to the environment, seeking information, and participating in an environmental group were actions they could take to improve their lives and the community.

4.8 Strengths of the Research

Few studies exist that have investigated the perception of risk for Aboriginal/First Nations/Tribal peoples in Canada or the U.S. This research contributes to that gap in knowledge and is specific to the Mohawks of Akwesasne. The primary investigator of this research is an Aboriginal person and community member of Akwesasne. Involvement in the community facilitated the integration of Mohawk cultural values and beliefs with the study on risk perception.

The primary investigator has worked in Akwesasne for many years with community networks (environment, health, and social) that overall, enhanced the

approval and support of the research. Her experiences have shown that it is necessary to acknowledge community protocols of doing research and accessing information. If people or agencies provided limited information about Akwesasne, then that decision was respected. The Akwesasne Task Force on the Environment has credibility and the trust of the community. This community organization supported the research for this thesis, which eased the completion of the survey and its analysis.

There are several benefits to the community from this research study. Foremost was internal capacity building – from hiring and training of interviewers from the community to creating awareness of environmental and health issues among the respondents. Additional benefits include the creation of a database on perception of risk, and the dissemination of results and recommendations to the community, local governments and their health and environment departments. The community became aware of the presence of the University of Ottawa during the research period and enhanced existing relationships between the community and the University.

4.9 Limitations of this Research

Generalizations of these findings are limited to the community at Akwesasne as the Tribes (U.S.) and First Nations (Canada) have distinct cultural characteristics within each Nation. Furthermore, this limitation is extended to the Six Nations of the Haudenosaunee (Iroquois Confederacy). Although the Haudenosaunee communities have similar cultural foundations, their current situations should be assessed individually.

No interviews were conducted in the Mohawk language, although all respondents were given that option at the time of acquiring consent for the interviews. Both the consent form and questionnaire were translated into the Mohawk language prior to starting fieldwork. No information was collected for the preferred language of the respondent. Although the option was available, it's not known for sure if the individual who speaks English as a second language would have had a thorough understanding of the questions. Translation of words becomes difficult as English words like cancer or toxic waste have no Mohawk language counterparts. The Mohawk language can incorporate a description of those hazards as a way to convey an understanding of a concept.

The primary investigator was unaware of the value of asking the non-respondents for demographic information. This additional information would have allowed the characterization of the non-respondents. For example, non-response may be related to demographic and lifestyle variables associated with employment, some or all of which may also influence the perception of risk to health and environment hazards. By the time the primary investigator became aware of the importance of collecting this information, the collection phase of the survey had been completed.

The predetermined list of hazards, medical devices and opinion statements were written based on current issues, whether they were local, state and/or provincial, and national. This survey was completed in a specific timeframe and the respondents' perception of risk is only a "snapshot" in time. The issues were

specific to environmental change, and can be influenced by how and when the media report a story.

The questionnaire did not include specific scales, which would have allowed an assessment of various dimensions of perception of risk. For example, dread is a factor that influences the perception of risk and a dread scale consisting of four to six questions could measure this one construct. Other scales that could possibly have been used are those that measure trust, control of health, and benefit and risk, for example. These scales could have been used to gain more information between personal experience and knowledge about the hazards with health risk perception.

A possible reason contributing to the low response rate may have been the interviewers' young age. This may have influenced potential participants to regard them as inexperienced therefore not credible, which could have led the potential participants to decide not to respond to the survey. The four interviewers were either post-secondary students or recently graduated from a post-secondary institution. They were female and between the ages of 20 to 25 years of age and lifetime residents of Akwesasne. The candidate did not foresee their young age as being a barrier to individuals responding to the survey.

The choice of administering one-to-one interviews was intended to yield a response rate greater than 70%. Mail and telephone surveys have achieved lower response rates than individual interviews. The face-to-face interviews generated greater intimacy and increased the respondent's willingness to participate in the study. Use of interviews typically increases the length of individual responses and

total time, but what is not known is whether this increased the accuracy of the answers.

This study allowed selected individuals to refuse to participate if they so chose. Compared with non-volunteers, the volunteers were frequently more healthy, concerned about issues, have a higher level of education, are employed in professional and skilled jobs, live in households with children, and are active in community affairs (Brownson & Pettiti, 1998). The "healthy respondent" is the individual who is willing to participate in studies and is pro-active in lifestyle behaviors. Generalizing results to the target population must be done cautiously because the study population may not be truly representative.

To reduce interviewer bias, the interviewers were trained prior to administering surveys and their initial interviews were reviewed. The training was one way to ensure that the interviews were conducted in a consistent manner in an effort to reduce bias. However, the interviewer may have unknowingly influenced (using a different tone of voice or body language) how the individual answered a question, which would have introduced bias.

Recall bias occurs when respondents may have had exposure to a disease or an adverse health outcome, which they are more likely to remember because of their personal or family member's experience. For these situations the respondent may exaggerate their actual experience or minimize it to appear more acceptable to the interviewer. Recall is different for the individual who hasn't had exposure to the disease or health outcome.

When categories of rating scales are used (e.g. almost no, slight, moderate, high) in surveys, their interpretation is different for each interviewee, and could have different meanings for the same rater in different contexts. When respondents have a choice of “don’t know” and are faced with a complex question, an inordinate proportion of respondents with a grade school education but not those with a college education would select the “don’t know” response (Pedhauzer & Schmelkin, 1992).

The primary investigator was not aware of the value of conducting duplicate interviews on a sub-sample of the study population; this would have checked the inter-rater reliability of the interviewers. The inter-rater reliability evaluates the degree of agreement among different interviewers. Ideally a small number of duplicate interviews, for example 20 people per interviewer, would have provided some comfort that the questionnaires were being administered in the same way and that different interviewers did not bias the respondents’ answers. The small number of people participating in duplicate interviews would not have demonstrated strength but rather would have given a sense of assurance that the administration of the survey was consistent by all interviewers.

There are two response styles that may have influenced how participants responded to the survey. One style was acquiescence and is the tendency of respondents to agree with what they’re being asked. There is some evidence that indicates that this occurs somewhat more frequently among the less educated and among those less intensely involved in the interview (Pedhauzer & Schmelkin, 1992). The second style was the tendency of the respondent to present oneself in

a good light to the researcher or interviewer, therefore basing their answers not on their perspective but on what they believed was socially desirable (Pedhauzer & Schmelkin, 1992).

The 1992 Canadian survey had only limited similar questions with the 2000 Akwesasne survey. However, the time frame between surveys - 1992 and 2000 – raises the possibility of environment and health issues changing over the eight years. It is well recognized that the media can influence people's perception of risk. For example, at the time of the 1992 national survey, media highlighted the risks associated with breast implants and as a result, Canadians expressed a higher perception of risk to this aesthetic surgical procedure. Also, the primary investigator did not have an additional respondent group, either Aboriginal or non-Aboriginal to make comparisons of responses within the same time frame.

4.10 Conclusions/Major Findings

The community of Akwesasne is a *practicing* matrilineal society. Women have influence on the political and social structures within the community. Cultural values and beliefs of a matrilineal society reinforce the responsibilities of women who are custodians for Mother Earth and life. It is also their responsibility to care for all children, so that they can identify future leaders for the Nation. Therefore, it is incumbent upon women to provide a social and physical environment that is nurturing for children.

Women are aware of the state of the environment and are always seeking resolution to health and environmental issues that affect health. The reliance on traditional diets and activities in contaminated environments puts subsistence

practices in jeopardy and furthers the exposure of Indigenous peoples to environmental contaminants and to increased risks to health (Schell et al. 2003). These factors heighten the concern of females and results in increased perception of risk.

There are many factors that contribute to the increased perception of risk. An important factor is having accurate knowledge of an environmental or health hazard. The majority of survey respondents were female indicating that there is interest in environment and health issues. As a result of this interest, existing and future education programs should target women about hazards and risks, so that they can share accurate information with their family and friends.

The media and medical doctors were identified as the major source of information about health and environmental risks. Efforts in risk communication should use these two sources and create messages that are accurate and reliable. More importantly, the information has to be presented in a language (no technical terms) that the layperson can understand. It is imperative that the agency communicating the message have credibility in the community, so that the audience trusts the information.

Traditional Healers, friends and relatives, and environmental groups were the next major sources of information for environment and health risks as evidenced by the confidence the respondents had of these sources. Agencies should take advantage of the variety of these sources to develop communication networks to educate the public.

Respondents have stated that they were dissatisfied with local governments because environmental and health information is not communicated or disseminated on a regular basis. The lack of reliable information exacerbates existing levels of unawareness of both risks and risk reduction programming. The lack of communication further enhances low levels of confidence in government agencies, industry, and universities. To improve these situations, agencies need to build trust in their relationships with the public. One way to do this is to involve the residents of Akwesasne in the decision-making, particularly when the decision affects the whole community. As partners in decision-making, this places the responsibility to gain knowledge with the community so it can make informed decisions.

Prior to the survey the candidate believed that the perception of risk to environmental hazards would be greater than the perception of risk to health hazards. This was based on an assumption that because of cultural values and beliefs of this Mohawk community that the environment would be at the forefront of the many issues. As a result of the research, the environment was one of the top four issues but health preceded environment. For example, respondents had a higher perception of risk to diabetes than contaminated fish. In addition, in consideration of the Superfund sites proximal to Akwesasne, the majority of respondents stated that a risk-free environment is an achievable goal for the community. Also, as a source of information related to health issues, traditional healers were noted as a credible source, which was known by the candidate, and the survey results reaffirmed it. The majority of residents of Akwesasne know the

environment is contaminated but they refuse to move from their traditional territory because of strong beliefs about sustaining relationships to their homeland.

4.11 Recommendations

The recommendations that follow that are based on the major findings of this research.

1. For Akwesasne, that future research should further investigate the relationship between perceived risk and personal knowledge of and experience with hazards. Scales have proven to be effective and a few examples of factors that could be considered are benefits and risks, control, emotion, voluntary and non-voluntary hazards. The role of how cultural values and beliefs influence perception of risk would provide insight for individuals communicating and developing policy for risk management.
2. The survey had a list of environment and health hazards that were not specific to one issue but rather many. This wide scope of research adds to the difficulty of assessing the perception of risk. An assessment needs to be completed of a subset of these issues (high health risks). This would narrow the scope of the research but would provide more depth of understanding to the perception of risk.
3. The health of the community is connected to the health of the environment. Therefore, increased responsibility needs to be put on the polluters to clean

up contaminated sites in concert with the application of political pressure by local government for acceptable remediation.

4. The goals of risk communication differ between the mass media, government, and health agencies. If media is a major source of health and environmental information, then it is incumbent upon people using this source to ensure the media is reporting accurate information about risks and using language that can be understood by the target audience.
5. Local governments, federal agencies, industry and universities must increase the community's awareness of their programs by increasing their credibility. Public distrust is easy to dissolve but necessary to preserve when discussing risk management. Lessons could be learned from the communication methods of outreach programs that have been successful in educating target audiences about specific issues such as, diabetes, cigarette smoking, and asthma. Their success is due to sustained risk communication efforts.
6. Traditional Healers and family and friends have been identified as a source of information and education. Awareness sessions of current issues should be provided at house meetings. This would be an excellent use of a source that the community relies upon, and the result would be quick dissemination

of information. Inclusion of the community or public would also increase trust in the organization or agency attempting to deliver risk messages.

7. Non-government environmental organizations must continue their outreach work because they have been successful at utilizing a community driven approach aimed at sharing responsibility and building capacity in the community. Real change and solutions come from the people most affected by the problems.
8. The goals of existing educational campaigns must be evaluated for effectiveness. If intervention and prevention programs are not increasing awareness of high health risks (street drugs and AIDS), then it may be necessary to try new approaches to communication.
9. To improve participation rates with this population, public statements by Akwesasne's three local governments in support of the research may increase survey respondents. Statements could have been delivered as public service or community announcements on the local radio and in the local newspapers. Another possible way to improve participation could have been the use of mailed or delivered reminders of the upcoming appointments for the interviews.

10. Risk communicators must realize that people's beliefs change slowly and may persist even in light of opposing evidence. Effective communication efforts must be sustained for long periods of time so that people can decide if and when they should change risky behavior. How and what the message says is important and depends on the target audience.

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APPENDICES

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APPENDIX A—Consent Form

Perception of Risk to Health from Environmental Factors Amongst the Mohawks of Akwesasne

Consent Form

My name is Maxine Cole and I am a graduate student at the University of Ottawa currently doing research in Akwesasne. The research involves conducting a survey among women and men of Akwesasne concerning various issues facing Akwesasronon today. It is the goal of this research project to assess the perception of risk to health from environmental factors and other risk-taking activities. I am interested in your attitudes and opinions about these issues. The survey will also assess your awareness of information regarding risks to health and how much confidence you have in these sources of information. In addition, how do you feel about what people and agencies/departments are responsible for health protection and how well are those responsibilities being fulfilled.

I have randomly selected one person from your household to be interviewed to complete the survey, which will take approximately 45 minutes. If you choose to I will schedule a time that is convenient for you to complete the interview. Your participation in this survey will increase your awareness to your opinions and attitudes about perceptions of risks to health from environmental factors and other risk-taking activities. In addition, your perception will add to Akwesasne's awareness of perception of risk to these factors. Once the project report is complete, I will let you know what the results are.

The information provided to me during the interview, such as personal information and the completed questionnaire will be kept in a locked file cabinet at the office of the Akwesasne Task Force on the Environment (ATFE). The ATFE is supporting my research therefore I have been allowed office space and use of a locked file cabinet. As the researcher for this project, I will be the only person who has access to the information.

Participating in this survey is voluntary; therefore you have a choice to discontinue the interview at any time. If for any reason after the interview, you do not want your information used, please call me to let me know of your decision. At that time your completed survey and other information will be destroyed or returned to you. If you have any questions or would like more information please contact Maxine Cole, ATFE, 518-358-9067 or 613-575-9967.

Please sign this form once you have read and understand what I am asking of you. I will provide a copy of the signed consent form to you.

Print name of Interviewee: _____ Date: _____

Signature of Interviewee: _____

Appendix B: Sample Size and Confidence Interval

To calculate the sample size I have taken a very conservative approach and have based the calculation on a dichotomous response variable, yes or no. The probability of the response variable being yes is the same for each individual. Since there are only two possible outcomes, yes or no, yes is denoted by p and that of no by q , then $p + q = 1$ or $q = 1 - p$. Therefore, if $p = 0.5$ and $q = 0.5$ again using a conservative approach, the sample size will be calculated with the significance level α set at 0.05. Thus, the sample of 400 will yield a confidence interval of $\pm 5\%$ or smaller for any value of P . The calculated sample size must be multiplied by a correction factor $(1-n/N)$ to adjust for sampling from a finite population, therefore for this specific sample size $n = 400$ and $N = 2,110$.

$$\hat{p} \pm 2 \sqrt{\frac{pq}{n} \left(1 - \frac{n}{N}\right)}$$

$$\hat{p} \pm 2 \sqrt{\frac{(0.5)(0.5)}{400} \left(1 - \frac{400}{2,110}\right)}$$

$$\hat{p} \pm 2 \sqrt{\frac{(0.5)^2}{400} (1 - 0.189)}$$

$$\hat{p} \pm 2 \sqrt{.000625 (0.81)}$$

$$\hat{p} \pm 2 \sqrt{.005063}$$

$$\hat{p} \pm 0.045$$

APPENDIX C—Akwesasne Survey

(QUESTIONNAIRE)

14 PAGES

1 2 3 4 5 6 7

Good morning/afternoon/evening. My name is _____ and I am currently employed by the Akwesasne Task Force on the Environment. I am conducting a survey among men and women in this area concerning various issues facing Akwesasronon today and would appreciate a few minutes of your time. The survey is a research project for Maxine Cole who is a graduate student at the University of Ottawa. I am not selling anything. I am simply interested in your attitudes and opinions. Participating in this survey is completely voluntary. The information is being collected for the ATFE to better understand the concerns of the community. Your participation would be very helpful and most appreciated.

Your household has been selected randomly and I would like the opinion of one of the members of your household. To make sure I'm interviewing the right person in this household I'd like to ask you a few introductory questions:

- I. Including everyone, how many people live in this household: _____
(record # of people)
- II. Of these, how many are 18 years of age and older: _____
(record # of people 18 and older)

1. BE SURE THAT EVERY MEMBER OF THE HOUSEHOLD 18 YEARS OF AGE AND OLDER IS ACCOUNTED FOR (CHECK Q.2)
2. THE ONLY RESPONDENT THAT MAY BE INTERVIEWED FROM THIS HOUSEHOLD IS THE PERSON THAT SHOWS AN "X" OPPOSITE HIS/HER NAME. NO SUBSTITUTIONS MAY BE MADE.

NAME	AGE	M	F	MARK (X) FOR SELECTED RESPONDENT
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				

3. CONTINUE THE INTERVIEW WITH **ONLY** THE SELECTED RESPONDENT, IF NECESSARY REINTRODUCE YOURSELF.
4. IF YOU ARE UNABLE TO CONTINUE THIS INTERVIEW – MARK REASON AND THE APPROPRIATE INFORMATION ON THE RECORD OF VISIT FOR THIS HOUSEHOLD AND ASK YOUR SUPERVISOR FOR FURTHER INSTRUCTIONS.
5. **TIME INTERVIEWED STARTED** _____ **A.M.**
P.M.

SECTION ONE

1. The first question involves word association. Think about "risk" for a moment. When you hear the word "risk" what is the first word or image that comes to mind? When you hear the word "health" what is the first word or image that comes to mind?

(OBTAIN ONE ASSOCIATION FOR EACH WORD)

RISK = _____

(4,5)
(6,7)
(8,9)
(10,11)

HEALTH = _____

(12,13)
(14,15)
(16,17)
(18,19)

- 2.a) I'm going to read you a list of items relating to health. For each item, I'm going to ask you for your opinion, first about the health risk to you and your family, and then about the health risk to the community as a whole.

(ASK i) AND ii) FOR EACH ITEM BEFORE GOING TO NEXT ITEM ON LIST.)

- i. In thinking about yourself and your family, would you say there is almost no health risk, slight health risk, moderate health risk, or high health risk from **(READ ITEM)?**
- ii. Using the same scale, how would you rate the health risk to the community as a whole from **(READ ITEM)?**

Almost no health risk	Slight health risk	Moderate health risk	High health risk	Don't know/ No opinion
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AIDS

You and your family	☐ 20-1	☐ 2	☐ 3	☐ 4	☐ 5
Community as a whole	☐ 21-1	☐ 2	☐ 3	☐ 4	☐ 5

Street drugs

You and your family	☐ 22-1	☐ 2	☐ 3	☐ 4	☐ 5
Community as a whole	☐ 23-1	☐ 2	☐ 3	☐ 4	☐ 5

Nuclear waste transport

You and your family	☐ 24-1	☐ 2	☐ 3	☐ 4	☐ 5
Community as a whole	☐ 25-1	☐ 2	☐ 3	☐ 4	☐ 5

Drinking alcoholic beverages

You and your family	☐ 26-1	☐ 2	☐ 3	☐ 4	☐ 5
Community as a whole	☐ 27-1	☐ 2	☐ 3	☐ 4	☐ 5

Diabetes

You and your family	☐ 28-1	☐ 2	☐ 3	☐ 4	☐ 5
Community as a whole	☐ 29-1	☐ 2	☐ 3	☐ 4	☐ 5

Burn barrels

You and your family	☐ 30-1	☐ 2	☐ 3	☐ 4	☐ 5
Community as a whole	☐ 31-1	☐ 2	☐ 3	☐ 4	☐ 5

Loss of wild plants and animals

You and your family	☐ 32-1	☐ 2	☐ 3	☐ 4	☐ 5
Community as a whole	☐ 33-1	☐ 2	☐ 3	☐ 4	☐ 5

Cellular telephones

You and your family	☐ 34-1	☐ 2	☐ 3	☐ 4	☐ 5
Community as a whole	☐ 35-1	☐ 2	☐ 3	☐ 4	☐ 5

		Almost no health risk	Slight health risk	Moderate health risk	High health risk	Don't know/ No opinion
Contaminated fish						
	You and your family	☐ 36-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 37-1	☐ 2	☐ 3	☐ 4	☐ 5
Poverty						
	You and your family	☐ 38-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 39-1	☐ 2	☐ 3	☐ 4	☐ 5
Homelessness						
	You and your family	☐ 40-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 41-1	☐ 2	☐ 3	☐ 4	☐ 5
Violence						
	You and your family	☐ 42-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 43-1	☐ 2	☐ 3	☐ 4	☐ 5
Gasoline storage tanks						
	You and your family	☐ 44-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 45-1	☐ 2	☐ 3	☐ 4	☐ 5
Cigarette smoking						
	You and your family	☐ 46-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 47-1	☐ 2	☐ 3	☐ 4	☐ 5
Asthma						
	You and your family	☐ 48-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 49-1	☐ 2	☐ 3	☐ 4	☐ 5
Miscarriages						
	You and your family	☐ 50-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 51-1	☐ 2	☐ 3	☐ 4	☐ 5
Thyroid problems						
	You and your family	☐ 52-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 53-1	☐ 2	☐ 3	☐ 4	☐ 5
High blood pressure						
	You and your family	☐ 54-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 55-1	☐ 2	☐ 3	☐ 4	☐ 5
Heart disease						
	You and your family	☐ 56-1	☐ 2	☐ 3	☐ 4	☐ 5
	Community as a whole	☐ 57-1	☐ 2	☐ 3	☐ 4	☐ 5

- 2.b) For the next items, I would like your opinion on the health risks only for the community of Akwesasne. For each item, please tell me whether you think there is almost no health risk, slight health risk, moderate health risk, or high health risk for Akwesasne as a community.
(REPEAT SCALE FREQUENTLY)

