THE ENVIRONMENTAL NICHE OF ABORIGINAL INFANTS: POSSIBLE IMPLICATIONS FOR SUDDEN INFANT DEATH SYNDROME

BY

C. ELIZABETH WILSON

A Dissertation
Submitted to the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

Department Of Anthropology
University of Manitoba
Winnipeg, Manitoba

National Library of Canada
Acquisitions and Bibliographic Services
395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale du Canada
Acquisitions et services bibliographiques
395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

0-612-35048-7

Canada

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

*****

COPYRIGHT PERMISSION PAGE

THE ENVIRONMENTAL NICHE OF ABORIGINAL INFANTS:

POSSIBLE IMPLICATIONS FOR SUDDEN INFANT DEATH SYNDROME

BY

C. ELIZABETH WILSON

A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirements of the degree

of

DOCTOR OF PHILOSOPHY

ABSTRACT

The recorded rates of Sudden Infant Death Syndrome (SIDS) are highest among Aboriginal infants. In non-Aboriginal communities, the rate of SIDS has decreased after interventions into infant care practices, such as sleeping infants in the supine position. Prior to intervention, it is necessary to know the infant care strategies utilized by a community.

Based on seventy reserve interviews, this research project gives a detailed report of infant care practices currently used by contemporary Aboriginal mothers. Nineteen senior women were also interviewed in order to facilitate a comparison between traditional and contemporary practices. The results indicate that traditional infant care practices used fifty years ago are still prevalent in contemporary Aboriginal communities. These traditions include supine sleeping position, co-sleeping, swaddling and breastfeeding. The research reveals that the majority of contemporary Aboriginal infants sleep supine, are swaddled, are breastfed and co-sleep. The traditional swing, in which infants also sleep supine, continues to be used. Investigations were also carried out on the general residential environment of the infant, which revealed alarmingly high levels of air pollutants, including fungi and bacteria.

ACKNOWLEDGMENTS

A task of this magnitude can only be accomplished with financial, emotional and physical support. I would like to thank the Social Sciences and Humanitities Research Council for four years of financial support (1991 to 1996) through a Doctoral Fellowship. Direct support for the project was given by the Northern Training Program. The Dean of Arts of the University of Manitoba assisted with five travel grants for anthropological and SIDS conferences in Australia, Norway, Montreal, Toronto and, most recently, Washington, D.C.

My husband has supported my efforts by his unshakable degree of commitment to my project. His support has been financial and emotional. I can never express my gratitude for all the tasks he undertook: laundry, cooking and listening to my particular struggles during the times away from home. Thank you, Gerry.

The scientific results of fungi and bacteria readings would not have been possible without the generosity of Rhodora Tan of AGAT Labs in Calgary. She helped me realize that the logistical problems were not insurmountable. AGAT's contribution of equipment and instructions on how to use it, plus processing of sample collections, indicates their commitment to infant health.

I have gained an enormous amount of information from the committee members of the SIDS Global Strategy Task Force. I wish to publicly thank Kaaren Fitzgerald, President of the Task Force, for all her support. Also, thanks to Dr. Tony Nelson of Hong Kong's Prince of Wales Hospital and Dr. David Bolton of New Zealand for hours of assistance with the thermal balance model. Dr. A. Kahn of Berlin has encouraged my efforts and my search for funding. A special thank you is extended to Dr. James McKenna. Questions pertaining to the thermal care of the baby were adopted from a questionnaire by Dr. McKenna and his colleagues in their NIH cosleeping reseach which

was kindly sent to me. This kind of collaborative help is essential to conducting valid research.

Within Calgary, I would like to thank Dean Michael Maher, Faculty of Management for providing office space to write my dissertation and Maria King for finding the space. Professor Tang Lee of Environmental Design loaned me equipment to test for air borne particles and Co and Co2 levels, as well as offering me support, technical advice and encouragement along the way. Dr. Tak Fung, Computer Science Department, kept me laughing as I struggled with statistical problems. Thank you, my dear friend! Ms. Jessica Fung, BComm., 1996, became my second set of hands by scanning photos and maps for me. Dr. I. Mitchell, Alberta Children's Hospital and Ethics Chair for SIDS International, critiqued my presentation and provided a practice audience prior to the Washington SIDS Conference. His input was invaluable. All data on SIDS in Alberta was obtained through the co-operation of the Chief Medical Examiner's Office, whose friendly staff made my task easier.

Lynne and Lane Harris of Slave Lake (Lynne turned out to be a distant cousin I had never met before) provided a home for me in the North during my field work and a refuge during difficult times. The Aboriginal community's support was pivotal to my work. The Chief and Council who approved my request to work on their reserve have set a precedent for future co-operation. The staff of the Health Unit provided many laughs and much support as I struggled with the new environment. Angie and her daughter Emma, and Donna, August and their children, provided me with warm home environments during the cold winter and made a daunting task much easier. My translator and guide, Stella, was my bridge to the community and my ultimate assistant. Finally, I want to express my gratitude to the Reserve's Health Unit Director without whose support the project would not have started.

DEDICATION

In the face of many hardships, including the unforgiving climate, Aboriginal women nuture their infants, an enormous task carried out under increasingly difficult circumstances. Despite all the problems, they continue to smile as they strive to produce healthy infants who will become the future leaders of their community. This work is dedicated to the Aboriginal mothers of the North.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

CHAPTER I

INTRODUCTION

A recent definition of Sudden Infant Death Syndrome (SIDS) was presented by an expert panel of the National Institute of Child Health and Human Development:

> The sudden death of an infant under one year of age which remains unexplained after a thorough investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history (Willinger, *et al.*, 1991).