	Almost no health risk	Slight health risk	Moderate health risk	High health risk	Don't know/ No opinion
Toxic waste.....	☐ 58-1	☐ 2	☐ 3	☐ 4	☐ 5
Contaminants from pesticides in food.....	☐ 59-1	☐ 2	☐ 3	☐ 4	☐ 5
Prescription drugs.....	☐ 60-1	☐ 2	☐ 3	☐ 4	☐ 5
Antibiotic resistant bacteria.....	☐ 61-1	☐ 2	☐ 3	☐ 4	☐ 5
Tap water.....	☐ 62-1	☐ 2	☐ 3	☐ 4	☐ 5
Drinking alcoholic beverages.....	☐ 63-1	☐ 2	☐ 3	☐ 4	☐ 5
Motor vehicle accidents.....	☐ 64-1	☐ 2	☐ 3	☐ 4	☐ 5
Asbestos.....	☐ 65-1	☐ 2	☐ 3	☐ 4	☐ 5
Depletion of the ozone layer.....	☐ 66-1	☐ 2	☐ 3	☐ 4	☐ 5
Outdoor air quality.....	☐ 67-1	☐ 2	☐ 3	☐ 4	☐ 5
Bottled water.....	☐ 68-1	☐ 2	☐ 3	☐ 4	☐ 5
Crime.....	☐ 69-1	☐ 2	☐ 3	☐ 4	☐ 5
Non-prescription drugs (over-the-counter)....	☐ 70-1	☐ 2	☐ 3	☐ 4	☐ 5
Climate change.....	☐ 71-1	☐ 2	☐ 3	☐ 4	☐ 5
Tanning.....	☐ 72-1	☐ 2	☐ 3	☐ 4	☐ 5
Food additives.....	☐ 73-1	☐ 2	☐ 3	☐ 4	☐ 5
Indoor air quality.....	☐ 74-1	☐ 2	☐ 3	☐ 4	☐ 5
Stress.....	☐ 75-1	☐ 2	☐ 3	☐ 4	☐ 5
PCBs	☐ 76-1	☐ 2	☐ 3	☐ 4	☐ 5
Commercial herbal medicines.....	☐ 77-1	☐ 2	☐ 3	☐ 4	☐ 5
Chemicals that affect hormone levels.....	☐ 78-1	☐ 2	☐ 3	☐ 4	☐ 5
Flu epidemics.....	☐ 79-1	☐ 2	☐ 3	☐ 4	☐ 5
Eating fish and wildlife.....	☐ 80-1	☐ 2	☐ 3	☐ 4	☐ 5
Loss of wetlands.....	☐ 81-1	☐ 2	☐ 3	☐ 4	☐ 5
Industrial landfills.....	☐ 82-1	☐ 2	☐ 3	☐ 4	☐ 5
Backyard dumps.....	☐ 83-1	☐ 2	☐ 3	☐ 4	☐ 5
Salt water in drinking water sources.....	☐ 84-1	☐ 2	☐ 3	☐ 4	☐ 5
Traditional medicines.....	☐ 85-1	☐ 2	☐ 3	☐ 4	☐ 5
Human sewage into the river.....	☐ 86-1	☐ 2	☐ 3	☐ 4	☐ 5
Household septic systems.....	☐ 87-1	☐ 2	☐ 3	☐ 4	☐ 5

3. Suppose that you or some member of your family were considering using the following medical devices or treatments. For each one, please tell me whether you think there is almost no health risk to that individual, slight health risk, moderate health risk, or high health risk? (**REPEAT SCALE FREQUENTLY**)

	<u>Almost no health risk</u>	<u>Slight health risk</u>	<u>Moderate health risk</u>	<u>High health risk</u>	<u>Don't know/ No opinion</u>
Chemotherapy	☐ 88-1	☐ 2	☐ 3	☐ 4	☐ 5
Artificial joint replacement	☐ 89-1	☐ 2	☐ 3	☐ 4	☐ 5
Steroid therapy	☐ 90-1	☐ 2	☐ 3	☐ 4	☐ 5
Heart pacemakers	☐ 91-1	☐ 2	☐ 3	☐ 4	☐ 5
Organ transplants	☐ 92-1	☐ 2	☐ 3	☐ 4	☐ 5
Hormone replacement therapy	☐ 93-1	☐ 2	☐ 3	☐ 4	☐ 5
Laser eye surgery	☐ 94-1	☐ 2	☐ 3	☐ 4	☐ 5
Blood transfusions	☐ 95-1	☐ 2	☐ 3	☐ 4	☐ 5
Home respiratory treatments	☐ 96-1	☐ 2	☐ 3	☐ 4	☐ 5

4. People obtain their information on health issues and risks from a number of sources. I'm going to read you a short list of possible sources for health information. Would you please tell me for each one whether you get almost no information, a little information, a fair amount of information or a lot of information from that source about health issues and risk?

	<u>Almost no information</u>	<u>A little information</u>	<u>A fair amount of information</u>	<u>A lot of information</u>	<u>Don't know/ No opinion</u>
1. Radio	☐ 97-1	☐ 2	☐ 3	☐ 4	☐ 5
2. TV	☐ 98-1	☐ 2	☐ 3	☐ 4	☐ 5
3. Industry	☐ 99-1	☐ 2	☐ 3	☐ 4	☐ 5
4. Medical doctors	☐ 100-1	☐ 2	☐ 3	☐ 4	☐ 5
5. Akwesasne governments	☐ 101-1	☐ 2	☐ 3	☐ 4	☐ 5
6. State/provincial governments	☐ 102-1	☐ 2	☐ 3	☐ 4	☐ 5
7. Federal agencies	☐ 103-1	☐ 2	☐ 3	☐ 4	☐ 5
8. Environmental groups	☐ 104-1	☐ 2	☐ 3	☐ 4	☐ 5
9. University scientists	☐ 105-1	☐ 2	☐ 3	☐ 4	☐ 5
10. Friends and relatives	☐ 106-1	☐ 2	☐ 3	☐ 4	☐ 5
11. Traditional healers	☐ 107-1	☐ 2	☐ 3	☐ 4	☐ 5
12. Newspapers/newsletters	☐ 108-1	☐ 2	☐ 3	☐ 4	☐ 5
13. Internet	☐ 109-1	☐ 2	☐ 3	☐ 4	☐ 5

5. In considering this same list again, would you tell me how much confidence you have in each one as an information source about health issues. Would you say you have almost no confidence, a little confidence, a fair amount of confidence, or a lot of confidence in each of the following as an information source about health issues and risk.

		<u>Almost no confidence</u>	<u>A little confidence</u>	<u>A fair amount of confidence</u>	<u>A lot of confidence</u>	<u>Don't know/ No opinion</u>
1.	Radio	☐ 110-1	☐ 2	☐ 3	☐ 4	☐ 5
2.	TV	☐ 111-1	☐ 2	☐ 3	☐ 4	☐ 5
3.	Industry	☐ 112-1	☐ 2	☐ 3	☐ 4	☐ 5
4.	Medical doctors	☐ 113-1	☐ 2	☐ 3	☐ 4	☐ 5
5.	Akwesasne governments	☐ 114-1	☐ 2	☐ 3	☐ 4	☐ 5
6.	State/provincial governments	☐ 115-1	☐ 2	☐ 3	☐ 4	☐ 5
7.	Federal agencies	☐ 116-1	☐ 2	☐ 3	☐ 4	☐ 5
8.	Environmental groups	☐ 117-1	☐ 2	☐ 3	☐ 4	☐ 5
9.	University scientists	☐ 118-1	☐ 2	☐ 3	☐ 4	☐ 5
10.	Friends and relatives	☐ 119-1	☐ 2	☐ 3	☐ 4	☐ 5
11.	Traditional healers	☐ 120-1	☐ 2	☐ 3	☐ 4	☐ 5
12.	Newspapers/newsletters	☐ 121-1	☐ 2	☐ 3	☐ 4	☐ 5
13.	Internet	☐ 122-1	☐ 2	☐ 3	☐ 4	☐ 5

6. Another aspect of health is the degree to which people and organizations are responsible for protecting people against health risks. For each of the following, would you tell me if you think they have no responsibility, some responsibility, moderate responsibility, or major responsibility for protecting people against health risks?

	<u>No responsibility</u>	<u>Some responsibility</u>	<u>Moderate responsibility</u>	<u>Major responsibility</u>	<u>Don't know/ No opinion</u>
Provincial/state governments	☐ 123-1	☐ 2	☐ 3	☐ 4	☐ 5
Individual citizens with regard to their personal health	☐ 124-1	☐ 2	☐ 3	☐ 4	☐ 5
Medical doctors	☐ 125-1	☐ 2	☐ 3	☐ 4	☐ 5
Other health professionals (nurses)	☐ 126-1	☐ 2	☐ 3	☐ 4	☐ 5
Health Canada or EPA	☐ 127-1	☐ 2	☐ 3	☐ 4	☐ 5
Private industry	☐ 128-1	☐ 2	☐ 3	☐ 4	☐ 5
Environmental groups	☐ 129-1	☐ 2	☐ 3	☐ 4	☐ 5
St. Regis Mohawk Tribe	☐ 130-1	☐ 2	☐ 3	☐ 4	☐ 5
Mohawk Council of Akwesasne	☐ 131-1	☐ 2	☐ 3	☐ 4	☐ 5
Mohawk Nation Council of Chiefs	☐ 132-1	☐ 2	☐ 3	☐ 4	☐ 5
Akwesasne Task Force on the Environment	☐ 133-1	☐ 2	☐ 3	☐ 4	☐ 5
Traditional healers	☐ 134-1	☐ 2	☐ 3	☐ 4	☐ 5
Friends & relatives	☐ 135-1	☐ 2	☐ 3	☐ 4	☐ 5

7. In thinking about these same people and organizations, how good a job is each doing in fulfilling their responsibilities for protecting people against health risks? Would you say the job they are doing is poor, adequate, good, or excellent in protecting people against health risks?

	<u>Poor</u>	<u>Adequate</u>	<u>Good</u>	<u>Excellent</u>	<u>Don't know/ No opinion</u>
Provincial/state governments	☐ 136-1	☐ 2	☐ 3	☐ 4	☐ 5
Individual citizens with regard to their personal health	☐ 137-1	☐ 2	☐ 3	☐ 4	☐ 5
Medical doctors	☐ 138-1	☐ 2	☐ 3	☐ 4	☐ 5
Other health professionals (nurses)	☐ 139-1	☐ 2	☐ 3	☐ 4	☐ 5
Health Canada or EPA	☐ 140-1	☐ 2	☐ 3	☐ 4	☐ 5
Private industry	☐ 141-1	☐ 2	☐ 3	☐ 4	☐ 5
Environmental groups	☐ 142-1	☐ 2	☐ 3	☐ 4	☐ 5
St. Regis Mohawk Tribe	☐ 143-1	☐ 2	☐ 3	☐ 4	☐ 5
Mohawk Council of Akwesasne	☐ 144-1	☐ 2	☐ 3	☐ 4	☐ 5
Mohawk Nation Council of Chiefs	☐ 145-1	☐ 2	☐ 3	☐ 4	☐ 5
Akwesasne Task Force on the Environment	☐ 146-1	☐ 2	☐ 3	☐ 4	☐ 5
Traditional healers	☐ 147-1	☐ 2	☐ 3	☐ 4	☐ 5
Friends & relatives	☐ 148-1	☐ 2	☐ 3	☐ 4	☐ 5

Evaluation of health issues can be complex. People have very different opinions about the conditions and issues that apply to health risks. I am going to read you a series of statements and ask for your personal opinion about each one. Please tell me whether you disagree strongly, disagree somewhat, agree somewhat, or agree strongly with each of the following statements of opinion.

		<u>Disagree strongly</u>	<u>Disagree somewhat</u>	<u>Agree somewhat</u>	<u>Agree strongly</u>	<u>Don't know/ No opinion</u>
1.	There are serious health problems related to the environment where I live.	☐ 149-1	☐ 2	☐ 3	☐ 4	☐ 5
2.	The land, air, and water around us are, in general, more contaminated now than ever before.	☐ 150-1	☐ 2	☐ 3	☐ 4	☐ 5
3.	I believe my community is becoming a healthier place in which to live.	☐ 151-1	☐ 2	☐ 3	☐ 4	☐ 5
4.	The loss of clean fish and animals makes me angry.	☐ 152-1	☐ 2	☐ 3	☐ 4	☐ 5
5.	I believe that a risk-free environment is an attainable goal in Akwesasne.	☐ 153-1	☐ 2	☐ 3	☐ 4	☐ 5
6.	I feel that the St. Lawrence-FDR Dam has been beneficial to the community.	☐ 154-1	☐ 2	☐ 3	☐ 4	☐ 5
7.	Decisions about health risks should be left to the experts.	☐ 155-1	☐ 2	☐ 3	☐ 4	☐ 5
8.	Children and the elderly are at more risk to health problems related to the environment than other individuals within my community.	☐ 156-1	☐ 2	☐ 3	☐ 4	☐ 5
9.	Industry is working hard to resolve health problems related to the environment in the best interest of the general public.	☐ 157-1	☐ 2	☐ 3	☐ 4	☐ 5
10.	Restoring the environment will resolve some health problems.	☐ 158-1	☐ 2	☐ 3	☐ 4	☐ 5
11.	Economic development can be achieved without endangering health.	☐ 159-1	☐ 2	☐ 3	☐ 4	☐ 5
12.	Hazardous materials can be safely transported through Akwesasne.	☐ 160-1	☐ 2	☐ 3	☐ 4	☐ 5
13.	There is nothing much I can do to help resolve health problems related to the environment.	☐ 161-1	☐ 2	☐ 3	☐ 4	☐ 5

		<u>Disagree strongly</u>	<u>Disagree somewhat</u>	<u>Agree somewhat</u>	<u>Agree strongly</u>	<u>Don't know/ No opinion</u>
14.	Natural events, such as severe windstorms, hurricanes, and flooding are the result of global climate change.	☐ 162-1	☐ 2	☐ 3	☐ 4	☐ 5
15.	The governments do not adequately protect endangered species.	☐ 163-1	☐ 2	☐ 3	☐ 4	☐ 5
16.	Industry is attempting to reduce greenhouse gas emissions by building fuel-efficient vehicles, such as gasoline-electric hybrids.	☐ 164-1	☐ 2	☐ 3	☐ 4	☐ 5
17.	High-technology research, such as organ transplants and genetic engineering, is in the best interest of the public in the long term.	☐ 165-1	☐ 2	☐ 3	☐ 4	☐ 5
18.	The governments adequately regulate high-technology research.	☐ 166-1	☐ 2	☐ 3	☐ 4	☐ 5
19.	If a specific activity is hazardous to my health, the government or health professionals will warn me about the risk.	☐ 167-1	☐ 2	☐ 3	☐ 4	☐ 5
20.	Consumer products sold in Canada/U.S. have been adequately tested prior to marketing.	☐ 168-1	☐ 2	☐ 3	☐ 4	☐ 5
21.	Traditional medicines must be taken with care due to side effects.	☐ 169-1	☐ 2	☐ 3	☐ 4	☐ 5
22.	If I live a healthy lifestyle, such as eating the right foods, getting enough rest, and exercising, I will never get cancer.	☐ 170-1	☐ 2	☐ 3	☐ 4	☐ 5
23.	Most cancers are hereditary in nature.	☐ 171-1	☐ 2	☐ 3	☐ 4	☐ 5
24.	Social factors, such as family get togethers, are important in determining my health status.	☐ 172-1	☐ 2	☐ 3	☐ 4	☐ 5
25.	Spiritual factors, such as giving thanks, are important in determining my health status.	☐ 173-1	☐ 2	☐ 3	☐ 4	☐ 5
26.	I often seek information to see what I could do to help me resolve health problems.	☐ 174-1	☐ 2	☐ 3	☐ 4	☐ 5
27.	My participation in an environmental group will help improve environmental quality.	☐ 175-1	☐ 2	☐ 3	☐ 4	☐ 5
		Disagree	Disagree	Agree	Agree	Don't know/

		<u>strongly</u>	<u>somewhat</u>	<u>somewhat</u>	<u>strongly</u>	<u>No opinion</u>
28.	If someone told me not to eat the fish from a particular source I would listen.	☐ 176-1	☐ 2	☐ 3	☐ 4	☐ 5
29.	Catching too much fish will affect the community's health.	☐ 177-1	☐ 2	☐ 3	☐ 4	☐ 5
30.	If I don't help resolve health problems related to the environment someone else will.	☐ 178-1	☐ 2	☐ 3	☐ 4	☐ 5
31.	I can safely dispose of any chemical in my sink or backyard.	☐ 179-1	☐ 2	☐ 3	☐ 4	☐ 5
32.	Governments should encourage private industry to develop innovative means to address environment and health problems of industrial origin.	☐ 180-1	☐ 2	☐ 3	☐ 4	☐ 5
33.	The community has adequate emergency response plans for environmental disasters.	☐ 181-1	☐ 2	☐ 3	☐ 4	☐ 5
34.	Safe artificial hearts will be widely available in the near future.	☐ 182-1	☐ 2	☐ 3	☐ 4	☐ 5
35.	Air bags in motor vehicles save lives.	☐ 183-1	☐ 2	☐ 3	☐ 4	☐ 5
36.	Consumer products, such as computer screens and TV sets are being safely disposed of.	☐ 184-1	☐ 2	☐ 3	☐ 4	☐ 5
37.	If I don't see anything wrong with the fish then its okay to eat.	☐ 185-1	☐ 2	☐ 3	☐ 4	☐ 5
38.	I use less pesticides, herbicides, and fungicides than in the past.	☐ 186-1	☐ 2	☐ 3	☐ 4	☐ 5
39.	Lung cancer is more common now among women than breast cancer.	☐ 187-1	☐ 2	☐ 3	☐ 4	☐ 5
40.	Obesity can lead to adverse health effects.	☐ 188-1	☐ 2	☐ 3	☐ 4	☐ 5
41.	Videogames increase aggressive behavior among youth.	☐ 189-1	☐ 2	☐ 3	☐ 4	☐ 5
42.	I am willing to take health risks to live in a society with a lot of industrial development.	☐ 190-1	☐ 2	☐ 3	☐ 4	☐ 5

BASIC DATA:

Now in order to classify the data, I need some basic information about you. I will treat all of the following information as confidential.

(RECORD BY OBSERVATION)

1. **Gender:** **Female** ☐ 191-1 **Male** ☐ 191-2

2. In which of the following age categories do you belong?

18-24	☐ 192-1	45-54	☐ 192-4
25-29	☐ 192-2	55-64	☐ 192-5
30-44	☐ 192-3	65&over	☐ 192-6

3. In which education category do you belong?

Some/completed public school?	☐ 193-1
Some/completed high school?	☐ 193-2
Some/completed community college (CEGEP in Quebec)	☐ 193-3
Some/completed university	☐ 193-4
Some/completed graduate school	☐ 193-5

4. Place of residence: _____

(198,199)
(200,201)
(202,203)
(204,205)
(206,207)
(208,209)

Nia:wen for your time and cooperation.

TIME INTERVIEW ENDED _____ A.M.
P.M.

DISTRICT _____

INTERVIEWER'S NAME _____

DATE OF INTERVIEW _____

I hereby certify that this interview was conducted according to the questionnaire and instructions for this project. I also certify that the answers are as given to me by this respondent. I also acknowledge that a proportion of my work will be verified by head office with the respondent.

INTERVIEWER'S SIGNATURE: _____

FOR OFFICE USE ONLY:

CODED BY _____

CHECKED BY _____

VERIFIED BY _____

KEYPUNCHED BY _____

APPENDIX D--Analysis

Statistical Analysis of Survey Population

From the survey, it is of interest to estimate the proportion of respondents indicating "yes" to a specific question. Since the survey involves a two-stage cluster sampling design, it is important that the survey design is taken into account in the estimation process.

Let h_k denote the number of people 18 years of age or older in the k^{th} household in Akwesasne. Let $Y_k = 1$ or 0 if the respondent selected in that household indicated "yes" or "no", respectively, to the question of interest. The proportion of respondents indicating "yes" to that question in Akwesasne can then be estimated by

$$\hat{p} = \sum h_k Y_k / \sum h_k,$$

with variance

$$V(\hat{p}) = 1/(\sum h_k)^2 \sum_k \sum_l \triangle_{kl}^N [h_k h_l (Y_k - \hat{p})(Y_l - \hat{p})],$$

where

$$\triangle_{kl}^N = (n - N)/N(n - 1) \quad \text{if } k \neq l$$

and

$$\triangle_{kl}^N = (1 - n)/N h_k \quad \text{if } k = l,$$

Here, N denotes the total number of households in Akwesasne, and n denotes the number of households in the sample.

APPENDIX E—Re-test Questionnaire

AUGUST 26, 2002

3 PAGES

H.H. # _____

☐ ☐ ☐ ☐ ☐ ☐ ☐
1 2 3 4 5 6 7

INTRODUCTION:

Good morning/afternoon/evening. My name is _____, and I am currently employed by the Akwesasne Task Force on the Environment. Previously, you gave consent to do a ten-minute re-test of the risk perception survey that you completed within the last 4 weeks. This shortened version of the original survey will assess differences in your responses to the same questions you answered earlier. Also, your responses will help to determine the effectiveness of the original questions.

INTERVIEWER:

1. BE SURE THAT THE MEMBER OF THE HOUSEHOLD IS THE SAME PERSON THAT AGREED TO BE INTERVIEWED FOR THE RE-TEST. NO SUBSTITUTIONS MAY BE MADE.

NAME	AGE	M	F	MARK (X) FOR SELECTED RESPONDENT

2. CONTINUE THE INTERVIEW WITH ONLY THE SELECTED RESPONDENT, IF NECESSARY REINTRODUCE YOURSELF.
3. IF YOU ARE UNABLE TO CONTINUE THIS INTERVIEW – MARK REASON AND THE APPROPRIATE INFORMATION ON THE RECORD OF VISIT FOR THIS HOUSEHOLD AND ASK YOUR SUPERVISOR FOR FURTHER INSTRUCTIONS.
4. TIME INTERVIEWED STARTED _____ A.M.
P.M.

Evaluation of health issues can be complex. People have very different opinions about the conditions and issues that apply to health risks. I am going to read you a series of statements and ask for your personal opinion about each one. Please tell me whether you disagree strongly, disagree somewhat, agree somewhat, or agree strongly with each of the following statements of opinion.

	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/ No opinion
1. I believe my community is becoming a healthier place in which to live.	☐ 210-1	☐ 2	☐ 3	☐ 4	☐ 5
2. Industry is working hard to resolve health problems related to the environment in the best interest of the general public.	☐ 211-1	☐ 2	☐ 3	☐ 4	☐ 5
3. Economic development can be achieved without endangering health	☐ 212-1	☐ 2	☐ 3	☐ 4	☐ 5
4. Industry is attempting to reduce greenhouse gas emissions by building fuel-efficient vehicles, such as gasoline-electric hybrids	☐ 213-1	☐ 2	☐ 3	☐ 4	☐ 5
5. High-technology research, such as organ transplants and genetic engineering, is in the best interest of the public in the long term.	☐ 214-1	☐ 2	☐ 3	☐ 4	☐ 5
6. The governments adequately regulate high-technology research.	☐ 215-1	☐ 2	☐ 3	☐ 4	☐ 5
7. Catching too much fish will affect the community's health	☐ 216-1	☐ 2	☐ 3	☐ 4	☐ 5

Nia:wen for your time and cooperation.

TIME INTERVIEW ENDED _____ A.M.
P.M.

INTERVIEWER'S NAME _____

DATE OF INTERVIEW _____

I hereby certify that this interview was conducted according to the questionnaire and instructions for this project. I also certify that the answers are as given to me by this respondent. I also acknowledge that a proportion of my work will be verified by head office with the respondent.

INTERVIEWER'S SIGNATURE: _____

FOR OFFICE USE ONLY:

CODED BY _____

CHECKED BY _____

VERIFIED BY _____

KEYPUNCHED BY _____

APPENDIX F--Attached Figures

- 3a – d Perceived Health Risk of Selected Hazards to the Families of Akwesasne Based on Respondents' Age and Gender
- 5a – d Perceived Health Risk of Selected Hazards to the Community of Akwesasne Based on Respondents' Age and Gender
- 7a –d Comparison of Family and Community Perceived High Health Risk of Selected Hazards in Akwesasne Based on Respondents' Age and Gender
- 8a –d Perceived Health Risk to Families in Akwesasne to Medical Devices and Treatment Based on Respondents' Age and Gender

Figure 3a. Perceived Health Risk of Selected Hazards to the Families of Akwesasne Based on Respondents Less Than 40 Years of Age and Female

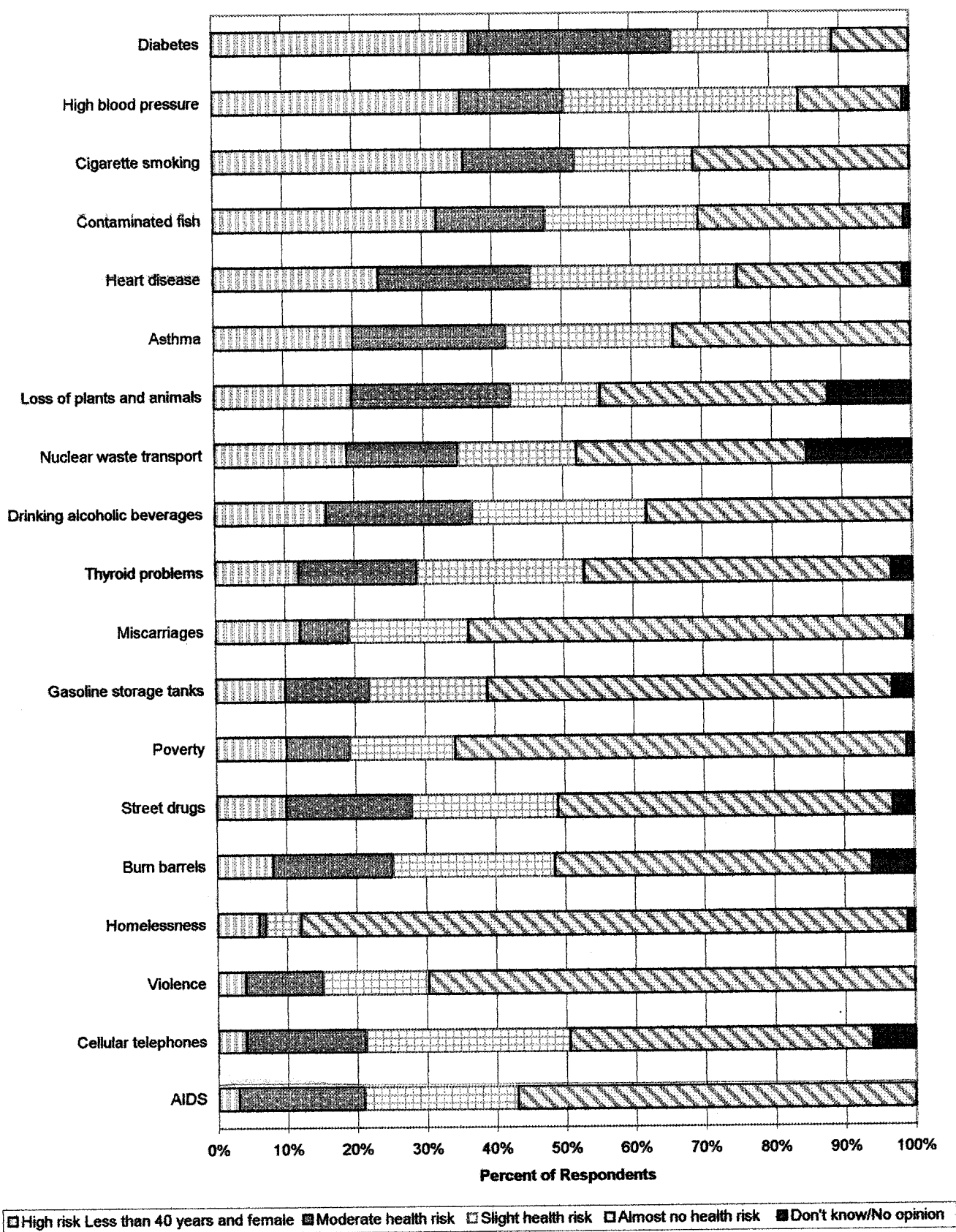


Figure 3b. Perceived Health Risk of Selected Hazards to the Families of Akwesasne Based on Respondents Less Than 40 Years of Age and Male

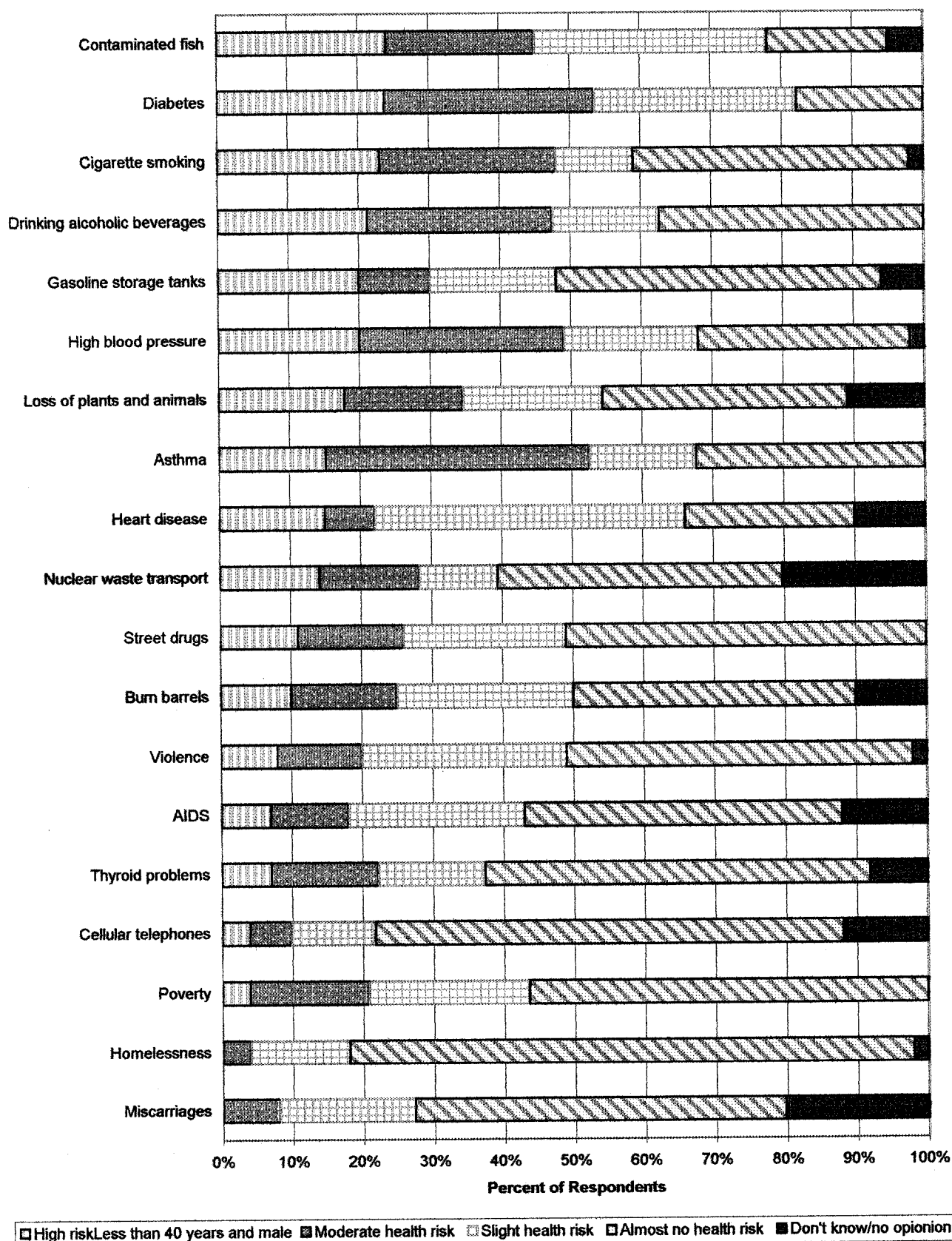


Figure 3c. Perceived Health Risk of Selected Hazards to the Families of Akwesasne Based on Respondents 40 Plus Years of Age and Female.

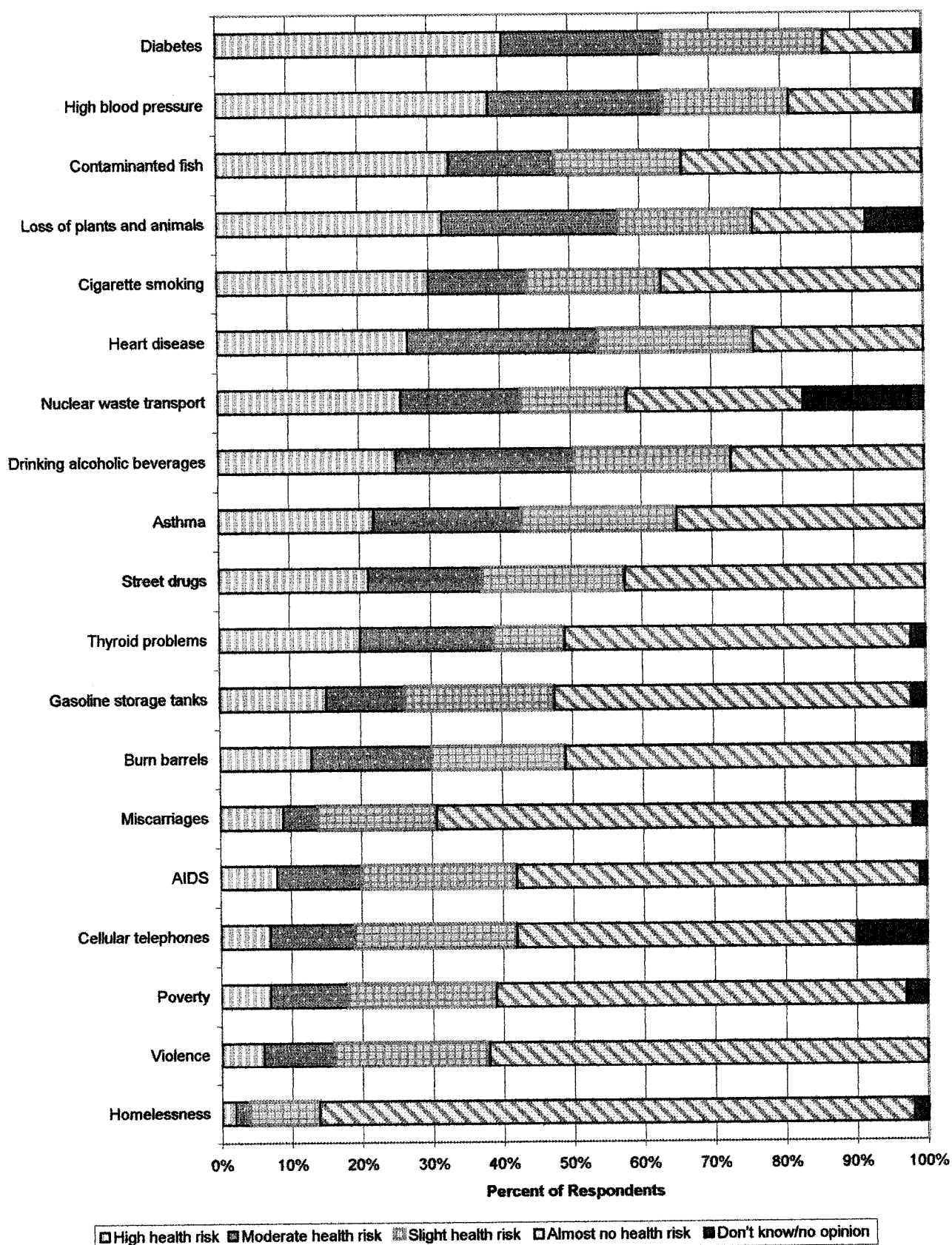


Figure 3d. Perceived Health Risk of Selected Hazards to the Families of Akwesasne Based on Respondents 40 Plus Years of Age and Male

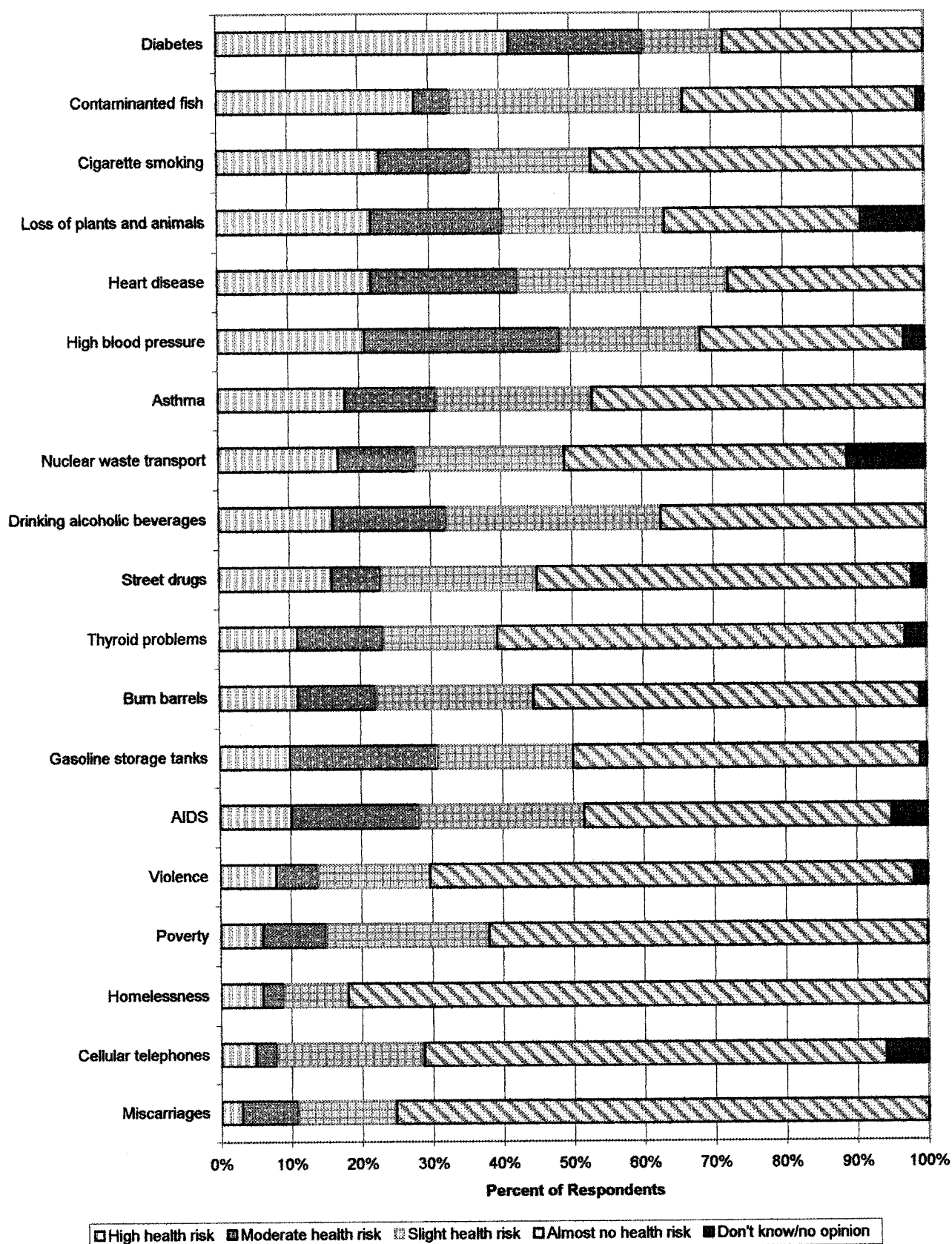


Figure 5a. Perceived Health Risk of Selected Hazards to the Community of Akwesasne Based on Respondents Less Than 40 Years of Age and Female

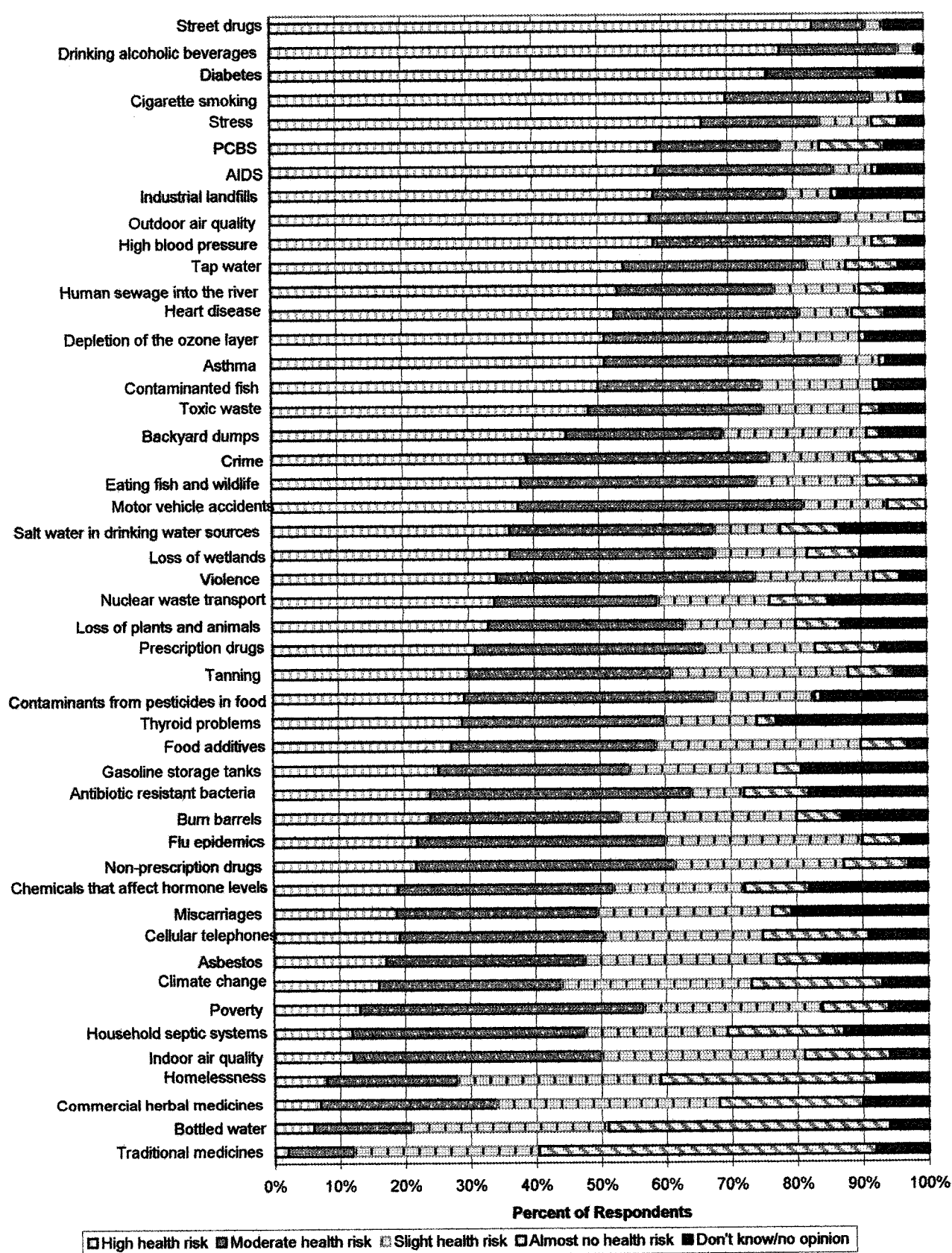


Figure 5b. Perceived Health Risk of Selected Hazards to the Community of Akwesasne Based on Less Than 40 Years of Age and Male