Researchers have identified common factors (the SIDS Profile) among mothers of SIDS victims and the infants who succumb to SIDS. Frequently, the mother is young (under 20 years of age), from lower socioeconomic conditions, smokes cigarettes and abuses chemical substances. The SIDS victims are disproportionately male (61%), premature with low birth weight, and death occurs during the nocturnal sleeping hours (Kraus and Bulterys, 1991). Frequently, the victims were sleeping in the prone (lying face downwards) position, often heavily covered and sleeping in a heated room (Fleming, *et al.*, 1990). SIDS incidence peaks at three to four months of age. Statistical data reveal a distinct correlation between the incidence of SIDS and cultural background. In Aboriginal populations, the rate of SIDS is reported to be three to four times higher than that found in non-Aboriginal populations (Muir, 1991; Robinson and Cumming, 1993; Moffat, 1993). Recently, epidemiological and ecological evidence has suggested that SIDS may be associated with several infant care practices (Moffat, 1993). As a result, some anthropologists have begun to examine infant care strategies as part of their analysis of the etiology of SIDS, since there is ample evidence of variations in infant care strategies amongst differing populations.

Aboriginal peoples of Canada (I will use the term "Aboriginal" for Canadian Status Indians) have experienced cultural disruption throughout their history of interaction with agents or agencies of the Canadian government. For Aboriginal mothers, in

particular, a significant disruption occurred with the introduction of dependency on doctors and nurses in the birthing process and for advice regarding infant and child care practices.

Infant care practices are incorporated by a society when, after extensive use, they are perceived to be a source of protection for the infant from vulnerability to disease and death. These practices vary, but would include choices of wearing apparel, methods of feeding, sleeping patterns (where the infant sleeps, with whom and for what duration), perceptions of illness, methods of dealing with illness and types of healing practices for infant illness. To the extent that these practices are successful, they become strategies that eventually receive confirmation as cultural traditions. Infant care strategies become intertwined with concepts of well-being and the medical practices of a society and therefore become part of the traditional culture. Frequently, the belief system is at the epicenter of cultural health care practices and the subset of infant care practices. Within the framework of culture, it is appropriate to identify infant care practices as a component within a medical system. Because of this linkage, culture becomes an important variable in infant mortality/survivorship.

Culture is a set of control mechanisms for governing the behaviour of individuals and societies (Geertz, 1979). These mechanisms provide a set of instructions for day to day living. People act out their lives in a perceptual framework "that tells them how the world is and how the world ought to be" (Oliver-Smith, 1992). While the way in which individuals deal with cultural change varies with different situations and circumstances, the generalization can be made that cultural continuity with the past is an essential part of the process. As suggested by Wolf (1982), continuity is a theme of culture in historically developed forms through which members of a society relate to each other. When mechanisms governing behaviour are no longer viable, chaos may result, as Geertz notes:

> Undirected by culture patterns -- organized systems of significant symbols -- man's behavior would be virtually ungovernable, a mere chaos of pointless acts and exploding emotions, his experience virtually shapeless (1979:46).

O'Conner, *et al.* (1989) argue that women are keepers of the culture and that it was the grandmothers who maintained the identity of Aboriginal people. At the present time, grandmothers represent continuity in the face of change. They have been exposed to the dominant society's medical system and experienced the influence of Western ways. With a foot in both the past, with its traditional knowledge, and the present with its uncertainties, grandmothers represent a sense of security in a setting still rife with chaos. The infant care practices used by contemporary mothers may attest to the role played by grandmothers as the source of continuity. Continuity and cultural stability require a society to find significant ways to relate to each other in the regular and recurring human experiences. This significance is also touched on briefly by Geertz when he states that culture:

> ... comes down...to a searching out of significant symbols, and clusters of significant symbols -- the material vehicles of perception, emotion, and understanding -- and the statement of the underlying regularities of human experience implicit in their formation (1979:408).

For Aboriginal health care, the clusters of significant symbols are the practices of which the grandmothers are the repository. However, there may be another kind of change taking place, a change in cultural identity. Aboriginal women are searching to find a culturally appropriate method of establishing their own identity vis-à-vis the health care system. Establishing identity involves mothers seeking the knowledge of their elders. By sharing their experiences, they may be moving away from the medicalization of birthing and infant care towards greater incorporation of, or reliance upon, traditional cultural health practices. This change does not recapture the past, but may be a step towards an incorporation of both traditional and Western medical practices.

Such a blending of cultural, physiological, biological and environmental systems suggest that the use of a biocultural model is the appropriate method to collecting and understanding such complex sets of data and its potentail interaction with the SIDS phenomenon. Data hidden to researchers who confine themselves to only one of the systems, or to a central inteviewing location or technique, may be revealed through the biocultural, interactive approach.

1.1 Research Problem

The research problem undertaken in my thesis research was to gather and to analyze information about infant care practices used by contemporary Aboriginal mothers on a reserve in northern Alberta and to document some aspects of the environmental niche in which those infants are being nurtured. The research was conducted in the fall months of 1995 and the winter months of 1996. The cold weather months were selected because SIDS incidence typically appears greater during these months. In order to determine how contemporary infant care practices have changed or remained similar to traditional practices, on-site interviews were conducted with seventy contemporary mothers and a group of senior Aboriginal women. Senior female informants represent the general knowledge base of infant care practices in their particular community. I then compare whether or not the contemporary group share that knowledge base and to what extent external medical input influences infant care practices. I also compare the practices to known SIDS risk factors. In several areas of the world, SIDS incidence has apparently decreased after intervention into sleeping position practices, altering infant sleeping position from prone (face down) to supine (face up, sleeping on the back). Such an intervention campaign could possibly reduce Aboriginal SIDS rates. However, at the time of this research project little data were available about actual sleeping practices employed by contemporary Aboriginal women.