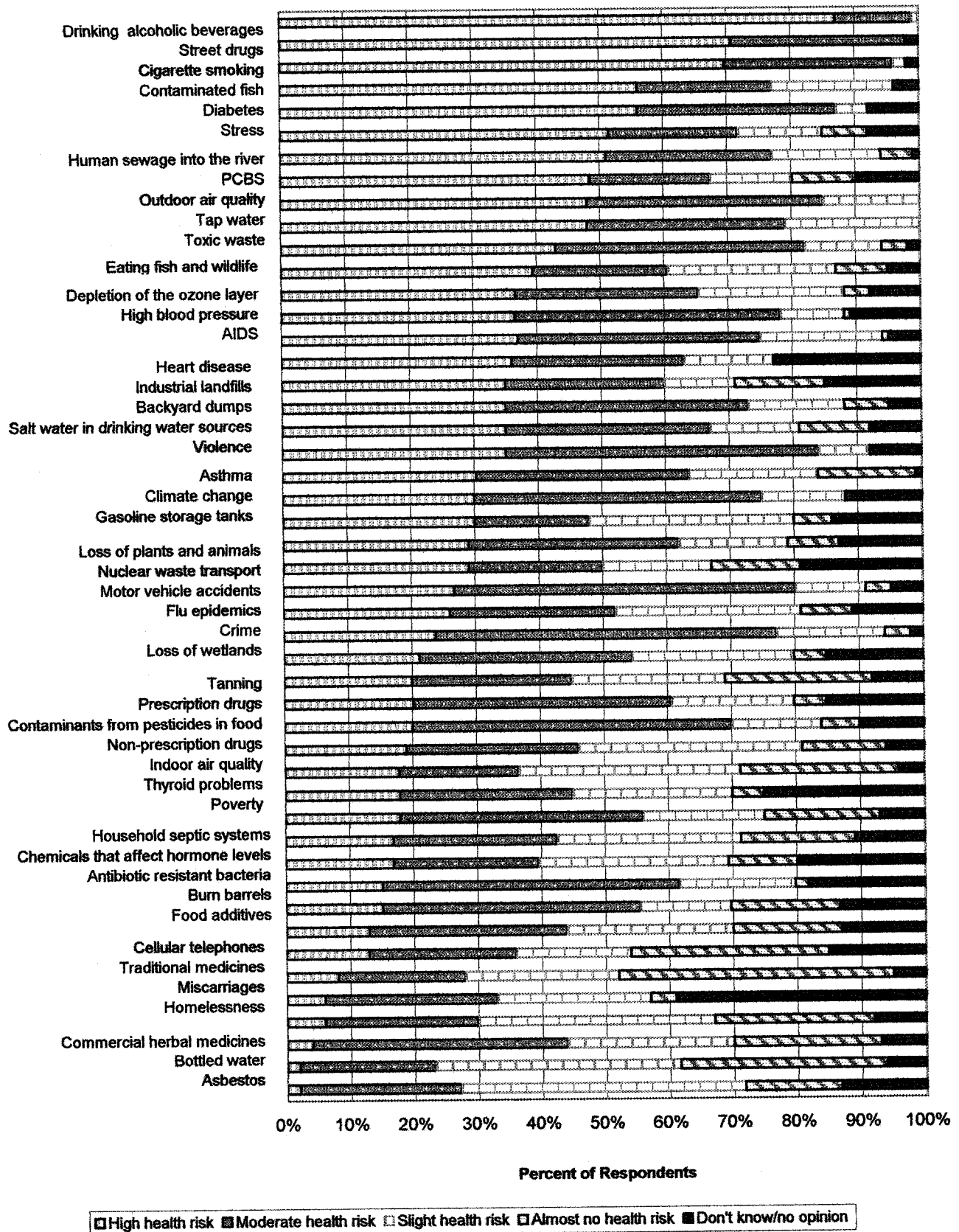


Figure 5c. Perceived Health Risk of Selected Hazards to the Community of Akwesasne Based on 40 Plus Years of Age and Female

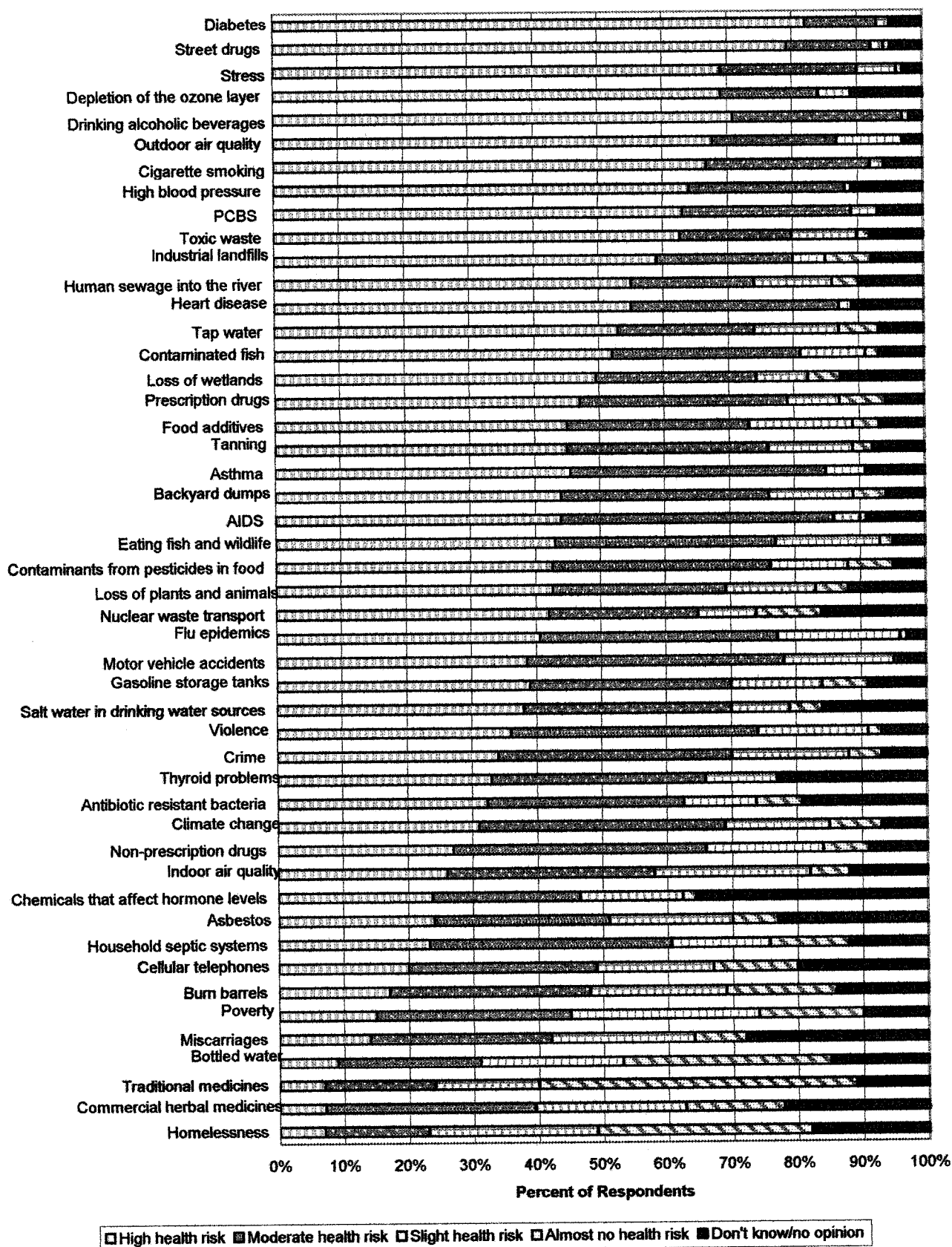


Figure 5d. Perceived Health Risk of Selected Hazards to the Community of Akwesasne Based on 40 Plus Years of Age and Male

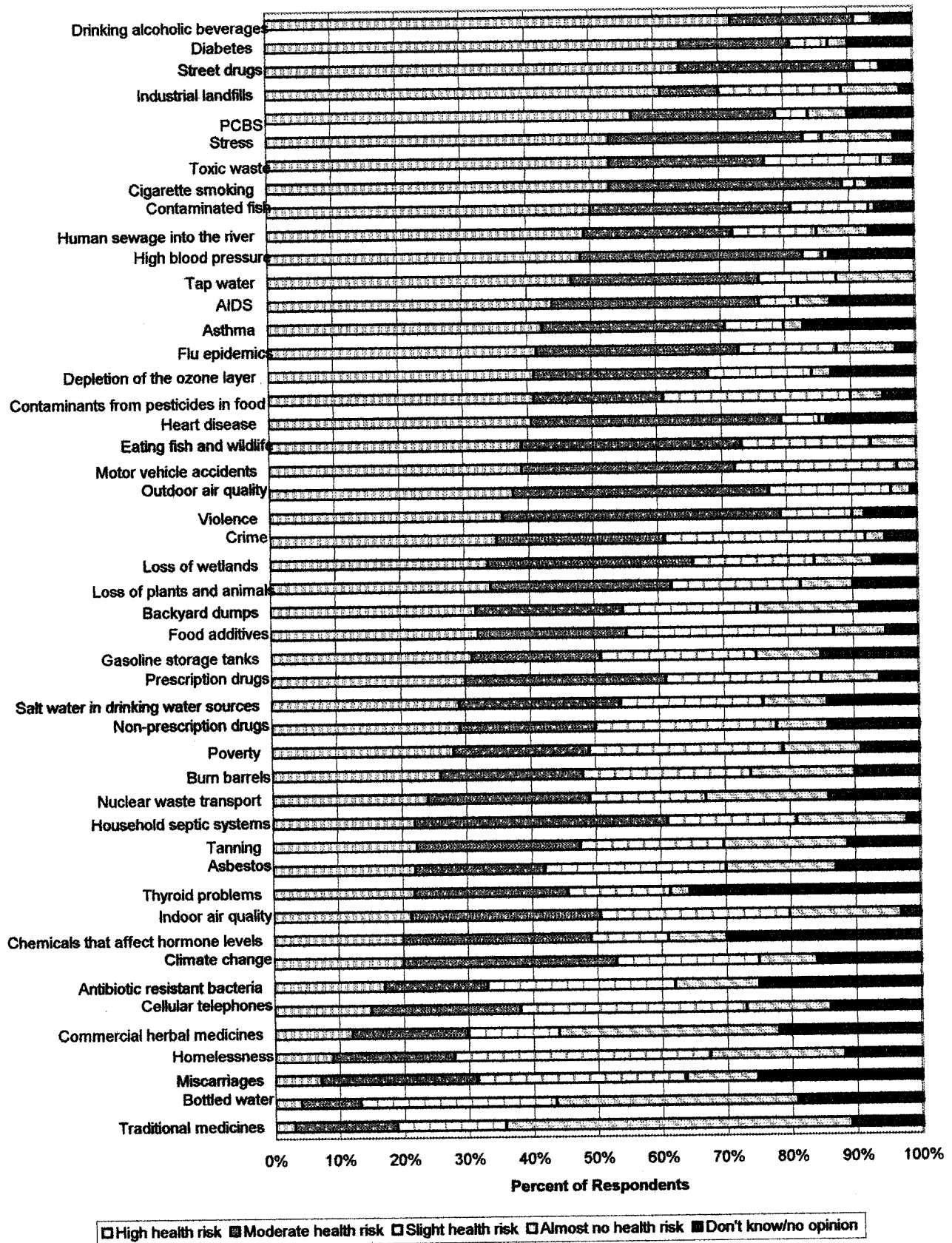


Figure 7a. Comparison of Family and Community Perceived High Health Risk of Selected Hazards in Akwesasne Based on Less Than 40 Years of Age and Female

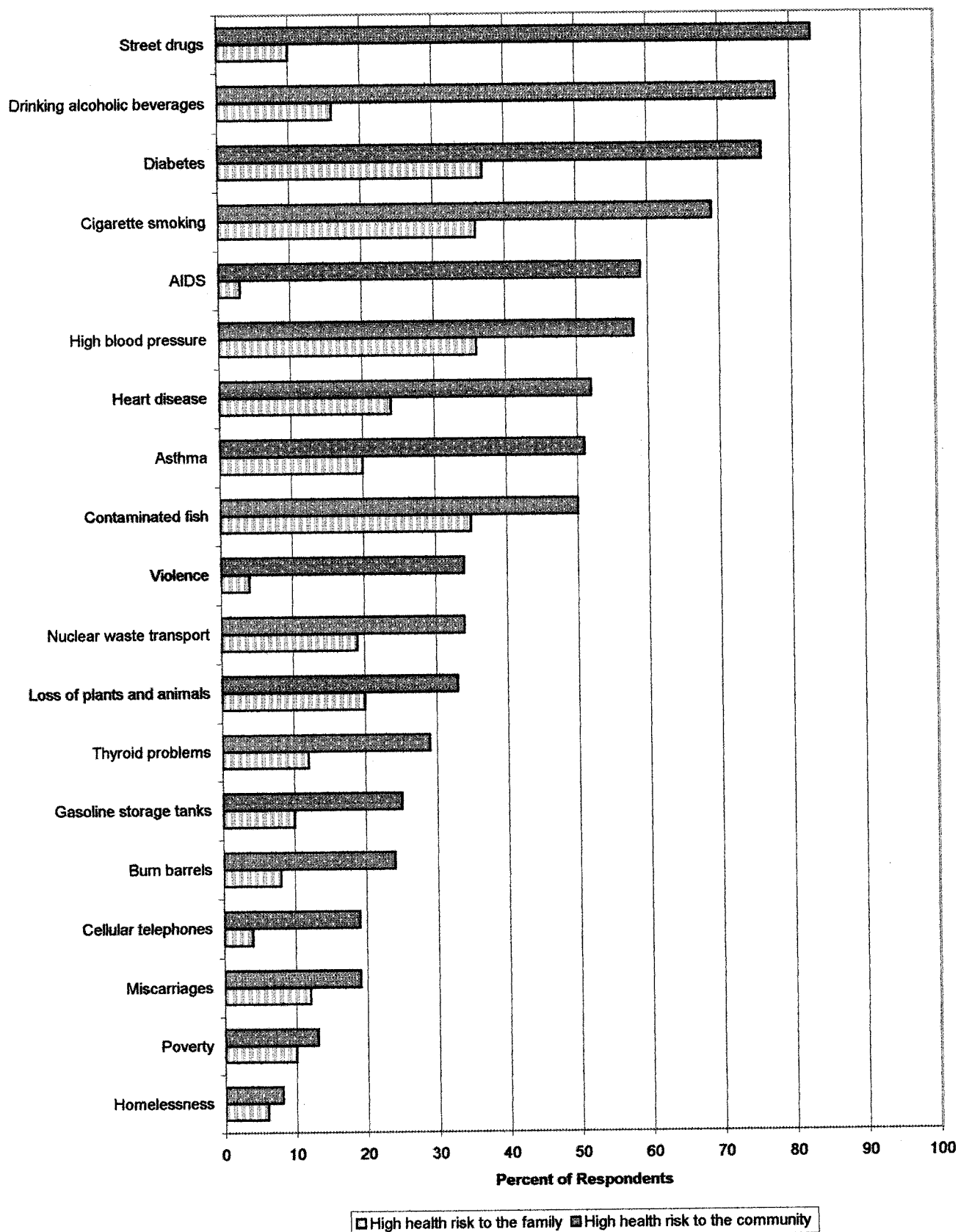


Figure 7b. Comparison of Family and Community Perceived High Health Risk of Selected Hazards in Akesasne Based on Less Than 40 Years of Age and Male

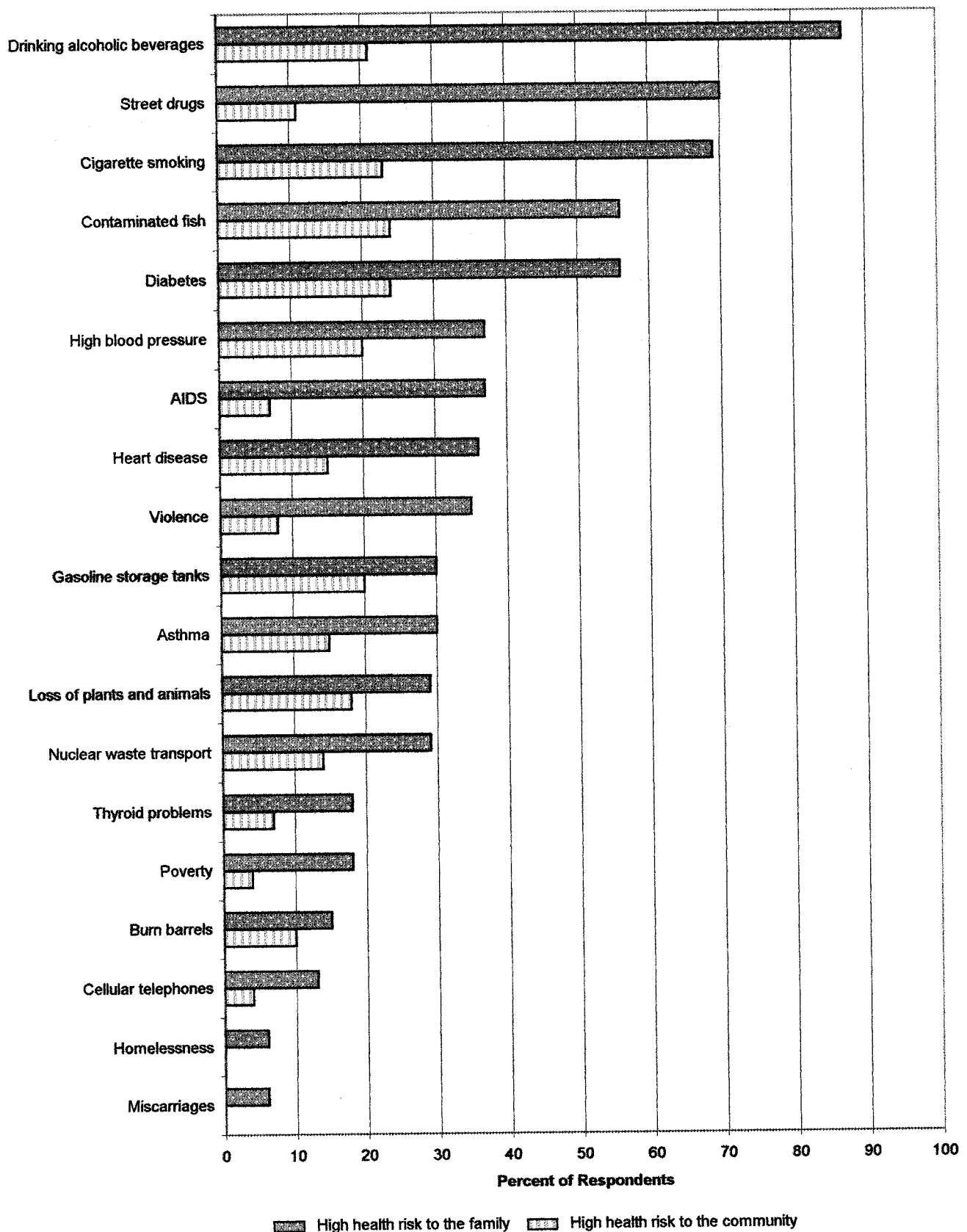


Figure 7c. Comparison of Family and Community Perceived High Health Risk of Selected Hazards in Akwesasne Based on 40 Plus Years of Age and Female

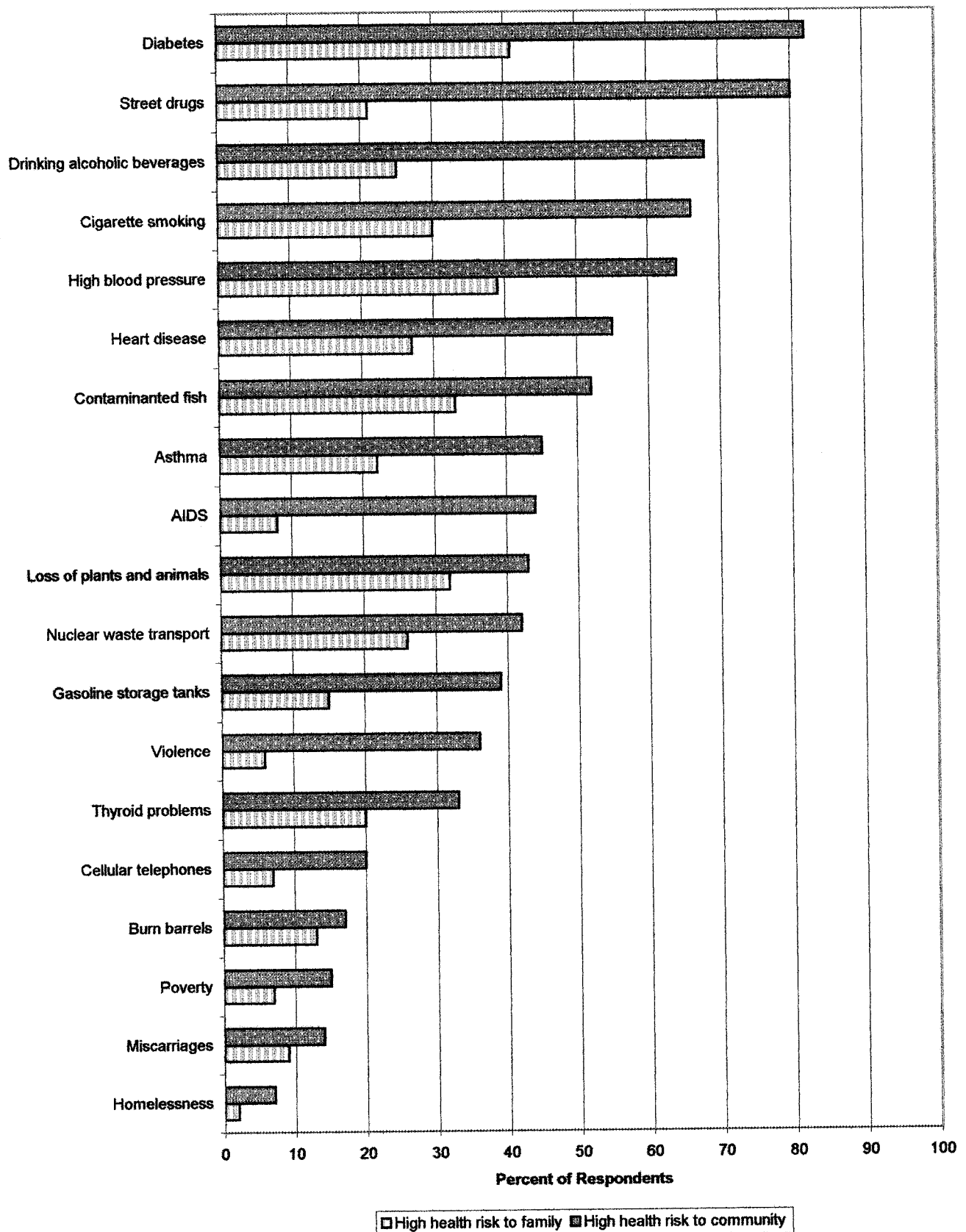


Figure 7d. Comparison of Family and Community Perceived High Health Risk of Selected Hazards in Akwesasne Based on 40 Plus Years of Age and Male

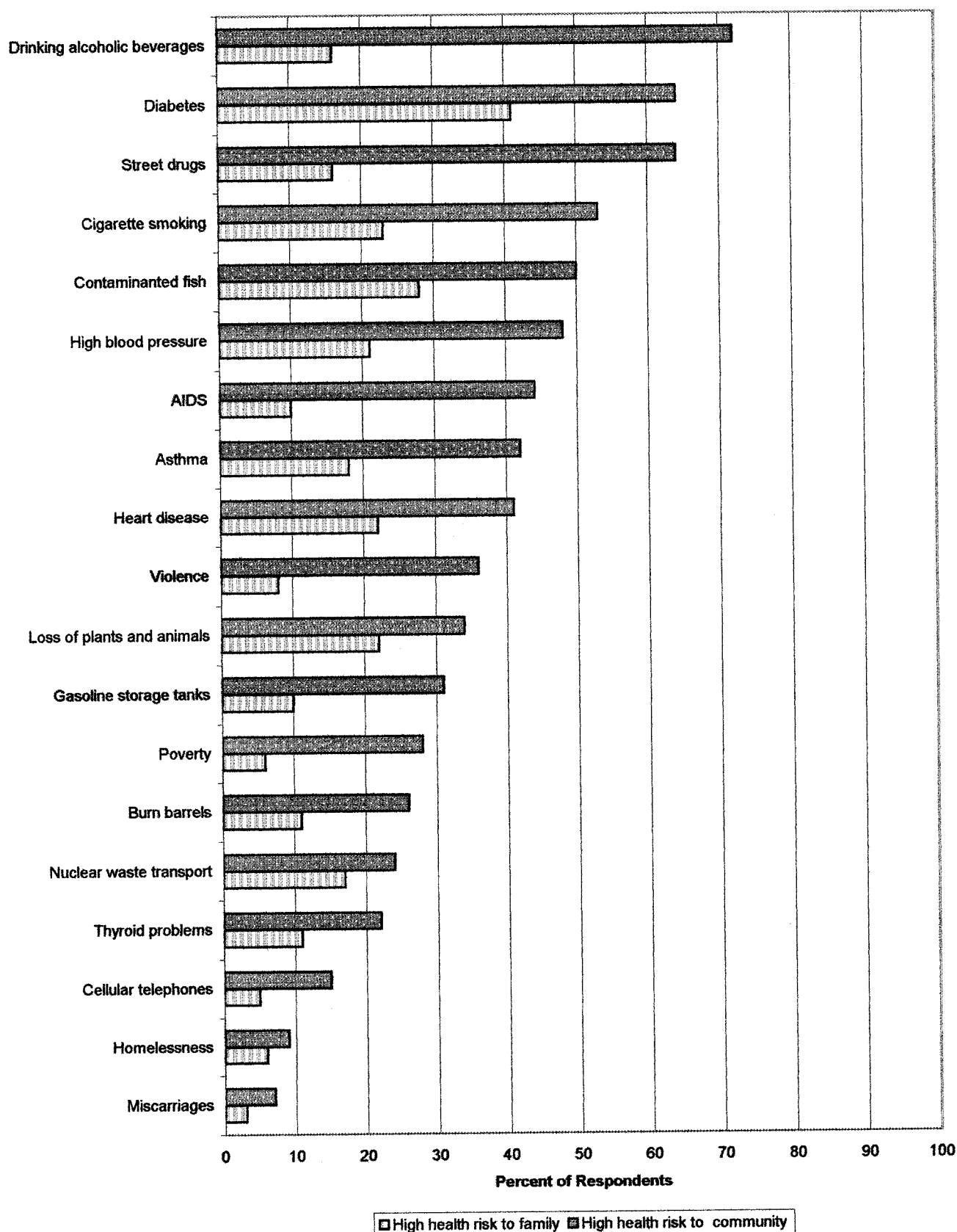


Figure 8a. Perceived Health Risk to Families in Akwesasne to Medical Devices and Treatments Based on Less Than 40 Years of Age and Female

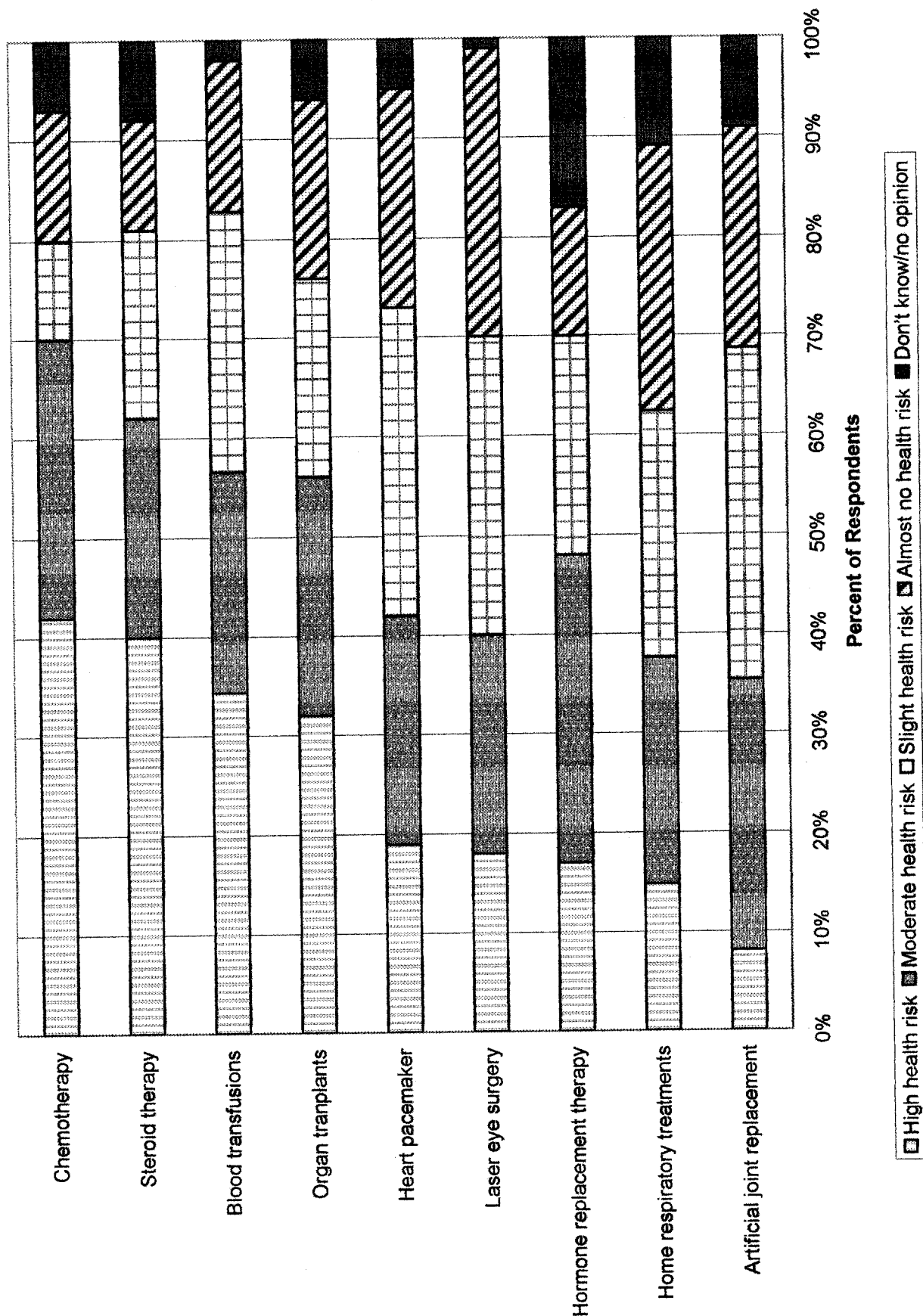


Figure 8b. Perceived Health Risk to Families in Akwesasne to Medical Devices and Treatments Based on Less Than 40 Years of Age and Male

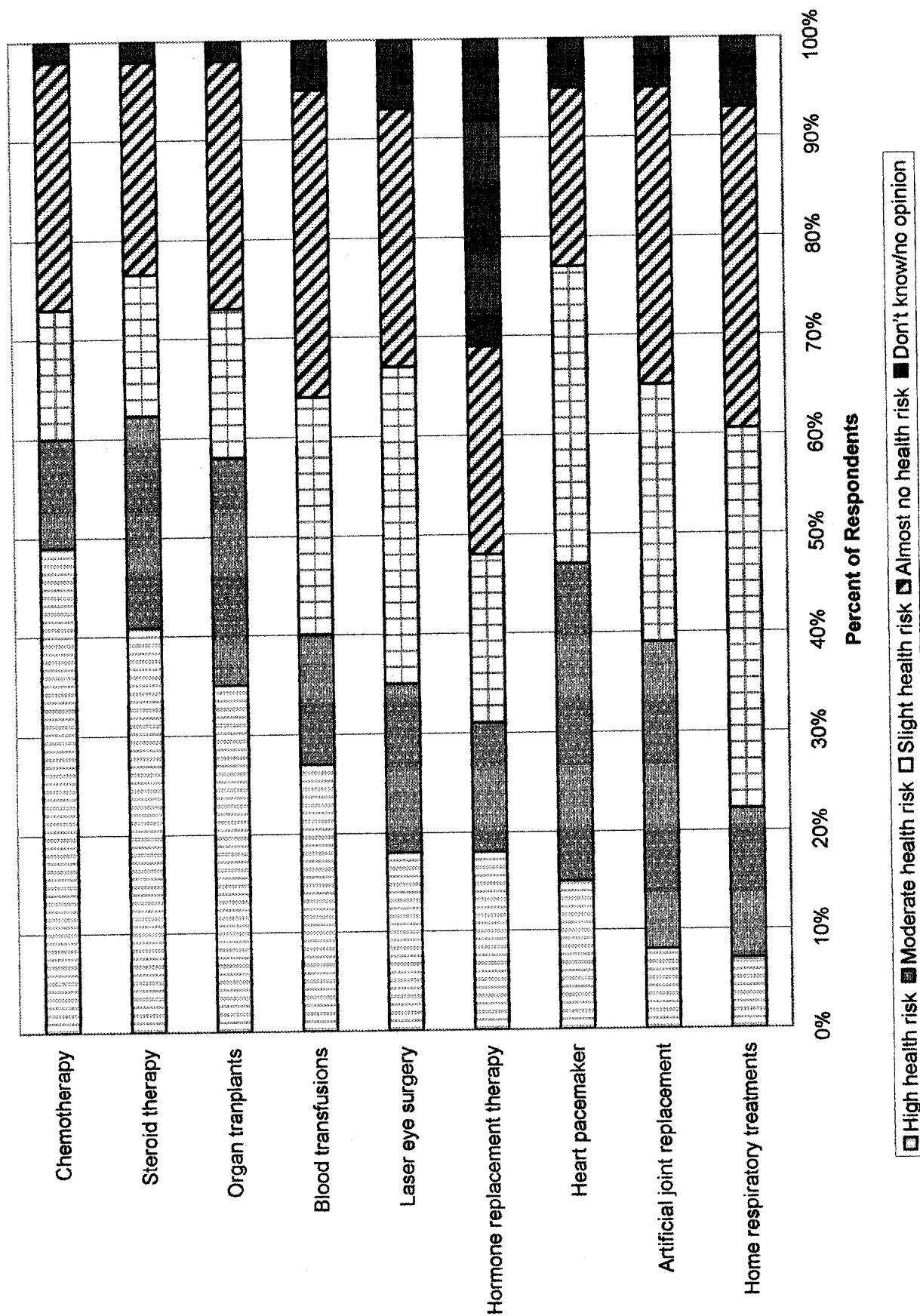


Figure 8c. Perceived Health Risk to Families in Akwesasne to Medical Devices and Treatments Based on 40 Plus Years of Age and Female

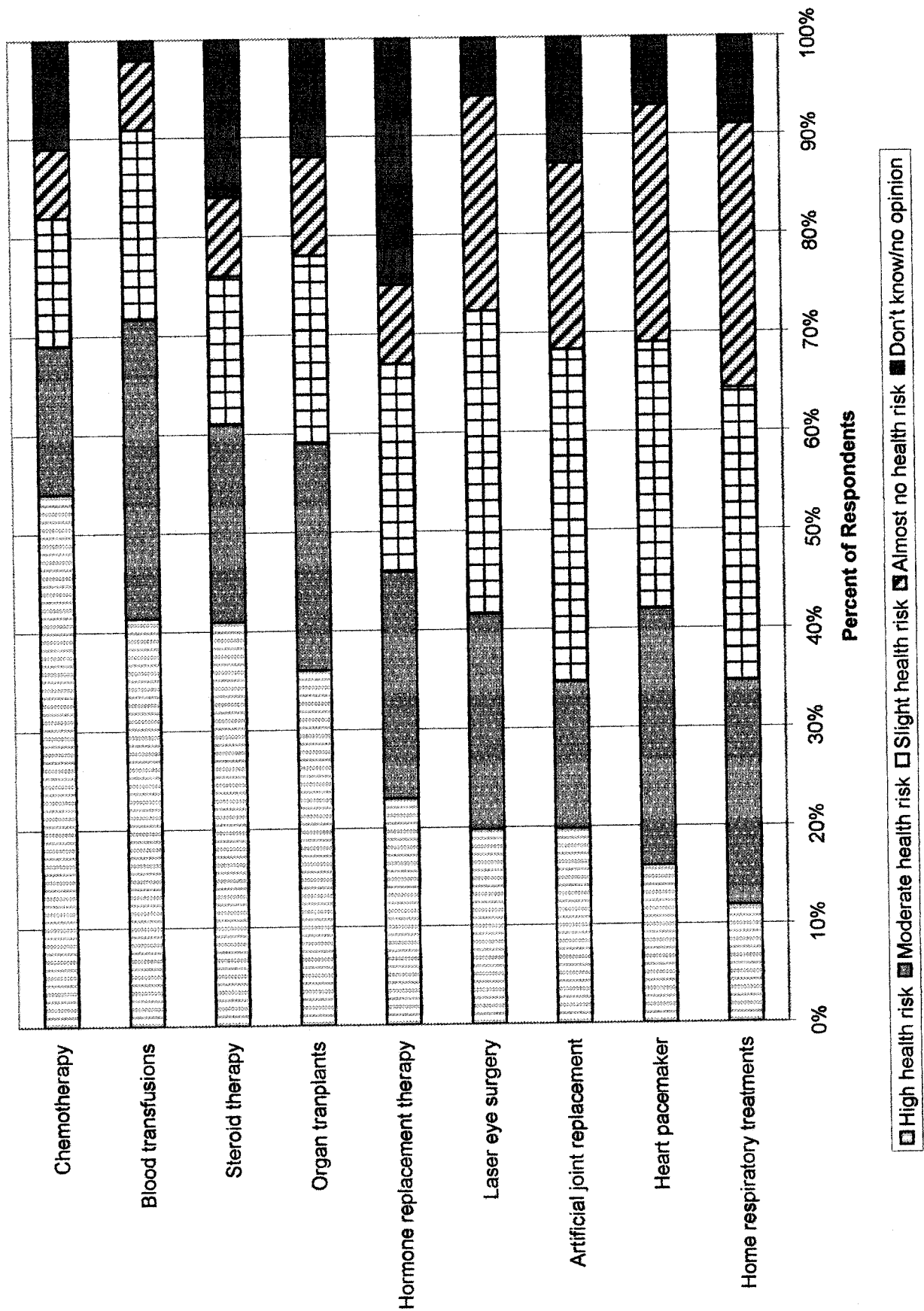
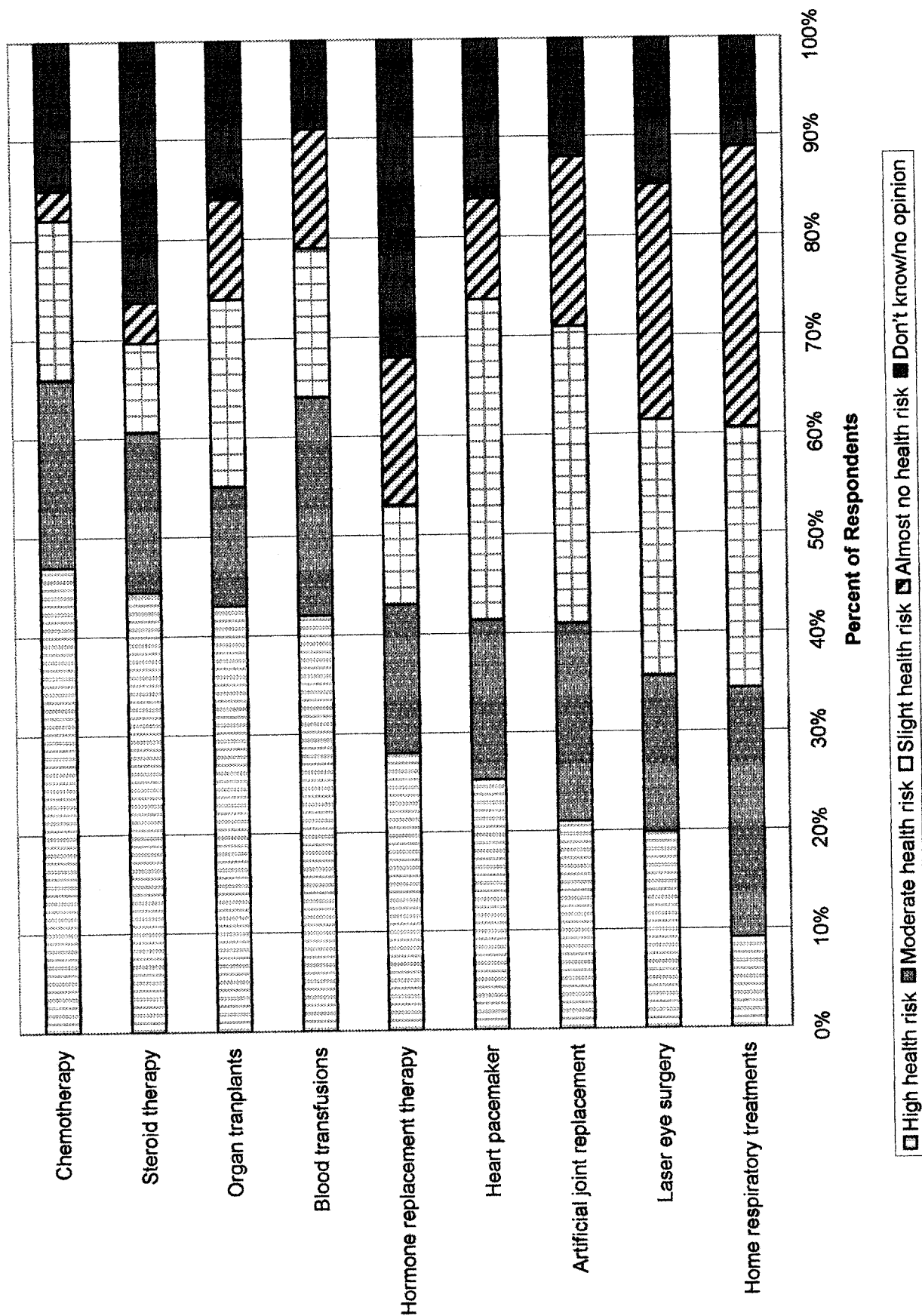


Figure 8d. Perceived Health Risk to Families in Akwesasne to Medical Devices and Treatments Based on 40 Plus Years of Age and Male



APPENDIX G--Attached Tables

4a – d	Sources of Information About Health Risks in the Community of Akwesasne Based on Respondents' Age and Gender
5a – d	Confidence in Sources of Information About Health Risks in the Community of Akwesasne Based on Respondents' Age and Gender
6a – d	Responsibility for Protecting People from Health Risks in the Community of Akwesasne Based on Respondents' Age and Gender
7a – d	Fulfillment of Responsibility for Protecting People from Health Risks in the Community of Akwesasne Based on Respondents' Age and Gender
8	Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne for All Respondents
8a - d	Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on Respondents' Age and Gender

Table 4a. Sources of Information About Health Risks in the Community of Akwesasne for Females Less Than 40 Years of Age