Data on the impact of medical intervention on infant care practices are also limited. While child care workers and physicians deal with Aboriginal infants on several levels, from pre-natal visits to the actual birthing, to post-natal visits including required inoculations, virtually no documentation exists as to how this external intervention affects traditional care practices. In fact, the results of this project suggest that contemporary Aboriginal mothers closely follow traditional infant care practices as handed down by mother and grandmothers. These include breast feeding, swaddling, use of hammocks, co-sleeping and a general reliance on senior familial expertise in child-rearing. Most of the traditional practices appear to coincide with variables articulated by SIDS researchers as protective of the infant with reference to the syndrome. Encouraging as this might seem, the reported SIDS incidence among Aboriginal populations is still well above that of non-Aboriginals. Under the umbrella of the environmental niche, I investigated factors in the environment which might have implications for SIDS.

1.2 Research Goals

The purpose of the research project reported herein is to focus on the following issues:

- Documentation of traditional Alberta Aboriginal infant care practices prior to biomedical intervention
- Documentation of contemporary Alberta Aboriginal infant care
- Comparison of the areas of traditional and contemporary infant care practices on a reserve to illuminate any continuity or displacement
- Assessment of the relationship of contemporary infant care to the risk factors and/or preventative infant care strategies purported by SIDS research
- Determination, if possible, of why the contemporary infant care strategy is employed

- Record and analyze other factors found in the Aboriginal infant environment.

1.3 Format of Presentation

The research goals and strategy flow from the research problem--the need to find answers or explanations as to why infants in Aboriginal populations appear to succumb to SIDS at much higher rates than non-Aboriginal populations. In Chapter II, I review the literature available on SIDS and establish the bio-behavioural direction of SIDS research through reference to the biological and behavioural (cultural) risk factors currently thought to be related to SIDS risk. This biobehavioural approach suggests a more thorough examination of the infant's environmental niche.

In Chapter III, I briefly refer to the bio-behavioural nature of risk for SIDS, and then examine Aboriginal perceptions of health and illness. The difference between traditional and western medicine is examined through consideration of political power or authoritative knowledge. This discussion introduces the concepts of the technocratic model, body technology and the household production of health. The chapter concludes with a consideration of Aboriginal women's perception of health, it's relationship to infant care practices, and their attitude to external influences.

In Chapter IV, I present a detailed description of the research site and population, the procedures used in subject selection, details about the mechanics (such as the questionnaire) employed to gather the data, and the various instruments used to record air and surface contaminant data.

Chapter V is directed to epidemiological data on Aboriginal births and SIDS deaths with comparison of on-reserve and off-reserve SIDS incidence in the northern part of the province of Alberta. In Chapter VI, I document birth and infant care practices using an ethnographic approach. Chapter VII contains an identification of contaminants found

in homes on the reserve site. The thesis is concluded in Chapter VIII with a discussion of the significance and limitations of the data and the conclusions derived from this study.

CHAPTER II

REVIEW OF THE LITERATURE

In the first section of this review, I focus on the history of SIDS as it relates to factors associated with SIDS deaths and other factors identified in the mother/infant relationship. Next, I focus on a specific, but limited, literature review of Canadian Aboriginals and SIDS and then turn to establish associative factors as they are represented in Aboriginal contemporary infant care. The second section of the review is directed to research available on air pollutants and bacteria as possible risk factors in SIDS deaths.

2.1 SIDS History

At the Second International Conference on Causes of Sudden Death in Infants convened in Seattle in 1969, the term "sudden infant death syndrome" (SIDS) was fashioned and transported the sudden unexplained deaths of infants into a medical phenomenon (Beckwith, 1970). The concept of SIDS was justified as a syndrome because a majority of sudden and unexpected deaths of apparently "thriving infants" had many features in common, including death during an apparent sleeping period, a distinctive age distribution curve and frequent intrathoracic petechial hemorrhages (Beckwith, 1993). Regarding the 1969 SIDS definition, Beckwith in 1993 states:

> However, this definition remained primarily one of exclusion, and failed to incorporate any inclusionary criteria based upon more than 20 years of descriptive clinical, epidemiological, and pathological study of this problem (p. 421)

Over two decades, small increments of evidence have directed researchers to address infant care as a source of risk factors related to the incidence of SIDS. Epidemiological investigations have identified patterns or features of the syndrome commonly referred to as a profile. These include factors pertinent to both mother and infant.

2.1.1 Maternal Factors

a. Maternal Age. The risk of SIDS is increased if the mother is less than twenty years of age (Kraus and Borhani, 1972; Steele and Langworth, 1966; Frogatt and Lynas, 1971; Little and Peterson, 1990). There appears to be a synergistic effect of maternal age and parity. The third infant of an eighteen year old mother has a higher risk for SIDS than the first infant of a sixteen year old mother (Kraus and Borhani, 1972). What is unclear from the statement is whether the mother's age alone is the risk factor, since co-variance exists between maternal age and parity. This suggests that maternal age alone is not a risk factor. Second, what is the difference between mothers aged fourteen years of age and mothers aged nineteen since both are considered to be in the young category. Is there a higher SIDS incidence with fourteen year old mothers than with nineteen year old mothers?

b. Marital Status. The rate of SIDS for infants of divorced or never married mothers is twice as high as that for infants with married mothers (Kraus and Borhani, 1972; Shannon and Kelly, 1982). An Alaskan study found a much higher relative risk (expressed in terms of numbers of deaths per 1,000 live births) for unmarried White women (2.84) compared to Native women (1.56) (Adams, 1985), while Irwin, *et al.*,(1992) found the opposite amongst Native women in Washington State where unmarried status was associated with SIDS risk (2.37). No Canadian data on marital status were recovered, as the currently applied marital status category appears too vague to provide useful information. Does unmarried mean never married, or were married but now are divorced? How are long-term stable common-law relationships categorized?

c. Smoking. Maternal smoking has been found consistently to double the risk of SIDS (Mitchell, *et al.*, 1993 and 1991; Steele and Langworth, 1966; McGlashan, 1989; and Li and Daling, 1991). Two prospective studies (Bulterys, 1990 and Haglund, *et al.*, 1990) and several case-control studies have reported on maternal smoking and SIDS

(Mitchell, *et al.*, 1991; Rintakaka and Hirvonen, 1986; and Nicholl and O'Cathian, 1988). The effect of smoking on infants under three months was studied and reported also to have negative effects (Haglund, 1990; Nicholl and O'Cathian, 1988). On a population basis, the risk attributed to maternal smoking has been estimated to be 40% (Mitchell, *et al.*, 1991). Smoking by the father and other household members increased the SIDS risk if the infant's mother smoked, but did not appear to have an effect if the mother did not smoke (Mitchell, *et al.*, 1993). A recent review of the effect of passive smoking found that smoking in the same room as the infant increases the risk of SIDS (Klonoff-Cohen, *et al.*, 1995). This research suggests that smoking might affect the fetus to a greater extent than passive smoke affects the infant. Most researchers are united in their determination that smoking is a risk factor associated with SIDS. Despite this unanimity, why are similar results not found in China where smoking levels in the home are high? It seems clear that smoking, even the inhalation of second hand smoke, is injurious to health and therefore would have an adverse effect on infants. However, my research in China found a virtual absence of SIDS (Wilson, 1990).

d. Bottle versus Breast Feeding. There is suggestive, but inconclusive, evidence for an increased risk of SIDS in bottle-fed infants. Several case-control studies found no association (Dwyer, *et al.*, 1991; Frogatt and Lynas, 1971). Conversely, a reduced risk for SIDS was found if the infant was breastfed consistently during the first six months (Mitchell, *et al.*, 1993). The authors state that these results show a substantial association which should support the need for more positive promotion and active community involvement to further enhance the level and length of exclusive breast feeding (Mitchell, *et al.*, 1993). Authors using case-control studies in five counties in Southern California, also examined the effect of tobacco exposure through breast feeding concluding that breast feeding was protective for SIDS among nonsmokers (Odds ratio=3.7) but not among smokers (Klonoff-Cohen, *et al.*, 1995).

e. Prenatal Care. Lack of prenatal care is considered to be a risk factor (Kraus and Borhani, 1972; Naeye, *et al.*, 1976 and Little and Peterson, 1990). However, the time of the prenatal care is not specified, nor is prenatal care itself defined.

2.1.2 Factors Related to Infants

a. Age of SIDS victim. The age at death distribution of SIDS shows low risk during the neonatal period, a marked increase from two to four months of age and a decline of incidence thereafter (Ponsonby, Dwyer and Jones, 1992). The observed mean age for SIDS victims at death is 2.9 months, with a median of 2.4 months and a peak age of 3.5 to 4 months (Valdes-Dapena, 1980; Little and Peterson, 1990). Whether an age/gender co-variance existed is not tested nor reported.

b. Birth Weight and Prematurity of Infants. Infants who weighed 3.5 to 4 pounds (1,750 to 2,000 grams) at birth had a risk of SIDS ten times greater than infants who weighed 7.5 to 8.5 pounds (3,750 to 4,250 grams) at birth (Bergman, *et al.*, 1972; Little and Peterson, 1990). There is a direct and inverse relationship between the infant's birth weight and the rate of SIDS. Infants who weighed over 9 pounds (4,500) grams at birth recorded SIDS rates of 0.87 per 1,000 live births compared with infants weighing between 3 to 4 pounds (1,500 to 2,000 grams) who recorded a rate of 6.55 (Kraus and Borhani, 1972; and Little and Peterson, 1990). Low birth weight is an indicator of prematurity and in growth retardation before birth, as well as a SIDS risk factor. In a birth weight and perinatal mortality comparison between the United States and Norway, the authors concluded that the prevention of pre-term births, not changes in mean birth weight, would prevent excess mortality in the United States (Wilcox, *et al.*, 1995). Vanlandingham, *et al.* (1980) in a comparative study found that rates of low birth weight among Aboriginals and non-Aboriginals in six American states were virtually identical (5.8% Aboriginal vs. 5.0% non-Aboriginal). Washington state recorded higher rates of low birth weight for Aboriginals than for non-Aboriginals (5.2% versus. 3.5%). In the Vanlandingham study,

low birth weight was found to be an independent risk factor for SIDS within Aboriginal populations. In Canada, low birth weight has not been found to be more common among Aboriginal peoples (Morrison, *et al.*, 1986; Langer, 1990). It is generally accepted that low birth weight jeopardizes infant health. Therefore, it is not surprising that SIDS victims also are frequently of low birth weight. Whether this establishes a direct causal link with the syndrome is uncertain at best.

c. Male versus Female Infants. SIDS among male infants has been reported as 1.82 per 1,000 live births compared to 1.26 for females (Kraus and Borhani, 1972; Kraus and Bulterys, 1991). This rate is consistent with male/female rate comparisons collected around the world. For example, in Czechoslovakia, 58% of SIDS victims were reported to be males, consistent with findings in Great Britain, Northern Ireland and the United States (Valdes-Dapena, 1978). An exception to the preponderance of male victims is reported among the general Aboriginal population (Kraus and Borhani, 1972; Fleshman and Peterson, 1977; Valdes-Dapena, 1978; Irwin, *et al.*, 1992). More Aboriginal female infants succumb to SIDS than do male. For all of Canada, there is a reported 60% male to 40% female SIDS victims, consistent with the other studies (Millar and Hill, 1993).

d. Sleeping Position. Notable progress in reducing the SIDS rate has been documented with reference to prone versus supine (lying face-up) sleeping position (deJonge, *et al.*, 1989; Lee, *et al.*, 1989; Fleming, *et al.*, 1990; Dwyer, *et al.*, 1991;). SIDS was found to decline proportionately during an intervention campaign structured to alter infant sleeping position from prone to supine (Fleming, *et al.*, 1990; and Dwyer, *et al.*, 1991). Sleeping position as a risk factor for SIDS among Aboriginal infants in Canada has received little attention in published material (Robinson and Cumming, 1993).