Source	Proportion of Respondents (SE)					Total
	A lot of information	A fair amount of information	A little information	Almost no information	Don't know/no opinion	
TV	.51 (.07)	.34 (.06)	.13 (.04)	.01 (.01)	0.0	100.0
Newspapers/newsletters	.41 (.07)	.35 (.07)	.21 (.05)	.03 (.02)	0.0	100.0
Medical doctors	.33 (.06)	.29 (.06)	.35 (.07)	.03 (.02)	0.0	100.0
Friends and relatives	.31 (.06)	.38 (.07)	.30 (.06)	.01 (.01)	0.0	100.0
Environmental groups	.29 (.06)	.24 (.05)	.29 (.05)	.17 (.05)	0.0	100.0
Radio	.28 (.06)	.34 (.06)	.30 (.06)	.05 (.02)	.01 (.01)	100.0
Traditional healers	.24 (.05)	.37 (.06)	.20 (.05)	.15 (.04)	.03 (.02)	100.0
Internet	.20 (.05)	.31 (.06)	.18 (.05)	.28 (.05)	.03 (.04)	100.0
Akwesasne governments	.16 (.05)	.26 (.06)	.34 (.06)	.17 (.05)	.07 (.03)	100.0
University scientists	.10 (.05)	.13 (.05)	.28 (.06)	.39 (.06)	.10 (.04)	100.0
Federal agencies	.08 (.04)	.20 (.05)	.29 (.05)	.34 (.06)	.08 (.04)	100.0
State/provincial governments	.08 (.04)	.08 (.04)	.32 (.06)	.34 (.06)	.07 (.04)	100.0
Industry	.06 (.04)	.12 (.05)	.34 (.05)	.42 (.06)	.03 (.05)	100.0

Table 4b. Sources of Information About Health Risks in the Community of Akwesasne for Males Less Than 40 Years of Age

Source	Proportion of Respondents (SE)					Total
	A lot of information	A fair amount of information	A little information	Almost no information	Don't know/no opinion	
Internet	.36 (.08)	.17 (.07)	.23 (.07)	.23 (.07)	.02 (.05)	100.0
Newspapers/ newsletters	.31 (.09)	.39 (.10)	.19 (.07)	.11 (.05)	0.0	100.0
TV	.30 (.09)	.38 (.10)	.21 (.07)	.10 (.05)	0.0	100.0
Medical doctors	.26 (.08)	.36 (.10)	.19 (.06)	.16 (.06)	.02 (.02)	100.0
Radio	.25 (.08)	.50 (.10)	.11 (.05)	.14 (.05)	0.0	100.0
Friends and relatives	.21 (.08)	.39 (.11)	.31 (.08)	.08 (.04)	0.0	100.0
Environmental groups	.15 (.06)	.44 (.09)	.27 (.07)	.13 (.05)	0.0	100.0
Traditional healers	.12 (.05)	.32 (.08)	.30 (.08)	.21 (.07)	.05 (.04)	100.0
University scientists	.07 (.06)	.23 (.08)	.33 (.08)	.31 (.08)	.06 (.06)	100.0
Akwesasne governments	.06 (.04)	.21 (.07)	.30 (.08)	.40 (.09)	.02 (.03)	100.0
Federal agencies	.06 (.06)	.27 (.08)	.29 (.07)	.36 (.08)	.02 (.06)	100.0
State/provincial governments	.04 (.05)	.26 (.08)	.27 (.07)	.38 (.08)	.05 (.05)	100.0
Industry	.02 (.06)	.24 (.08)	.29 (.08)	.43 (.08)	.03 (.05)	100.0

Table 4c. Sources of Information About Health Risks in the Community of Akwesasne for Females 40 Plus Years of Age

Source	Proportion of Respondents (SE)					Total
	A lot of information	A fair amount of information	A little information	Almost no information	Don't know/no opinion	
Newspapers/newsletters	.48 (.07)	.30 (.05)	.17 (.04)	.05 (.02)	0.0	100.0
TV	.42 (.06)	.36 (.06)	.19 (.05)	.03 (.01)	0.0	100.0
Medical doctors	.34 (.06)	.30 (.05)	.22 (.04)	.13 (.04)	.01 (.0)	100.0
Radio	.31 (.05)	.35 (.06)	.24 (.05)	.10 (.02)	0.0	100.0
Friends and relatives	.26 (.05)	.32 (.06)	.33 (.05)	.09 (.03)	0.0	100.0
Traditional healers	.25 (.04)	.25 (.05)	.23 (.04)	.20 (.04)	.06 (.03)	100.0
Internet	.23 (.05)	.15 (.04)	.07 (.03)	.48 (.05)	.07 (.03)	100.0
Environmental groups	.21 (.05)	.39 (.05)	.27 (.05)	.09 (.03)	.02 (.02)	100.0
Akwesasne governments	.14 (.03)	.34 (.05)	.27 (.05)	.20 (.04)	.02 (.02)	100.0
University scientists	.08 (.04)	.15 (.04)	.19 (.04)	.46 (.05)	.11 (.04)	100.0
Federal agencies	.05 (.03)	.21 (.05)	.32 (.05)	.32 (.05)	.09 (.04)	100.0
State/provincial governments	.05 (.03)	.27 (.05)	.34 (.05)	.27 (.05)	.06 (.03)	100.0
Industry	.04 (.03)	.18 (.05)	.22 (.04)	.50 (.05)	.09 (.04)	100.0

Table 4d. Sources of Information About Health Risks in the Community of Akwesasne for Males 40 Plus Years of Age

Source	Proportion of Respondents					Total
	A lot of information	A fair amount of information	A little information	Almost no information	Don't know/no opinion	
TV	.56 (.10)	.29 (.07)	.11 (.04)	.03 (.03)	0.0	100.0
Newspapers/ newsletters	.35 (.08)	.43 (.09)	.12 (.05)	.09 (.04)	0.0	100.0
Radio	.34 (.08)	.31 (.07)	.25 (.07)	.09 (.04)	0.0	100.0
Friends and relatives	.34 (.08)	.34 (.08)	.22 (.06)	.10 (.04)	0.0	100.0
Akwesasne governments	.34 (.06)	.30 (.05)	.22 (.04)	.21 (.04)	.01 (.0)	100.0
Traditional healers	.29 (.07)	.21 (.06)	.28 (.06)	.20 (.05)	.03 (.03)	100.0
Medical doctors	.28 (.06)	.37 (.08)	.19 (.06)	.16 (.06)	0.0	100.0
Environmental groups	.24 (.06)	.30 (.07)	.29 (.06)	.16 (.05)	0.0	100.0
Internet	.16 (.05)	.13 (.05)	.11 (.05)	.53 (.07)	.07 (.04)	100.0
University scientists	.11 (.06)	.15 (.06)	.18 (.06)	.48 (.07)	.08 (.06)	100.0
Federal agencies	.09 (.05)	.09 (.05)	.39 (.07)	.38 (.07)	.05 (.05)	100.0
Industry	.07 (.06)	.11 (.06)	.29 (.07)	.51 (.07)	.02 (.05)	100.0
State/provincial governments	.05 (.05)	.21 (.06)	.37 (.07)	.33 (.06)	.04 (.05)	100.0

Table 5a. Confidence in Sources of Information About Health Risks in the Community of Akwesasne for Females Less Than 40 Years of Age

Source	Proportion of Respondents(SE)					Total
	A lot of confidence	A fair amount of confidence	A little confidence	Almost no confidence	Don't know/no opinion	
Traditional healers	.44 (.07)	.31 (.07)	.15 (.04)	.06 (.03)	.05 (.02)	100.0
Medical doctors	.43 (.07)	.38 (.07)	.13 (.04)	.06 (.03)	0.0	100.0
TV	.36 (.07)	.40 (.07)	.21 (.05)	.03 (.02)	0.0	100.0
Radio	.33 (.07)	.44 (.07)	.20 (.05)	.02 (.01)	.01 (.01)	100.0
Newspapers/new sletters	.30 (.07)	.41 (.07)	.24 (.05)	.04 (.02)	.01 (.01)	100.0
Friends and relatives	.24 (.06)	.48 (.08)	.29 (.06)	0.0	1.4	100.0
University scientists	.24 (.05)	.28 (.06)	.29 (.06)	.07 (.03)	.13 (.04)	100.0
Akwesasne governments	.21 (.05)	.34 (.06)	.25 (.05)	.16 (.04)	.35 (.03)	100.0
Internet	.15 (.07)	.38 (.07)	.25 (.05)	.10 (.04)	.11 (.04)	100.0
Environmental groups	.13 (.04)	.31 (.06)	.24 (.05)	.06 (.03)	.06 (.03)	100.0
Federal agencies	.13 (.04)	.31 (.06)	.27 (.05)	.23 (.04)	.06 (.03)	100.0
State/provincial governments	.13 (.04)	.30 (.06)	.27 (.05)	23 (.05)	.07 (.04)	100.0
Industry	.06 (.04)	.15 (.05)	.34 (.06)	.37 (.06)	.08 (.05)	100.0

Table 5b. Confidence in Sources of Information About Health Risks in the Community of Akwesasne Males Less Than 40 Years of Age

Source	Proportion of Respondents (SE)					Total
	A lot of confidence	A fair amount of confidence	A little confidence	Almost no confidence	Don't know/no opinion	
Medical doctors	.38 (.09)	.48 (.11)	.13 (.06)	.01 (.01)	0.0	100.0
Traditional healers	.35 (.06)	.31 (.06)	.18 (.04)	.05 (.02)	.10 (.03)	100.0
Newspapers/newsletters	.35 (.06)	.42 (.06)	.18 (.04)	.05 (.02)	0 (0)	100.0
Environmental groups	.26 (.07)	.32 (.09)	.35 (.09)	.01 (.01)	.06 (.04)	100.0
Friends and relatives	.21 (.07)	.33 (.09)	.36 (.09)	.07 (.04)	.02 (.02)	100.0
Internet	.20 (.05)	.13 (.03)	.19 (.04)	.30 (.05)	.08 (.04)	100.0
University scientists	.18 (.06)	.25 (.08)	.40 (.09)	.10 (.05)	.07 (.04)	100.0
Federal agencies	.14 (.06)	.18 (.07)	.20 (.06)	.40 (.09)	.07 (.05)	100.0
TV	.12 (.05)	.49 (.11)	.32 (.09)	.07 (.04)	0.0	100.0
Akwesasne governments	.11 (.05)	.37 (.09)	.24 (.07)	.29 (.08)	0.0	100.0
Radio	.11 (.05)	.48 (.11)	.36 (.09)	.06 (.03)	0 (0)	100.0
State/provincial governments	.08 (.04)	.08 (.08)	.29 (.07)	.30 (.08)	.02 (.04)	100.0
Industry	.07 (.06)	.17 (.07)	.37 (.08)	.39 (.08)	0.0	100.0

Table 5c. Confidence in Sources of Information About Health Risks in the Community of Akwesasne for Females 40 Plus Years of Age

Source	Proportion of Respondents					Total
	A lot of confidence	A fair amount of confidence	A little confidence	Almost no confidence	Don't know/no opinion	
Medical doctors	.37 (.06)	.47 (.06)	.08 (.03)	.06 (.02)	.02 (.01)	100.0
Traditional healers	.35 (.06)	.32 (.06)	.18 (.04)	.05 (.02)	.10 (.03)	100.0
Newspapers/newsletters	.35 (.06)	.42 (.06)	.18 (.04)	.05 (.02)	0 (0)	100.0
Environmental groups	.33 (.06)	.40 (.06)	.17 (.04)	.02 (.01)	.07 (.03)	100.0
TV	.27 (.04)	.50 (.07)	.14 (.04)	.07 (.03)	.02 (.01)	100.0
Radio	.26 (.05)	.43 (.07)	.20 (.04)	.09 (.03)	.02 (0)	100.0
Friends and relatives	.25 (.05)	.42 (.07)	.25 (.05)	.07 (.02)	0 (0)	100.0
University scientists	.23 (.05)	.24 (.04)	.16 (.04)	.16 (.04)	.21 (.04)	100.0
Internet	.20 (.05)	.13 (.03)	.19 (.04)	.30 (.05)	.18 (.04)	100.0
Akwesasne governments	.16 (.04)	.35 (.06)	.29 (.05)	.14 (.03)	.07 (.03)	100.0
Federal agencies	.15 (.04)	.23 (.04)	.27 (.05)	.23 (.04)	.13 (.04)	100.0
State/provincial governments	.09 (.03)	.32 (.05)	.26 (.04)	.22 (.04)	.11 (.03)	100.0
Industry	.09 (.04)	.17 (.04)	.26 (.05)	.40 (.05)	.07 (.04)	100.0

Table 5d. Confidence in Sources of Information About Health Risks in the Community of Akwesasne for Males 40 Plus Years of Age

Source	Proportion of Respondents					Total
	A lot of confidence	A fair amount of confidence	A little confidence	Almost no confidence	Don't know/no opinion	
TV	.27 (.07)	.44 (.09)	.23 (.06)	.02 (.02)	.03 (.03)	100.0
Traditional healers	.26 (.07)	.36 (.07)	.22 (.06)	.07 (.03)	.09 (.04)	100.0
Radio	.24 (.06)	.43 (.09)	.26 (.07)	.01 (.01)	.05 (.03)	100.0
Environmental groups	.23 (.07)	.34 (.07)	.25 (.06)	.17 (.06)	.00 (.00)	100.0
Newspapers/newsletters	.22 (.07)	.46 (.08)	.21 (.07)	.08 (.04)	.03 (.02)	100.0
Friends and relatives	.20 (.06)	.47 (.09)	.22 (.05)	.08 (.04)	.03 (.02)	100.0
University scientists	.19 (.06)	.27 (.07)	.22 (.06)	.20 (.06)	.13 (.05)	100.0
Internet	.17 (.06)	.20 (.05)	.16 (.06)	.30 (.06)	.16 (.05)	100.0
Akwesasne governments	.09 (.04)	.40 (.08)	.29 (.07)	.19 (.05)	.03 (.02)	100.0
Federal agencies	.09 (.04)	.35 (.07)	.18 (.05)	.34 (.07)	.03 (.03)	100.0
Medical doctors	.06 (.05)	.16 (.06)	.06 (.03)	.08 (.04)	.04 (.05)	100.0
Industry	.06 (.06)	.16 (.06)	.29 (.06)	.44 (.07)	.04 (.04)	100.0
State/provincial governments	.05 (.04)	.34 (.07)	.28 (.06)	.28 (.06)	.05 (.03)	100.0

Table 6a.. Responsibility for Protecting People from Health Risks in the Community of Akwesasne for Females Less Than 40 Years of Age

Source	Proportion of Respondents (SE)					Total
	Major responsibility	Moderate responsibility	Some responsibility	No responsibility	Don't know/no opinion	
Medical doctors	.67 (.09)	.26 (.06)	.06 (.03)	0 (0)	.01 (.01)	100.0
Provincial/state government	.66 (.09)	.17 (.05)	.12 (.04)	.01 (.01)	.03 (.02)	100.0
Individual citizens with regard to their personal health	.65 (.09)	.20 (.05)	.08 (.03)	.03 (.02)	.04 (.03)	100.0
Health Canada or EPA	.63 (.09)	.22 (.05)	.03 (.02)	.03 (.02)	.08 (.03)	100.0
Mohawk Council of Akwesasne	.57 (.08)	.29 (.06)	.10 (.04)	.01 (.01)	.03 (.02)	100.0
Other health professionals (nurses)	.57 (.08)	.31 (.07)	.10 (.03)	0 (0)	.01 (.01)	100.0
Akwesasne Task Force on the Environment	.57 (.09)	.22 (.05)	.12 (.04)	.02 (.02)	.06 (.03)	100.0
Environmental groups	.57 (.09)	.26 (.06)	.13 (.04)	0 (0)	.03 (.02)	100.0
St. Regis Mohawk Tribe	.56 (.08)	.24 (.05)	.10 (.04)	.04 (.02)	.06 (.04)	100.0
Mohawk Nation Council of Chiefs	.55 (.08)	.27 (.06)	.12 (.04)	.01 (.01)	.06 (.03)	100.0
Private industry	.53 (.08)	.21 (.05)	.14 (.04)	.06 (.03)	.06 (.03)	100.0
Traditional healers	.40 (.02)	.37 (.07)	.20 (.05)	.01 (.01)	.02 (.01)	100.0
Friends & relatives	.39 (.07)	.34 (.06)	.22 (.05)	.03 (.02)	.01 (.01)	100.0

Table 6b. Responsibility for Protecting People from Health Risks in the Community of Akwesasne for Males Less Than 40 Years of Age

Source	Proportion of Respondents (SE)					Total
	Major responsibility	Moderate responsibility	Some responsibility	No responsibility	Don't know/no opinion	
Provincial/state government	.76 (.14)	.08 (.04)	.13 (.06)	0 (0)	.02 (.02)	100.0
Medical doctors	.71 (.13)	.29 (.09)	0 (0)	0 (0)	0 (0)	100.0
Health Canada or EPA	.65 (.12)	.18 (.06)	.13 (.06)	0 (0)	.04 (.03)	100.0
Akwesasne Task Force on the Environment	.58 (.12)	.26 (.08)	.07 (.05)	0 (0)	.08 (.06)	100.0
Mohawk Council of Akwesasne	.54 (.11)	.30 (.08)	.12 (.06)	0 (0)	.05 (.05)	100.0
Private industry	.53 (.08)	.21 (.05)	.29 (.09)	.01 (.01)	.06 (.03)	100.0
Individual citizens with regard to their personal health	.51 (.11)	.31 (.09)	.15 (.06)	0 (0)	.02 (.02)	100.0
Other health professionals (nurses)	.50 (.10)	.32 (.09)	.19 (.07)	0 (0)	0 (0)	100.0
St. Regis Mohawk Tribe	.49 (.10)	.37 (.09)	.04 (.03)	.04 (.03)	.07 (.05)	100.0
Mohawk Nation Council of Chiefs	.45 (.10)	.32 (.09)	.12 (.06)	.04 (.03)	.07 (.05)	100.0
Traditional healers	.32 (.09)	.37 (.09)	.19 (.08)	.08 (.04)	.04 (.03)	100.0
Friends & relatives	.30 (.09)	.35 (.09)	.30 (.08)	.06 (.05)	0 (0)	100.0
Environmental groups	.29 (.08)	.45 (.11)	.26 (.09)	0 (0)	0 (0)	100.0

Table 6c. Responsibility for Protecting People from Health Risks in the Community of Akwesasne for Females 40 Plus Years of Age

Source	Proportion of Respondents (SE)					Total
	Major responsibility	Moderate responsibility	Some responsibility	No responsibility	Don't know/no opinion	
Medical doctors	.80 (.08)	.13 (.03)	.05 (.02)	0 (0)	.02 (.01)	100.0
Mohawk Council of	.73 (.08)	.12 (.03)	.07 (.02)	.01 (.01)	.07 (.02)	100.0
Health Canada or EPA	.65 (.09)	.14 (.03)	.06 (.02)	0 (0)	.07 (.02)	100.0
Other health professionals (nurses)	.68 (.08)	.19 (.04)	.08 (.03)	.02 (.01)	.02 (.01)	100.0
St. Regis Mohawk Tribe	.68 (.08)	.16 (.04)	.05 (.02)	.03 (.02)	.07 (.03)	100.0
Akwesasne Task Force on the Environment	.67 (.08)	.19 (.04)	.07 (.02)	0 (0)	.08 (.06)	100.0
Provincial/state government	.63 (.08)	.23 (.04)	.07 (.02)	.02 (.01)	.04 (.02)	100.0
Mohawk Nation Council of Chiefs	.63 (.08)	.14 (.04)	.10 (.03)	0 (0)	.12 (.03)	100.0
Environmental groups	.59 (.08)	.28 (.05)	.08 (.02)	.01 (.01)	.04 (.02)	100.0
Individual citizens with regard to their personal health	.57 (.05)	.26 (.05)	.08 (.02)	.05 (.02)	.04 (.02)	100.0
Private industry	.52 (.07)	.25 (.05)	.12 (.03)	.02 (.01)	.09 (.03)	100.0
Traditional healers	.45 (.07)	.27 (.05)	.18 (.04)	.03 (.02)	.07 (.03)	100.0
Friends & relatives	.26 (.05)	.35 (.06)	.31 (.05)	.04 (.02)	.05 (.02)	100.0

Table 6d. Responsibility for Protecting People from Health Risks in the Community of Akwesasne for Males 40 Plus Years of Age

Source	Proportion of Respondents (SE)					Total
	Major responsibility	Moderate responsibility	Some responsibility	No responsibility	Don't know/no opinion	
Other health professionals (nurses)	.68 (.08)	.19 (.04)	.08 (.03)	.02 (.01)	.02 (.01)	100.0
Provincial/state government	.66 (.11)	.15 (.05)	.15 (.05)	.02 (.01)	.03 (.02)	100.0
Medical doctors	.65 (.09)	.24 (.07)	.08 (.05)	0 (0)	.03 (.02)	100.0
Health Canada or EPA	.64 (.10)	.16 (.06)	.08 (.04)	.03 (.02)	.09 (.04)	100.0
Individual citizens with regard to their personal health	.56 (.09)	.25 (.07)	.13 (.05)	0 (0)	.05 (.03)	100.0
Mohawk Council of Akwesasne	.54 (.09)	.29 (.08)	.07 (.03)	.04 (.03)	.05 (.03)	100.0
Traditional healers	.53 (.09)	.21 (.06)	.20 (.06)	.04 (.03)	.03 (.01)	100.0
St. Regis Mohawk Tribe	.52 (.09)	.35 (.08)	.07 (.03)	.03 (.02)	.03 (.03)	100.0
Mohawk Nation Council of Chiefs	.51 (.09)	.28 (.08)	.09 (.04)	.02 (.02)	.10 (.05)	100.0
Akwesasne Task Force on the Environment	.49 (.09)	.33 (.08)	.12 (.05)	0 (0)	.06 (.03)	100.0
Private industry	.48 (.08)	.19 (.06)	.19 (.06)	.04 (.02)	.09 (.04)	100.0
Environmental groups	.45 (.09)	.31 (.08)	.17 (.06)	.05 (.03)	.02 (.01)	100.0
Friends & relatives	.37 (.08)	.28 (.07)	.18 (.05)	.13 (.05)	.03 (.02)	100.0