In a recent survey in Manitoba, Moffatt (using mail out questionnaire with an overall sample of 661, of which 9.2% were status Indians) found that 25% of responding non-Aboriginal mothers and 16% of responding Aboriginal mothers used the prone

sleeping position. The Aboriginal response rate was poor (just over 50% of the Aboriginals queried compared to 90% of the non-Aboriginals) and the numbers were not sufficient to support a difference from other women (Moffatt, 1993). While it seems likely that the prone sleeping position is used less commonly by Aboriginal mothers (Moffatt, 1993), the high rate of SIDS in Aboriginal communities in Canada would indicate that sleeping position has the potential for impact in these communities (Robinson and Cumming, 1993). However, as the authors note, sleeping position as a risk factor among Aboriginal infants has received little attention in the scientific literature. Unfortunately, Moffatt's data cannot be generally applied to other status Aboriginals since cultural/band differences may exist.

Death scene investigation records (part of the required protocol) include the repeated observation that the infant was found in a prone (on stomach) position. The idea that an infant placed in the prone position to sleep is associated with an increased risk of SIDS was first presented in a British study (Carpenter and Shaddick, 1965). In this case-control study, SIDS victims were found "face downward" more frequently than was their normal sleeping habit (Carpenter and Shaddick, 1965). Not every infant who sleeps prone dies of SIDS and not all SIDS infants are found prone. Sleeping prone does not cause SIDS (Beal and Finch, 1991). Yet every controlled study investigating infant sleeping has found a higher percentage of SIDS infants sleeping prone (Beal and Finch, 1991).

The results of the first prospective study which examined sleeping position and SIDS concluded that the prone sleeping position is more common in SIDS victims than among case-controls and is significantly associated with an increased risk of SIDS (Dwyer, *et al.*, 1991).

Two post-intervention studies have been conducted. Wigfield, *et al.* (1992) in Avon, United Kingdom, examined the impact of changing infant sleeping practices on the incidence of SIDS. In the matched control infants, prone sleeping had decreased by 30%.

This information allowed the authors to project a reduction in SIDS for the area to 2.5/1,000 from the 3.5/1,000 rate recorded in 1989. A retrospective longitudinal study from 1984 to 1991 on sleeping positions and other variables established the framework for this prediction. Actual rates of SIDS decreased to 1.7/1,000, lower than projected. The authors concluded the decline could be attributed to the massive media campaign to publicize the risk of prone sleeping (Wigfield, *et al.*, 1992).

In Holland, SIDS cases increased during the 1970's and 1980's, as did the proportion of infants sleeping prone. After a public awareness campaign in 1987, the proportion of infants sleeping prone declined from 65% in 1986 to 17% in 1990, accompanied by a proportional fall in SIDS incidence (Engelbert and de Jonge, 1988). Inherent in this type of research are unknowns. For example, as a result of the public awareness campaign, are mothers directing more attention to their infants than prior to the campaign? Were all SIDS infants found in the prone position? Since older infants roll over and change position, does sleeping supine mean sleeping in that position all night, or simply that the infant was put down to sleep in the supine position?

Conversely, Klonoff-Cohen and Edelstein (1995), in a California case-contol retrospective SIDS study of death scene and routine sleeping positions, concluded there was no difference in the routine sleep position for SIDS infants and a control group. Infants were matched by gender, race, age and hospital.

McGlashan (1986), Dwyer, *et al.* (1991) and Cameron and Williams (1986) all used hospital of birth as one of their control criteria. Common health care practices might be taught to all parents of infants born at the same hospital resulting in difficulty in identification of different sleeping positions (Beal and Finch, 1991). Carefully selecting case-contols in SIDS studies is essential in obtaining unbiased results, as is clear definition of the variables being used and compared. Specifically, in case-control studies of sleeping position, various definitions are given for sleeping position, from the position in which the

infant was found, to the usual sleeping position of the infant, or the position in which the infant was last placed by the care-giver. Comparability is not possible because the three different definitions could constitute three separate factors and not a measurement of a single variable. The position in which the infant was found may reflect the result of agonal movements of the infant (Beal and Finch, 1991).

e. Seasonality. Seasonal variation in SIDS incidence has been reported in several epidemiological studies (Krause and Bulterys, 1991 and Beal, 1978). More cases occur during the colder months of the year, peaking at the beginning of the winter in both the northern and southern hemispheres (Kraus and Bulterys, 1991). Beal (1978) reported no seasonal variation for SIDS infants under three months of age; however, seasonality appeared to be an added risk factor for infants more than three months of age at death. Why this may be important is not explored or tested.

f. Overheating. Literature identifying this physiological process is not available although substantial literature on subarctic boreal forest inhabitants is available on the body's ability to maintain its core temperature under cold ambient temperature. The authors identify a variety of biological and behavioural adaptations. Biological factors include the distribution of body fat and body shape (long body, short extremities). What may be relevant to SIDS is that the authors noted "more actively functioning sweat glands in the face than on the body and rapid rewarming of fingers after cooling," suggesting that particular parts of the body are more adaptive to thermal balance than other parts (So, 1982; Moran, 1981). As Nelson (1996) states:

> [T]o maintain thermal balance over a period of time heat loss from the body must match heat produced. A failure to maintain thermal balance will result in either hypothermia or hyperthermia (Nelson, 1996: 151).