Table 7a. Fulfillment of Responsibility for Protecting People from Health Risks in the Community of Akwesasne for Females Less Than 40 Years of Age

Source	Proportion of Respondents (SE)					Total
	Excellent	Good	Adequate	Poor	Don't know/no opinion	
Medical doctors	.17 (.05)	.50 (.07)	.23 (.05)	.10 (.03)	0 (0)	100.0
Other health professionals (nurses)	.17 (.05)	.59 (.08)	.16 (.04)	.06 (.03)	.01 (.01)	100.0
Akwesasne Task Force on the Environment	.14 (.04)	.46 (.08)	.21 (.05)	.09 (.03)	.10 (.04)	100.0
Environmental groups	.13 (.04)	.53 (.08)	.24 (.06)	.03 (.02)	.06 (.03)	100.0
Traditional healers	.11 (.04)	.55 (.08)	.24 (.06)	.05 (.02)	.05 (.02)	100.0
Friends & relatives	.08 (.03)	.53 (.08)	.23 (.05)	.08 (.03)	.09 (.03)	100.0
Mohawk Council of Akwesasne	.06 (.03)	.45 (.07)	.23 (.05)	.20 (.05)	.07 (.04)	100.0
Mohawk Nation Council of Chiefs	.06 (.03)	.35 (.06)	.26 (.06)	.15 (.04)	.19 (.05)	100.0
St. Regis Mohawk Tribe	.06 (.04)	.33 (.06)	.28 (.06)	.26 (.05)	.06 (.04)	100.0
Health Canada or EPA	.04 (.02)	.47 (.08)	.23 (.05)	.08 (.03)	.19 (.05)	100.0
Provincial/state government	.03 (.03)	.33 (.06)	.26 (.05)	.31 (.06)	.07 (.04)	100.0
Individual citizens with regard to their personal health	0 (0)	.13 (.05)	.28 (.06)	.38 (.06)	.20 (.05)	100.0
Private industry	0 (0)	.13 (.05)	.28 (.06)	.38 (.06)	.20 (.05)	100.0

Table 7b. Fulfillment of Responsibility for Protecting People from Health Risks in the Community of Akwesasne for Males Less Than 40 Years of Age

Source	Proportion of Respondents (SE)					Total
	Excellent	Good	Adequate	Poor	Don't know/no opinion	
Medical doctors	.20 (.07)	.57 (.11)	.18 (.06)	.05 (.03)	0 (0)	100.0
Other health professionals (nurses)	.16 (.07)	.57 (.11)	.23 (.07)	.04 (.03)	0 (0)	100.0
Environmental groups	.13 (.04)	.53 (.08)	.24 (.06)	.04 (.02)	.06 (.03)	100.0
Akwesasne Task Force on the Environment	.12 (.04)	.60 (.12)	.19 (.06)	.05 (.03)	.04 (.03)	100.0
Traditional healers	.12 (.05)	.44 (.11)	.30 (.08)	.06 (.03)	.08 (.04)	100.0
Friends & relatives	.12 (.06)	.40 (.09)	.30 (.08)	.13 (.05)	.05 (.04)	100.0
Health Canada or EPA	.11 (.05)	.38 (.09)	.27 (.07)	.13 (.06)	.11 (.05)	100.0
St. Regis Mohawk Tribe	.11 (.06)	.27 (.08)	.30 (.07)	.29 (.08)	.04 (.04)	100.0
Provincial/state government	.07 (.05)	.31 (.08)	.25 (.07)	.36 (.06)	.01 (.05)	100.0
Mohawk Council of Akwesasne	.06 (.04)	.36 (.09)	.26 (.07)	.29 (.08)	.04 (.04)	100.0
Individual citizens with regard to their personal health	.05 (.06)	.19 (.07)	.16 (.07)	.50 (.08)	.10 (.07)	100.0
Private industry	.05 (.06)	.19 (.07)	.17 (.07)	.50 (.08)	.10 (.07)	100.0
Mohawk Nation Council of Chiefs	.02 (.02)	.35 (.09)	.24 (.07)	.24 (.07)	.15 (.06)	100.0

Table 7c. Fulfillment of Responsibility for Protecting People from Health Risks in the Community of Akwesasne for Females 40 Plus Years of Age

Source	Proportion of Respondents (SE)					Total
	Excellent	Good	Adequate	Poor	Don't know/no opinion	
Medical doctors	.16 (.03)	.51 (.07)	.23 (.05)	.08 (.03)	.02 (.02)	100.0
Environmental groups	.15 (.04)	.41 (.06)	.29 (.05)	.06 (.02)	.10 (.03)	100.0
Other health professionals (nurses)	.13 (.03)	.58 (.07)	.23 (.05)	.03 (.02)	.03 (.02)	100.0
Akwesasne Task Force on the Environment	.11 (.03)	.47 (.07)	.23 (.04)	.04 (.02)	.15 (.03)	100.0
Traditional healers	.07 (.02)	.54 (.07)	.15 (.04)	.05 (.02)	.19 (.04)	100.0
Mohawk Council of Akwesasne	.05 (.02)	.39 (.06)	.26 (.04)	.11 (.03)	.18 (.04)	100.0
Health Canada or EPA	.05 (.02)	.33 (.06)	.24 (.04)	.17 (.04)	.20 (.04)	100.0
St. Regis Mohawk Tribe	.05 (.03)	.31 (.05)	.20 (.04)	.31 (.05)	.14 (.04)	100.0
Mohawk Nation Council of Chiefs	.05 (.02)	.32 (.05)	.18 (.04)	.14 (.04)	.30 (.05)	100.0
Friends & relatives	.03 (.01)	.53 (.07)	.27 (.04)	.09 (.03)	.08 (.02)	100.0
Individual citizens with regard to their personal health	.01 (.01)	.09 (.04)	.23 (.05)	.46 (.05)	.21 (.05)	100.0
Provincial/state government	.01 (.01)	.27 (.05)	.31 (.05)	.30 (.05)	.10 (.04)	100.0
Private industry	.01 (.03)	.09 (.04)	.23 (.05)	.46 (.05)	.21 (.05)	100.0

Table 7d. Fulfillment of Responsibility for Protecting People from Health Risks in the Community of Akwesasne for Males 40 Plus Years of Age

Source	Proportion of Respondents (SE)					Total
	Excellent	Good	Adequate	Poor	Don't know/no opinion	
Traditional healers	.15 (.05)	.48 (.09)	.21 (.06)	.05 (.03)	.11 (.04)	100.0
Friends & relatives	.14 (.05)	.44 (.09)	.27 (.06)	.11 (.04)	.04 (.03)	100.0
Medical doctors	.09 (.04)	.66 (.09)	.18 (.06)	.02 (.02)	.05 (.03)	100.0
Mohawk Council of Akwesasne	.09 (.04)	.34 (.07)	.34 (.07)	.20 (.05)	.03 (.03)	100.0
Other health professionals (nurses)	.07 (.03)	.71 (.10)	.16 (.05)	.02 (.01)	.05 (.03)	100.0
Mohawk Nation Council of Chiefs	.06 (.03)	.34 (.07)	.31 (.07)	.16 (.05)	.12 (.04)	100.0
Akwesasne Task Force on the Environment	.05 (.03)	.45 (.08)	.32 (.07)	.16 (.05)	.03 (.02)	100.0
Environmental groups	.05 (.02)	.45 (.08)	.33 (.08)	.13 (.04)	.04 (.02)	100.0
Health Canada or EPA	.04 (.03)	.39 (.08)	.33 (.08)	.12 (.05)	.12 (.04)	100.0
St. Regis Mohawk Tribe	.03 (.03)	.37 (.07)	.31 (.07)	.27 (.06)	.03 (.03)	100.0
Individual citizens with regard to their personal health	.03 (.05)	.16 (.06)	.22 (.06)	.46 (.07)	.14 (.06)	100.0
Private industry	.03 (.05)	.16 (.06)	.22 (.06)	.46 (.07)	.14 (.06)	100.0
Provincial/state government	.02 (.04)	.22 (.06)	.32 (.07)	.41 (.07)	.04 (.04)	100.0

Table 8. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne for All Respondents

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
<i>Category 1: Local and global environmental health risks</i>					
There are serious health problems related to the environment where I live.	.03 (.01)	.05 (.02)	.23 (.03)	.67 (.03)	.01 (.01)
The land, air, and water around us are, in general, more contaminated now than ever before.	.02 (.01)	.05 (.02)	.20 (.03)	.71 (.03)	.02 (.01)
I believe my community is becoming a healthier place in which to live.	.34 (.03)	.30 (.03)	.30 (.03)	.05 (.01)	.02 (.01)
The loss of clean fish and animals makes me angry.	.02 (.01)	.05 (.01)	.17 (.03)	.74 (.03)	.02 (.01)
Children and the elderly are at more risk to health problems related to the environment than other individuals within my community.	.09 (.02)	.07 (.02)	.24 (.03)	.59 (.03)	.01 (.01)
Restoring the environment will resolve some health problems.	.03 (.01)	.09 (.02)	.53 (.03)	.33 (.03)	.02 (.01)
Natural events, such as severe windstorms, hurricanes, and flooding are the result of global climate change.	.02 (.01)	.07 (.02)	.39 (.03)	.40 (.03)	.11 (.02)
Industry is attempting to reduce greenhouse gas emissions by building fuel-efficient vehicles, such as gasoline-electric hybrids.	.10 (.02)	.11 (.02)	.43 (.03)	.09 (.02)	.27 (.03)
Catching too much fish will affect the community's health.	.05 (.01)	.17 (.02)	.30 (.03)	.35 (.03)	.12 (.02)
The community has adequate emergency response plans for environmental disasters.	.10 (.02)	.09 (.02)	.45 (.03)	.23 (.03)	.13 (.02)
<i>Category 2: General opinions and health risk from chemicals</i>					
I can safely dispose of any chemical in my sink or backyard.	.83 (.02)	.09 (.02)	.03 (.01)	.02 (.01)	.03 (.01)
I use less pesticides, herbicides, and fungicides than in the past.	.06 (.01)	.04 (.01)	.26 (.03)	.43 (.03)	.22 (.03)
<i>Category 3: Attitudes toward regulation</i>					
The governments do not adequately protect endangered species.	.19 (.03)	.26 (.03)	.24 (.03)	.06 (.01)	.25 (.03)
The governments adequately regulate high-technology research.	.19 (.03)	.26 (.03)	.24 (.03)	.06 (.01)	.25 (.03)
If a specific activity is hazardous to my health, the government or health professionals will warn me about the risk.	.33 (.03)	.26 (.03)	.29 (.03)	.09 (.02)	.04 (.01)

Table 8. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne for All Respondents

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
Governments should encourage private industry to develop innovative means to address environment and health problems of industrial origin.	.03 (.01)	.04 (.01)	.20 (.02)	.65 (.03)	.08 (.02)
Consumer products sold in Canada/U.S. have been adequately tested prior to marketing.	.13 (.02)	.34 (.03)	.32 (.03)	.09 (.02)	.13 (.02)
Consumer products, such as computer screens and TV sets are being safely disposed of.	.15 (.02)	.18 (.03)	.12 (.02)	.03 (.01)	.52 (.03)
<i>Category 4: Questions pertaining to cancer</i>					
If I live a healthy lifestyle, such as eating the right foods, getting enough rest, and exercising, I will never get cancer.	.57 (.03)	.26 (.03)	.10 (.02)	.04 (.01)	.03 (.01)
Most cancers are hereditary in nature.	.23 (.03)	.28 (.03)	.27 (.03)	.12 (.02)	.10 (.02)
Lung cancer is more common now among women than breast cancer.	.13 (.02)	.15 (.02)	.17 (.03)	.18 (.02)	.36 (.03)
<i>Category 5: Willingness to entertain risk/benefit tradeoffs</i>					
I feel that the St. Lawrence-FDR Dam has been beneficial to the community.	.44 (.03)	.19 (.03)	.14 (.02)	.03 (.01)	.20 (.02)
Economic development can be achieved without endangering health.	.08 (.02)	.14 (.02)	.41 (.03)	.29 (.03)	.08 (.02)
Hazardous materials can be safely transported through Akwesasne.	.56 (.03)	.14 (.02)	.18 (.02)	.05 (.01)	.07 (.01)
High-technology research, such as organ transplants and genetic engineering, is in the best interest of the public in the long term.	.17 (.03)	.17 (.02)	.36 (.03)	.10 (.02)	.02 (.02)
Traditional medicines must be taken with care due to side effects.	.07 (.02)	.10 (.02)	.33 (.03)	.37 (.03)	.13 (.02)
If someone told me not to eat the fish from a particular source I would listen.	.02 (.01)	.08 (.02)	.30 (.03)	.59 (.03)	.01 (0)
Safe artificial hearts will be widely available in the near future.	.13 (.02)	.12 (.02)	.31 (.03)	.12 (.02)	.33 (.03)
Air bags in motor vehicles save lives.	.05 (.01)	.14 (.02)	.45 (.03)	.27 (.03)	.08 (.02)
If I don't see anything wrong with the fish then its okay to eat.	.55 (.03)	.24 (.03)	.09 (.02)	.05 (.01)	.07 (.02)
I am willing to take health risks to live in a society with a lot of industrial development.	.60 (.03)	.18 (.02)	.11 (.02)	.05 (.01)	.06 (.01)

Table 8. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne for All Respondents

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
<i>Category 6: Pro-active behavior</i>					
Decisions about health risks should be left to the experts.	.34 (.03)	.30 (.03)	.19 (.03)	.16 (.02)	.02 (.01)
There is nothing much I can do to help resolve health problems related to the environment.	.39 (.03)	.33 (.03)	.15 (.02)	.07 (.02)	.06 (.01)
I often seek information to see what I could do to help me resolve health problems.	.03 (.01)	.10 (.02)	.43 (.03)	.40 (.03)	.03 (.01)
My participation in an environmental group will help improve environmental quality.	.03 (.01)	.05 (.01)	.51 (.03)	.30 (.03)	.10 (.02)
If I don't help resolve health problems related to the environment someone else will.	.26 (.03)	.31 (.03)	.25 (.03)	.06 (.02)	.11 (.02)
<i>Category 7: Miscellaneous questions</i>					
I believe that a risk-free environment is an attainable goal in Akwesasne.	.08 (.02)	.22 (.03)	.37 (.03)	.29 (.03)	.04 (.01)
Social factors, such as family get togethers, are important in determining my health status.	.04 (.01)	.05 (.01)	.45 (.03)	.40 (.03)	.06 (.01)
Spiritual factors, such as giving thanks, are important in determining my health status.	.03 (.01)	.10 (.02)	.43 (.03)	.40 (.03)	.03 (.01)
Obesity can lead to adverse health effects.	.01 (.01)	.02 (.01)	.13 (.02)	.82 (.03)	.02 (.01)
Videogames increase aggressive behavior among youth.	.05 (.01)	.08 (.02)	.31 (.03)	.44 (.03)	.11 (.02)
Industry is working hard to resolve health problems related to the environment in the best interest of the general public.	.35 (.03)	.27 (.03)	.27 (.03)	.05 (.01)	.01 (.01)

Table 8a. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on Less Than 40 Years of Age and Female

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
<i>Category1: Local and global environmental health risks</i>					
There are serious health problems related to the environment where I live.	.09 (.04)	.32 (.02)	.22 (.05)	.65 (.06)	.01 (.01)
The land, air, and water around us are, in general, more contaminated now than ever before.	.04 (.02)	.01 (.01)	.19 (.05)	.72 (.06)	.03 (.02)
I believe my community is becoming a healthier place in which to live.	.31 (.06)	.33 (.06)	.27 (.05)	.06 (.03)	.03 (.02)
The loss of clean fish and animals makes me angry.	.04 (.02)	.04 (.02)	.19 (.05)	.72 (.05)	.01 (.01)
Children and the elderly are at more risk to health problems related to the environment than other individuals within my community.	.13 (.04)	.11 (.04)	.24 (.05)	.52 (.06)	0 (0)
Restoring the environment will resolve some health problems.	.04 (.02)	.16 (.05)	.43 (.06)	.35 (.06)	.03 (.02)
Natural events, such as severe windstorms, hurricanes, and flooding are the result of global climate change.	.03 (.02)	.04 (.02)	.49 (.06)	.35 (.06)	.09 (.04)
Industry is attempting to reduce greenhouse gas emissions by building fuel-efficient vehicles, such as gasoline-electric hybrids.	.06 (.03)	.12 (.04)	.43 (.06)	.06 (.03)	.34 (.06)
Catching too much fish will affect the community's health.	.09 (.04)	.29 (.06)	.24 (.05)	.24 (.05)	.13 (.04)
The community has adequate emergency response plans for environmental disasters.	.05 (.02)	.11 (.04)	.45 (.06)	.28 (.06)	.11 (.04)
<i>Category2: General opinions and health risks from chemicals</i>					
I can safely dispose of any chemical in my sink or backyard.	.83 (.05)	.08 (.03)	.03 (.02)	.02 (.02)	.04 (.02)
I use less pesticides, herbicides, and fungicides than in the past.	.04 (.02)	.06 (.03)	.21 (.05)	.44 (.06)	.26 (.05)
<i>Category3: Attitudes toward regulation</i>					
The governments do not adequately protect endangered species.	.02 (.02)	.17 (.05)	.47 (.06)	.24 (.05)	.10 (.04)
The governments adequately regulate high-technology research.	.13 (.04)	.19 (.05)	.37 (.06)	.08 (.03)	.33 (.06)
If a specific activity is hazardous to my health, the government or health professionals will warn me about the risk.	.29 (.06)	.19 (.05)	.35 (.06)	.14 (.04)	.03 (.02)

Table 8a. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on Less Than 40 Years of Age and Female

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
Governments should encourage private industry to develop innovative means to address environment and health problems of industrial origin.	.01 (.01)	.07 (.03)	.24 (.05)	.59 (.06)	.09 (.03)
Consumer products sold in Canada/U.S. have been adequately tested prior to marketing.	.12 (.04)	.32 (.06)	.34 (.06)	.12 (.04)	.11 (.04)
Consumer products, such as computer screens and TV sets are being safely disposed of.	.12 (.04)	.22 (.05)	.19 (.05)	.03 (.02)	.45 (.06)
<i>Category4: Questions pertaining to cancer</i>					
If I live a healthy lifestyle, such as eating the right foods, getting enough rest, and exercising, I will never get cancer.	.58 (.06)	.30 (.060)	.06 (.03)	.04 (.02)	.01 (.01)
Most cancers are hereditary in nature.	.17 (.05)	.31 (.06)	.33 (.06)	.12 (.04)	.07 (.03)
Lung cancer is more common now among women than breast cancer.	.22 (.05)	.18 (.05)	.12 (.04)	.18 (.05)	.30 (.06)
<i>Category5: Willingness to entertain risk/benefit tradeoffs</i>					
I feel that the St. Lawrence-FDR Dam has been beneficial to the community.	.28 (.05)	.16 (.04)	.21 (.05)	.09 (.03)	.27 (.06)
Economic development can be achieved without endangering health.	.06 (.03)	.22 (.05)	.30 (.05)	.33 (.06)	.09 (.03)
Hazardous materials can be safely transported through Akwesasne.	.56 (.06)	.14 (.04)	.12 (.04)	.09 (.03)	.09 (.03)
High-technology research, such as organ transplants and genetic engineering, is in the best interest of the public in the long term.	.13 (.04)	.19 (.05)	.37 (.06)	.08 (.03)	.22 (.05)
Traditional medicines must be taken with care due to side effects.	.09 (.03)	.13 (.04)	.31 (.06)	.38 (.06)	.09 (.03)
If someone told me not to eat the fish from a particular source I would listen.	.01 (.01)	.06 (.03)	.27 (.050)	.66 (.06)	0 (0)
Safe artificial hearts will be widely available in the near future.	.12 (.04)	.17 (.05)	.30 (.06)	.11 (.04)	.30 (.05)
Air bags in motor vehicles save lives.	.01 (.01)	.12 (.04)	.53 (.06)	.30 (.05)	.04 (.02)
If I don't see anything wrong with the fish then its okay to eat.	.54 (.06)	.23 (.05)	.08 (.03)	.08 (.03)	.07 (.03)
I am willing to take health risks to live in a society with a lot of industrial development.	.51 (.06)	.22 (.05)	.11 (.03)	.07 (.03)	.09 (.03)

Table 8a. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on Less Than 40 Years of Age and Female

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
<i>Category 6: Pro-active behavior</i>					
Decisions about health risks should be left to the experts.	.31 (.06)	.31 (.06)	.20 (.05)	.15 (.04)	.03 (.02)
There is nothing much I can do to help resolve health problems related to the environment.	.44 (.06)	.29 (.05)	.13 (.04)	.08 (.03)	.06 (.03)
I often seek information to see what I could do to help me resolve health problems.	.01 (.01)	.14 (.04)	.41 (.06)	.42 (.06)	.01 (.01)
My participation in an environmental group will help improve environmental quality.	.01 (.01)	.04 (.02)	.60 (.06)	.24 (.05)	.11 (.04)
If I don't help resolve health problems related to the environment someone else will.	.20 (.05)	.32 (.06)	.27 (.05)	.08 (.03)	.12 (.04)
<i>Category 7: Miscellaneous questions</i>					
I believe that a risk-free environment is an attainable goal in Akwesasne.	.06 (.03)	.26 (.05)	.37 (.06)	.25 (.05)	.06 (.03)
Social factors, such as family get togethers, are important in determining my health status.	.07 (.03)	.07 (.03)	.50 (.06)	.32 (.06)	.04 (.02)
Spiritual factors, such as giving thanks, are important in determining my health status.	.04 (.02)	.09 (.04)	.39 (.06)	.36 (.06)	.12 (.04)
Obesity can lead to adverse health effects.	0 (0)	0 (0)	.10 (.03)	.90 (.03)	0 (0)
Videogames increase aggressive behavior among youth.	.07 (.03)	.12 (.04)	.30 (.06)	.44 (.06)	.07 (.03)
Industry is working hard to resolve health problems related to the environment in the best interest of the general public.	.26 (.05)	.28 (.05)	.30 (.06)	.09 (.03)	.07 (.03)