Given the recent discussion focusing on overwrapping and SIDS (Nelson, Taylor and Weatherall, 1989; Dwyer, *et al.*, 1991), the Bolton, *et al.* (1996) model on thermal balance in infants could be instrumental in measuring whether or not hyperthermia may

represent a possible causal or contributing factor in SIDS. The association of sudden infant death syndrome with cold weather has suggested to some researchers that hypothermia may be the operative factor (Bacon, 1993; Lean and Jennings, 1989; Stanton, 1984 and Wigfield, *et al.*, 1993). During the infant's first three months of life, its metabolic rate rises in conjunction with the rise of mass to surface area, which means that the net heat loss for each unit of surface area is 50% higher than that of a neonate (Fleming, *et al.*, 1992). A longitudinal study in the Avon area of the United Kingdom found that victims of SIDS (over 70 days of age) were more heavily wrapped and more likely to have slept in a room with the heating on all night, when compared to control infants. The authors conclude that there is some physiological evidence that infants approximately three months of age may be more vulnerable to heat stress than younger infants (Fleming, *et al.*, 1992). A three month old infant must excrete 50% more heat per unit surface area than the newborn infant to remain in thermal balance (Fleming, *et al.*, 1992). This hypothesis suggests that developmental changes interacting with infant care practices (wrapping and infant's room temperature) may be important to understanding SIDS.

In a Tasmanian study on the overheating hypothesis, the authors found the mean insulation for SIDS cases to be 1.3 Tog more than for controls (Dwyer, *et al.*, 1991). A Tog is defined as a unit of thermal resistance used to express the insulating properties of clothes and quilts (Bacon, *et al.*, 1991). Technically, one Tog is 10 times the temperature difference measured in Celsius (C) between the surfaces of a material when the heat flow through it is 1 watt/m2 (Bacon, *et al.*, 1993). In the Tasmanian study, attending ambulance crews recorded the ambient temperature of the SIDS cases. The mean value for SIDS cases was 18.1C compared to 16.6C for controls. SIDS cases in this study were reported more likely to have had room heating than did the matched controls (Dwyer, *et al.*, 1991). In a later study, Ponsonby, *et al.* (1993) conclude that "overheating and the

prone sleeping position are independently associated with an increased risk of the sudden infant death syndrome". This case-controlled study is important because of the complexity of the association between combined factors. While factors examined separately may result in association with SIDS, Ponsonby, *et al.* (1993) have been able to display a link between sleeping position and overheating, and SIDS. The difference in study design between Ponsonby, *et al.* (1993) and Fleming, *et al.* (1992) is that Ponsonby, *et al.*, were able to verify the parents' recollection about the amount of bedding and room temperature by the attending ambulance crew's records (as did Dwyer, *et al.*, in 1991) when they were called to the residence of a SIDS case.

Co-variation may exist between sleeping position and overheating. The prone sleeping position has implications for overheating because it reduces the body surface area available for heat loss. In other words, the infant's face has an important thermo-regulatory role to play in heat balance and can be compromised when a heavily wrapped infant is placed face down in its cot (Fleming, *et al.*, 1992).

Bacon, *et al.* (1991) conducted a thorough prospective study on overheating associated with infants in Newcastle, England. The authors concluded that mothers of younger and lower birth weight infants tended to have warmer rooms but less insulation from blankets on both winter and summer nights. Of the total group, 28.2% reported that their infant usually perspired when asleep at night, with 4% reporting infants sweating profusely. For temperature adjustment during sickness, 44.5% mothers said they would make no change, 18.8% would keep the room warmer and 36.5% said they would keep the room cooler. Whether the gender of the infant affects this decision is at present unknown. Younger mothers used more bedding and kept their infants warmer when ill than older mothers (Bacon *et al.*, 1991). The ambient temperature of the baby's sleeping place was recorded during the time of the interviewer's visit. Outside temperatures for the same day were obtained from the Meteorological Office. The data were analyzed

separately for mothers interviewed in the summer and for the mothers interviewed in the winter (Bacon, *et al.*, 1991). An earlier study which used the same methodology (Wailoo, *et al.*, 1989) was limited in design to winter nights. The Bacon and associates' study design incorporates seasonal comparisons thereby encompassing the scope to identifying added heat and bedding during winter months. Though these studies appear to link thermo-regulation and SIDS , further work is required to demonstrate any causal connection.

g. Co-Sleeping. Mitchell, *et al.* (1993) related the high SIDS incidence amongst the Maori as possibly being linked to their cultural habit of mothers sleeping in the same bed as their infants. Anthropologist McKenna (1986) has departed from other researchers by arguing that there are evolutionary benefits to the infant attained in co-sleeping which fulfill the developmental needs of the human infant. McKenna, *et al.* (1996) notes that co-sleeping is discouraged by health professionals and it is not considered a legitimate sleep management strategy for infants or children. He further suggests that co-sleeping is under-reported due to the contemporary social negativity surrounding this habit. He argues that while society may consider co-sleeping as anachronistic, it is biologically useful in protecting the infant from vulnerability to SIDS. From both a developmental and evolutionary perspective, parental contact and proximity with infants can be seen to represent a developmental bridge by extending the prenatal role of the mother in regulating important aspects of her infant's development (McKenna, *et al.*, 1996). Because human infants are neurologically immature at birth and slow to develop, and parental investment is generally high among human mothers, natural selection favors increased maternal sensitivity across a range of environmental contexts including co-sleeping. Current research tends to be focused on patterns of solitary sleeping infants. This research orientation represents a dubious example of Western ethnocentrism envisioned in scientific research design (McKenna *et al.*, 1990). In the belief that co-

sleeping is dangerous, mothers in industrial countries place infants to sleep alone. In non-industrial countries where cultural traditions dictate infant care strategies, co-sleeping is more normal. His research on co-sleeping suggests that sleep and arousal patterns of the co-sleeping pairs influence each other.

2.1.3 Canadian Aboriginal SIDS Literature. To date, there is only a small number of research articles pertaining to SIDS in Canadian Aboriginal populations. Reference to either "Aboriginal" or "Indian" will be consistent with the terminology used in the articles themselves. In a retrospective population study based upon a ten year medical chart review, Young (1983) investigated mortality patterns in a northwestern Ontario Aboriginal community. He defined Aboriginal status by reference to the "band lists" prepared by the Canadian Department of Indian and Northern Affairs. A person recorded on the band's list as having legal Aboriginal status was included in the study. It should be noted that Aboriginals are under no obligation to register infants. In fact, registration can be left until adulthood. Unlisted persons were not included in Young's study. Although not specifically seeking SIDS cases, his review is the first Canadian investigation to give an account of SIDS in a Canadian Aboriginal community. In the ten year period researched, which did not include a non-Aboriginal comparison, twenty-two Aboriginal infants were identified as SIDS cases, although the author acknowledges that only 9.4% of all deaths were autopsied.

The retrospective Aboriginal communities mortality research of Morrison, *et al.* (1986) differs from Young's in two ways. It was directed to infant mortality exclusively, whereas Young (1983) looked at all mortality patterns. Secondly, Morrison, *et al.* (1986) compared Canadian Indian reserves in five provinces: Quebec, Ontario, Manitoba, Saskatchewan and Alberta, whereas Young conducted his investigation in a single area. The infant mortality data of Morrison, *et al.* (1986) was retrieved from the national mortality database at Statistics Canada and aggregated to a provincial level. In

Saskatchewan, 2.2% non-Aboriginals live on reserves, and in Ontario 5.9% non-Aboriginals live on reserves. The authors do not give non-Aboriginal comparisons, but they used non-reserve mortality figures to generate expected values. Birth and death certificates were linked for all provinces reviewed except Quebec. Quebec does not supply names necessary for record linkage in machine readable form to Statistics Canada for either births or deaths. Compilation of all infant mortality revealed SIDS cases. Information on autopsies is not provided, although 97 SIDS deaths were recorded. Aboriginal SIDS rates were three times higher for both neonatal and post neonatal infants than for non-Aboriginals. Criteria used in selecting the non-Aboriginal group are not provided. Again, these results must be treated with caution due to the lack of explanation for the non-Aboriginal reserve population. In both Young (1983) and Morrison, *et al.* (1986), data on total number of births, on infant age distribution for SIDS incidence and seasonality of death are not provided. While these studies are frequently quoted to establish historically high Aboriginal SIDS incidence, both fall short of adequate validation by not supplying total Aboriginal births for the relevant periods discussed. Morrison's research is subject to two potential biases: First is the inclusion of non-status Aboriginals. Validation of status is not included in the methodology. Events occurring outside of the region may be missed. For example, if a Manitoba family goes to Ontario to visit and their infant is a victim of SIDS, the death may be recorded as a SIDS incident in Ontario, but not in Manitoba. Second, no attempt was made by the researchers to validate the band list. As will be noted in Chapter IV, band lists are frequently inaccurate and may give a false picture of the actual number of residents on the reserve, which could result in depressed rates overall for Aboriginals.

Moffatt, *et al.* (1988), initiated a retrospective, death certificate-based study to determine if the 1981 SIDS incidence reported to Statistics Canada (3.87/1,000 Aboriginal compared to 1.17/1,000 for all other Canadians) was accurate or inflated. The study was

conducted in the province of Manitoba and the Manitoba Health Services Commission provided figures for total live births in the province, while Medical Services Branch (MSB) provided figures for live births to treaty Indians. The authors clearly state the criteria they used to determine whether a SIDS infant was Indian. They state:

> An Indian was defined as one who has treaty status through the Department of Indian Affairs. Although this does not include all people who call themselves Indian or Metis, it is the only way of defining an Indian population in Canada, and reasonable denominators are available (Moffatt, *et al.*, 1988).

In Manitoba, 43 Indian and 124 non-Indian cases of SIDS were investigated. Income levels were not obtained, but by using data from a 1981 census, the authors plotted case addresses on neighborhood maps of Winnipeg, and determined that of the 48 SIDS cases within Winnipeg (43 non-Indian and 5 Indian cases) 25 were located in the two lowest income neighborhoods. The association of SIDS with low income status is in accord with previous studies. All but one case had been autopsied. The SIDS rate for Indians was determined to be 3.74 (compared to Statistics Canada's figure of 3.87) and 1.21 for non-Indians (compared to Statistics Canada's figure of 1.17). The authors conclude that the originally reported results do not appear to be inflated. Native infants account for nearly 25% of all SIDS deaths in Manitoba, although they make up less than 10% of the population (Moffatt, *et al.*, 1993).

Muir's (1991) population-based study relied on information provided to the Medical Services Branch, incorporating a broad spectrum of definitions regarding who is an Aboriginal. The lack of consistency in racial definition greatly weakens the validity of Muir's conclusions and will not be discussed further.

2.1.4 Possible Explanations for Excess SIDS Risk in Aboriginal Populations.

a. Age of SIDS Mothers. In a 1988 breast feeding survey, young Aboriginal maternal age was identified. Age of mothers ranged from 13 to 46 years with 8.7% of

Aboriginal mothers being less than 18 years of age and 13.5% aged 18 to 19 (Robinson and Cumming, 1993).

b. Breast Feeding. 60.7% of infants were breast fed at birth. By three months of age, this rate declined to 42% and to 31.1% by six months of age (Health and Welfare Canada, 1988). Whether some infants are both breast and bottle fed is not reported.

c. Smoking by Mother and Other Household Members. Information collected for the breast feeding survey (1988) showed that 52.8% of Aboriginal women smoked before pregnancy, and 48.2% continued to smoke during and after pregnancy (Robinson and Cumming, 1993). Because of the presumed prevalence of this risk factor in the Aboriginal population, there is a need to collect accurate data on smoking in the Aboriginal infant's environment.