Table 8b. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on Less Than 40 Years of Age and Male

Statements	Proportion of Respondents (SE)				Don't know/no opinion
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	
<i>Category 1: Local and global environmental health risks</i>					
There are serious health problems related to the environment where I live.	0 (0)	.10 (.05)	.21 (.07)	.69 (.11)	0 (0)
The land, air, and water around us are, in general, more contaminated now than ever before.	0 (0)	.02 (.02)	.18 (.07)	.80 (.13)	0 (0)
I believe my community is becoming a healthier place to live.	.35 (.08)	.30 (.08)	.33 (.08)	.02 (.02)	0 (0)
The loss of clean fish and animals makes me angry.	.01 (.01)	.12 (.06)	.21 (.07)	.63 (.12)	.02 (.02)
Children and the elderly are at more risk to health problems related to the environment than other individuals within my community.	.11 (.06)	.12 (.06)	.18 (.06)	.60 (.08)	0 (0)
Restoring the environment will resolve some health problems.	.07 (.04)	.08 (.05)	.57 (.08)	.26 (.07)	.01 (.01)
Natural events, such as severe windstorms, hurricanes, and flooding are the result of global climate change.	.02 (.02)	.11 (.06)	.42 (.08)	.36 (.08)	.10 (.06)
Industry is attempting to reduce greenhouse gas emissions by building fuel-efficient vehicles, such as gasoline-electric hybrids.	.17 (.06)	.10 (.05)	.55 (.08)	.05 (.03)	.14 (.05)
Catching too much fish will affect the community's health.	.01 (.01)	.14 (.06)	.37 (.08)	.40 (.08)	.07 (.04)
The community has adequate emergency response plans for environmental disasters.	.13 (.05)	.13 (.06)	.50 (.08)	.20 (.06)	.04 (.03)
<i>Category 2: General opinions and health risks from chemicals</i>					
I can safely dispose of any chemical in my sink or backyard.	.76 (.07)	.12 (.05)	.06 (.05)	0 (0)	.06 (.04)
I use less pesticides, herbicides, and fungicides than in the past.	0 (0)	.05 (.04)	.35 (.08)	.32 (.08)	.29 (.07)
<i>Category 3: Attitudes toward regulation</i>					
The governments do not adequately protect endangered species.	.07 (.04)	.19 (.07)	.45 (.08)	.26 (.07)	.02 (.02)
The governments adequately regulate high-technology research.	.23 (.07)	.23 (.07)	.37 (.08)	.07 (.04)	.11 (.05)

Table 8b. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on Less Than 40 Years of Age and Male

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
If a specific activity is hazardous to my health, the government or health professionals will warn me about the risk.	.27 (.07)	.25 (.07)	.40 (.08)	.05 (.03)	.02 (.02)
Governments should encourage private industry to develop innovative means to address environment and health problems of industrial origin.	.05 (.03)	.06 (.05)	.35 (.08)	.50 (.08)	.05 (.03)
Consumer products sold in Canada/U.S. have been adequately tested prior to marketing.	.13 (.05)	.25 (.07)	.44 (.08)	.02 (.02)	.15 (.06)
Consumer products, such as computer screens and TV sets are being safely disposed of.	.29 (.07)	.17 (.06)	.17 (.06)	0 (0)	.38 (.08)
<i>Category 4: Questions pertaining to cancer</i>					
If I live a healthy lifestyle, such as eating the right foods, getting enough rest, and exercising, I will never get cancer.	.54 (.08)	.29 (.08)	.13 (.05)	.05 (.04)	0 (0)
Most cancers are hereditary in nature.	.18 (.06)	.24 (.07)	.42 (.08)	.13 (.05)	.04 (.03)
Lung cancer is more common now among women than breast cancer.	.13 (.06)	.19 (.06)	.17 (.06)	.08 (.04)	.43 (.08)
<i>Category 5: Willingness to entertain risk/benefit tradeoffs</i>					
I feel that the St. Lawrence-FDR Dam has been beneficial to the community.	.48 (.08)	.08 (.05)	.25 (.08)	.04 (.03)	.15 (.06)
Economic development can be achieved without endangering health.	.08 (.05)	.06 (.03)	.63 (.12)	.11 (.05)	.12 (.06)
Hazardous materials can be safely transported through Akwesasne.	.39 (.08)	.08 (.05)	.36 (.08)	.05 (.05)	.12 (.06)
High-technology research, such as organ transplants and genetic engineering, is in the best interest of the public in the long term.	.19 (.07)	.17 (.06)	.35 (.08)	.13 (.05)	.17 (.06)
Traditional medicines must be taken with care due to side effects.	.12 (.05)	.06 (.04)	.37 (.08)	.31 (.07)	.14 (.06)
If someone told me not to eat the fish from a particular source I would listen.	.08 (.05)	.11 (.05)	.36 (.08)	.44 (.08)	.01 (.01)
Safe artificial hearts will be widely available in the near future.	.08 (.05)	.18 (.06)	.37 (.08)	.17 (.06)	.20 (.07)
Air bags in motor vehicles save lives.	.10 (.05)	.17 (.06)	.40 (.08)	.29 (.08)	.05 (.03)
If I don't see anything wrong with the fish then its okay to eat.	.60 (.08)	.23 (.07)	.12 (.06)	0 (0)	.06 (.04)

Table 8b. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on Less Than 40 Years of Age and Male

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
I am willing to take health risks to live in a society with a lot of industrial development.	.39 (.08)	.26 (.07)	.17 (.06)	.08 (.04)	.10 (.05)
<i>Category 6: Pro-active behavior</i>					
Decisions about health risks should be left to the experts.	.33 (.08)	.30 (.08)	.20 (.07)	.17 (.06)	0 (0)
There is nothing much I can do to help resolve health problems related to the environment.	.32 (.08)	.35 (.08)	.23 (.07)	.07 (.04)	.04 (.03)
I often seek information to see what I could do to help me resolve health problems.	.02 (.02)	.17 (.06)	.44 (.08)	.35 (.07)	.02 (.02)
My participation in an environmental group will help improve environmental quality.	.02 (.02)	.06 (.03)	.63 (.08)	.20 (.07)	.08 (.06)
If I don't help resolve health problems related to the environment someone else will.	.27 (.07)	.33 (.08)	.27 (.07)	.05 (.04)	.07 (.04)
<i>Category 7: Miscellaneous questions</i>					
I believe that a risk-free environment is an attainable goal in Akwesasne.	.15 (.06)	.23 (.07)	.37 (.08)	.25 (.07)	0 (0)
Social factors, such as family get togethers, are important in determining my health status.	.04 (.03)	.06 (.04)	.50 (.08)	.33 (.08)	.07 (.05)
Spiritual factors, such as giving thanks, are important in determining my health status.	.04 (.03)	.08 (.04)	.39 (.08)	.38 (.08)	.11 (.06)
Obesity can lead to adverse health effects.	.01 (.01)	.05 (.05)	.15 (.06)	.71 (.08)	.07 (.04)
Videogames increase aggressive behavior among youth.	.08 (.05)	.07 (.04)	.36 (.08)	.10 (.05)	.39 (.08)
Industry is working hard to resolve health problems related to the environment in the best interest of the general public.	.36 (.08)	.25 (.07)	.27 (.07)	.05 (.03)	.07 (.05)

Table 8c. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on 40 Plus Years of Age and Female

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
<i>Category 1: Local and global environmental health risks</i>					
There are serious health problems related to the environment where I live.	.02 (.01)	.06 (.03)	.23 (.04)	.67 (.05)	.02 (.01)
The land, air, and water around us are, in general, more contaminated now than ever before.	.02 (.01)	.09 (.04)	.20 (.04)	.68 (.05)	.01 (.01)
I believe my community is becoming a healthier place in which to live.	.33 (.05)	.30 (.05)	.30 (.05)	.05 (.02)	.02 (.01)
The loss of clean fish and animals makes me angry.	.03 (.02)	.02 (.01)	.18 (.05)	.76 (.05)	.01 (.01)
Children and the elderly are at more risk to health problems related to the environment than other individuals within my community.	.07 (.03)	.05 (.02)	.24 (.04)	.63 (.05)	.02 (.01)
Restoring the environment will resolve some health problems.	.01 (.01)	.06 (.02)	.56 (.05)	.34 (.05)	.03 (.01)
Natural events, such as severe windstorms, hurricanes, and flooding are the result of global climate change.	.02 (.01)	.05 (.03)	.40 (.05)	.41 (.05)	.11 (.03)
Industry is attempting to reduce greenhouse gas emissions by building fuel-efficient vehicles, such as gasoline-electric hybrids.	.08 (.03)	.11 (.04)	.39 (.05)	.10 (.03)	.32 (.05)
Catching too much fish will affect the community's health.	.05 (.02)	.14 (.03)	.29 (.05)	.39 (.05)	.13 (.03)
The community has adequate emergency response plans for environmental disasters.	.08 (.03)	.08 (.03)	.45 (.05)	.22 (.04)	.16 (.04)
<i>Category 2: General opinions and health risk from chemicals</i>					
I can safely dispose of any chemical in my sink or backyard.	.86 (.04)	.07 (.03)	.02 (.01)	.02 (.01)	.03 (.02)
I use less pesticides, herbicides, and fungicides than in the past.	.07 (.03)	.03 (.01)	.24 (.04)	.46 (.05)	.20 (.04)
<i>Category 3: Attitudes toward regulation</i>					
The governments do not adequately protect endangered species.	.01 (.01)	.14 (.03)	.36 (.05)	.29 (.05)	.19 (.04)
The governments adequately regulate high-technology research.	.21 (.05)	.23 (.04)	.25 (.04)	.05 (.02)	.25 (.05)

Table 8c. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on 40 Plus Years of Age and Female

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
If a specific activity is hazardous to my health, the government or health professionals will warn me about the risk.	.38 (.05)	.27 (.05)	.24 (.04)	.06 (.02)	.05 (.02)
Governments should encourage private industry to develop innovative means to address environment and health problems of industrial origin.	.03 (.02)	.02 (.01)	.15 (.04)	.71 (.05)	.08 (.03)
Consumer products sold in Canada/U.S. have been adequately tested prior to marketing.	.16 (.04)	.41 (.05)	.23 (.04)	.07 (.03)	.13 (.03)
Consumer products, such as computer screens and TV sets are being safely disposed of.	.12 (.04)	.17 (.04)	.09 (.03)	.02 (.01)	.60 (.05)
<i>Category 4: Questions pertaining to cancer</i>					
If I live a healthy lifestyle, such as eating the right foods, getting enough rest, and exercising, I will never get cancer.	.62 (.05)	.21 (.04)	.12 (.04)	.01 (.01)	.04 (.02)
Most cancers are hereditary in nature.	.26 (.05)	.25 (.04)	.27 (.05)	.12 (.03)	.09 (.03)
Lung cancer is more common now among women than breast cancer.	.10 (.03)	.12 (.03)	.22 (.05)	.22 (.04)	.34 (.05)
<i>Category 5: Willingness to entertain risk/benefit tradeoffs</i>					
I feel that the St. Lawrence-FDR Dam has been beneficial to the community.	.43 (.05)	.23 (.04)	.11 (.03)	0 (0)	.23 (.04)
Economic development can be achieved without endangering health.	.01 (.03)	.17 (.04)	.33 (.05)	.30 (.05)	.10 (.03)
Hazardous materials can be safely transported through Akwesasne.	.66 (.05)	.12 (.03)	.14 (.04)	.04 (.02)	.04 (.01)
High-technology research, such as organ transplants and genetic engineering, is in the best interest of the public in the long term.	.19 (.05)	.18 (.04)	.34 (.05)	.11 (.03)	.18 (.04)
Traditional medicines must be taken with care due to side effects.	.06 (.02)	.11 (.03)	.31 (.05)	.38 (.05)	.14 (.03)
If someone told me not to eat the fish from a particular source I would listen.	0 (0)	.07 (.02)	.27 (.05)	.64 (.05)	.02 (.01)
Safe artificial hearts will be widely available in the near future.	.13 (.04)	.10 (.03)	.24 (.04)	.12 (.03)	.41 (.05)
Air bags in motor vehicles save lives.	.06 (.03)	.14 (.04)	.42 (.05)	.25 (.04)	.13 (.04)
If I don't see anything wrong with the fish then its okay to eat.	.54 (.05)	.27 (.05)	.07 (.03)	.06 (.02)	.07 (.02)

Table 8c. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on 40 Plus Years of Age and Female

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
I am willing to take health risks to live in a society with a lot of industrial development.	.73 (.04)	.14 (.04)	.06 (.02)	.03 (.02)	.04 (.02)
<i>Category 6: Pro-active behavior</i>					
Decisions about health risks should be left to the experts.	.34 (.05)	.25 (.04)	.23 (.04)	.16 (.04)	.01 (.01)
There is nothing much I can do to help resolve health problems related to the environment.	.42 (.05)	.30 (.05)	.15 (.04)	.06 (.02)	.07 (.02)
I often seek information to see what I could do to help me resolve health problems.	.03 (.02)	.08 (.03)	.41 (.05)	.43 (.05)	.04 (.02)
My participation in an environmental group will help improve environmental quality.	.05 (.02)	.04 (.02)	.46 (.05)	.36 (.05)	.10 (.03)
If I don't help resolve health problems related to the environment someone else will.	.21 (.05)	.33 (.05)	.25 (.04)	.08 (.03)	.13 (.03)
<i>Category 7: Miscellaneous questions</i>					
I believe that a risk-free environment is an attainable goal in Akwesasne.	.09 (.03)	.18 (.05)	.40 (.05)	.30 (.05)	.04 (.02)
Social factors, such as family get togethers, are important in determining my health status.	.02 (.01)	.07 (.02)	.41 (.05)	.44 (.05)	.06 (.02)
Spiritual factors, such as giving thanks, are important in determining my health status.	.03 (.02)	.04 (.02)	.28 (.05)	.60 (.05)	.05 (.02)
Obesity can lead to adverse health effects.	0 (0)	.03 (.03)	.11 (.03)	.85 (.04)	.01 (.01)
Videogames increase aggressive behavior among youth.	.02 (.01)	.07 (.03)	.31 (.05)	.48 (.05)	.11 (.03)
Industry is working hard to resolve health problems related to the environment in the best interest of the general public.	.37 (.05)	.25 (.05)	.29 (.05)	.03 (.01)	.06 (.02)

Table 8d. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on 40 Plus Years of Age and Male

Statements	Proportion of Respondents (SE)				Don't know/no opinion
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	
<i>Category 1: Local and global environmental health risks</i>					
There are serious health problems related to the environment where I live.	.02(.01)	.03 (.03)	.26 (.06)	.69 (.07)	0 (0)
The land, air, and water around us are, in general, more contaminated now than ever before.	.02 (.01)	.02 (.02)	.22 (.06)	.70 (.06)	.04 (.03)
I believe my community is becoming a healthier place in which to live.	.37 (.07)	.25 (.06)	.30 (.06)	.08 (.04)	0 (0)
The loss of clean fish and animals makes me angry.	0 (0)	.08 (.04)	.08 (.04)	.78 (.06)	.07 (.03)
Children and the elderly are at more risk to health problems related to the environment than other individuals within my community.	.07 (.04)	.03 (.02)	.28 (.06)	.59 (.07)	.03 (.02)
Restoring the environment will resolve some health problems.	.03 (.02)	.08 (.04)	.55 (.07)	.32 (.07)	.02 (.01)
Natural events, such as severe windstorms, hurricanes, and flooding are the result of global climate change.	.03 (.03)	.11 (.04)	.23 (.06)	.47 (.07)	.16 (.05)
Industry is attempting to reduce greenhouse gas emissions by building fuel-efficient vehicles, such as gasoline-electric hybrids.	.14 (.05)	.14 (.05)	.42 (.07)	.13 (.05)	.17 (.05)
Catching too much fish will affect the community's health.	.06 (.03)	.11 (.05)	.33 (.07)	.36 (.06)	.14 (.05)
The community has adequate emergency response plans for environmental disasters.	.20 (.06)	.06 (.03)	.41 (.07)	.21 (.06)	.13 (.05)
<i>Category 2: General opinions and health risk from chemicals</i>					
I can safely dispose of any chemical in my sink or backyard.	.83 (.05)	.12 (.05)	.03 (.01)	.02 (.01)	.01 (.01)
I use less pesticides, herbicides, and fungicides than in the past.	.10 (.04)	.03 (.03)	.27 (.06)	.42 (.07)	.18 (.05)
<i>Category 3: Attitudes toward regulation</i>					
The governments do not adequately protect endangered species.	.02 (.02)	.16 (.05)	.38 (.07)	.31 (.06)	.14 (.05)
The governments adequately regulate high-technology research.	.22 (.06)	.31 (.07)	.16 (.05)	.04 (.02)	.27 (.06)

Table 8d. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on 40 Plus Years of Age and Male

Statements	Proportion of Respondents (SE)				
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	Don't know/no opinion
If a specific activity is hazardous to my health, the government or health professionals will warn me about the risk.	.30 (.06)	.31 (.07)	.25 (.06)	.10 (.04)	.03 (.02)
Governments should encourage private industry to develop innovative means to address environment and health problems of industrial origin.	.04 (.02)	.02 (.02)	.15 (.05)	.69 (.06)	.10 (.04)
Consumer products sold in Canada/U.S. have been adequately tested prior to marketing.	.06 (.03)	.28 (.06)	.38 (.07)	.15 (.05)	.14 (.05)
Consumer products, such as computer screens and TV sets are being safely disposed of.	.15 (.05)	.15 (.05)	.07 (.03)	.09 (.04)	.54 (.07)
<i>Category 4: Questions pertaining to cancer</i>					
If I live a healthy lifestyle, such as eating the right foods, getting enough rest, and exercising, I will never get cancer.	.46 (.07)	.30 (.06)	.09 (.03)	.09 (.04)	.07 (.04)
Most cancers are hereditary in nature.	.28 (.06)	.33 (.07)	.09 (.04)	.12 (.05)	.18 (.05)
Lung cancer is more common now among women than breast cancer.	.09 (.04)	.16 (.05)	.14 (.05)	.16 (.05)	.44 (.07)
<i>Category 5: Willingness to entertain risk/benefit tradeoffs</i>					
I feel that the St. Lawrence-FDR Dam has been beneficial to the community.	.60 (.07)	.25 (.06)	.03 (.02)	.03 (.02)	.08 (.04)
Economic development can be achieved without endangering health.	.08 (.03)	.03 (.03)	.53 (.07)	.32 (.06)	.04 (.02)
Hazardous materials can be safely transported through Akwesasne.	.47 (.07)	.22 (.06)	.22 (.06)	.03 (.01)	.07 (.04)
High-technology research, such as organ transplants and genetic engineering, is in the best interest of the public in the long term.	.16 (.05)	.14 (.05)	.38 (.07)	.08 (.04)	.25 (.06)
Traditional medicines must be taken with care due to side effects.	.03 (.02)	.09 (.04)	.37 (.07)	.39 (.07)	.12 (.04)
If someone told me not to eat the fish from a particular source I would listen.	.04 (.03)	.11 (.05)	.34 (.07)	.49 (.07)	.01 (.01)
Safe artificial hearts will be widely available in the near future.	.16 (.05)	.07 (.03)	.71 (.07)	.10 (.04)	.27 (.06)
Air bags in motor vehicles save lives.	.04 (.03)	.18 (.06)	.48 (.07)	.27 (.06)	.03 (.01)
If I don't see anything wrong with the fish then its okay to eat.	.54 (.07)	.23 (.06)	.12 (.05)	.03 (.03)	.07 (.03)

Table 8d. Responses to Attitude and Opinion Statements to Risks in the Community of Akwesasne Based on 40 Plus Years of Age and Male

Statements	Proportion of Respondents (SE)				Don't know/no opinion
	Disagree strongly	Disagree somewhat	Agree somewhat	Agree strongly	
I am willing to take health risks to live in a society with a lot of industrial development.	.60 (.07)	.15 (.05)	.17 (.06)	.03 (.01)	.05 (.03)
<i>Category 6: Pro-active behavior</i>					
Decisions about health risks should be left to the experts.	.35 (.07)	.40 (.04)	.09 (.04)	.14 (.05)	.03 (.02)
There is nothing much I can do to help resolve health problems related to the environment.	.33 (.06)	.42 (.07)	.11 (.04)	.09 (.04)	.04 (.02)
I often seek information to see what I could do to help me resolve health problems.	.05 (.03)	.03 (.02)	.50 (.07)	.37 (.07)	.05 (.03)
My participation in an environmental group will help improve environmental quality.	.03 (.02)	.08 (.04)	.45 (.07)	.32 (.06)	.13 (.05)
If I don't help resolve health problems related to the environment someone else will.	.41 (.07)	.24 (.06)	.22 (.06)	.02 (.01)	.11 (.04)
<i>Category 7: Miscellaneous questions</i>					
I believe that a risk-free environment is an attainable goal in Akwesasne.	.05 (.03)	.24 (.06)	.34 (.07)	.33 (.06)	.04 (.02)
Social factors, such as family get togethers, are important in determining my health status.	.08 (.04)	.01 (.01)	.41 (.07)	.45 (.07)	.05 (.03)
Spiritual factors, such as giving thanks, are important in determining my health status.	.03 (.02)	0 (0)	.41 (.07)	.49 (.07)	.07 (.03)
Obesity can lead to adverse health effects.	.04 (.03)	0 (0)	.19 (.06)	.73 (.07)	.03 (.03)
Videogames increase aggressive behavior among youth.	.05 (.03)	.07 (.03)	.30 (.06)	.41 (.07)	.17 (.05)
Industry is working hard to resolve health problems related to the environment in the best interest of the general public.	.40 (.07)	.29 (.06)	.19 (.06)	.07 (.03)	.05 (.03)