d. Sleep. Historically, Aboriginal infants were breastfed for an extensive period of two years or longer, clothed in furs and received considerable tactile communication. The infant was in almost constant contact with the mother. Infants were placed to sleep between parents or placed in a hammock strung above the mother's bed (Jenness, 1977). In either sleeping place, it is unlikely that the infant was placed in a prone position (Moffatt, 1993).

e. Thermoregulation. Traditionally, as Jenness (1977) noted, Aboriginal infants were kept warm by being wrapped in furs. Contemporary Canadian Aboriginals live in heated homes. Wrapping infants under many layers of material may have persisted even though the environment has changed.

f. Social Economic Status. Studies suggest that socio-economic status is probably an important contributor to SIDS (Moffatt, *et al.*, 1988; Irwin, 1992). There is statistical evidence to show that infant mortality rates are highest in lower socio-economic groups in Canada (Avard and Hanvey, 1989; Shah, 1987). Most Canadian Aboriginal people live in

poverty (Moffatt, 1993). In 1986, the mean income for Aboriginal families was $9,300 compared to the non-Aboriginal average of $18,200 (Postl, *et al.*, 1993).

2.2 Physical Environment of Infants and SIDS

Human bodies, including infants, harbour extensive communities of micro-organisms which are externally influenced (Bettelheim, *et al.*, 1995). A bacterial toxin model was first tested a few years prior to the defining of SIDS. Of 126 sudden and unexpected deaths (SUD), bacterial cultures showed that *E.Coli* from blood and the respiratory tract was commonly isolated in cases of SUD. Adelson and Kenney (1956) state that in these types of death "toxaemia deserves further consideration." SIDS researchers shifted the focus of research to other issues, effectively abandoning any further pursuit of a bacterial toxin theory of causation. Sayers, *et al.* (1996) recalled the re-opened interest in this theory with their earlier discovery that the upper respiratory tract of SIDS victims revealed a greater variety of bacterial species than did controls. *Streptococci* and *Enterobacteria* counts were higher in SIDS victims. A possible association between SIDS and the presence of *E. Coli* was reported by Bettelheim, *et al.* (1990 and 1995) and Bettiol, *et al.* (1994), while Drucker, *et al.* (1992) found that coliforms from the nose and upper respiratory tract of SIDS infants were toxigenic and could be lethal. While the investigation of environmental toxins has been sporadic, Bettelheim, *et al.* (1995) suggest that toxins may interact synergistically with, for example, the toxins generated by cigarette smoking and *Staphylococcal* toxins resulting in enhanced lethality. The role of environmental contaminants and toxins and their association with SIDS has recently been investigated also by Saadi, *et al.* (1996), Sayers, *et al.* (1996) and Mackenzie, *et al.* (1996).

2.3 Environmental Bacteria

Mackenzie, *et al.* (1996) have suggested that bacterial toxins may be involved in some cases of SIDS, including exotoxins of *Staphylococcus aureus* or *Bordetella pertussis*, and

endotoxins of Gram-negative species. In this study socially deprived and affluent areas were compared. Saliva samples, nasal and throat swabs were obtained from both mother and child. The results indicated a high proportion of *Staphylococcus aureus* in infants in the age range during which 60% of SIDS deaths now occur in Britain. They also identified both toxigenic staphylococci and their toxins in these infants.

In the Saadi, *et al.* (1996) study, the ability of human milk and infant formulas to inhibit binding of toxigenic bacteria to epithelial cells and to neutralize toxins identified in SIDS infants were compared. Some cases of SIDS, it has been suggested, were due to overwhelming inflammatory responses induced by bacterial toxins which can act as super antigens, e.g., the pyrogenic toxins of *Staphylococcus aureus* or the toxins of *Clostridium perfringens*. They found that human milk, even in the absence of specific antibodies, can exert protective effects in reducing colonisation by toxigenic bacteria implicated in SIDS or neutralising the activities of their toxins.

A different methodology was used by Sayers, *et al.* (1996.) After noting that *Staphylococci* and *Enterobacteria* were found together in seven SIDS cases (N=48), toxins were prepared from the bacteria by growing them on dialysis membrane over agar, washing, then removing live bacteria by centrifugation and filtration. The crude toxin preparation was diluted and injected into eleven day old chick embryos and lethality was assessed by eighteen hours' incubation. Toxin A was not lethal, nor was toxin A and B combination. Toxin C (nicotine) "potentiated the lethal action of single toxin preparation (A) and markedly potentiated the action of toxin combination A and B." The authors suggest that while bacterial substances do not become lethal on their own, a deadly cocktail exists when *Staphylococci* (A) and *Enterobacteria* (B) are combined with nicotine (C). These studies suggested the possibility of lethal variables in SIDS rates.

While not yet demonstrated to be related to SIDS, a review of the environment should consider air quality. Within an infant's environment, a form of fungus often found

in poorly maintained buildings is *Stachybotrys chartarum*, formerly called *Stachybotrys atra*. It is a black, slimy fungus which can grow in basements with either water leaks or extreme damp conditions. It thrives on cellulose fibres such as pressed board and paper products (Rasmussen, 1996). Spores from the fungus can become airborne and enter the lungs of infants causing a condition called pulmonary hemosiderosis. In a Chicago report (Rasmussen, 1996), sixteen deaths were attributed to this condition. All of the sixteen victims were six months old or younger. If diagnosed at an early stage, pulmonary hemosiderosis is curable. *Stachybotys chartarum* can produce several toxins called trichothecene mycotoxins. These mycotoxins are contained in the airborne spores and fungus. The spores are very small and when inhaled are drawn into the lungs (Giosta, 1996). Exposure is by direct skin contact, ingestion or inhalation. The infant is treated with steroids and the disease clears up. The fungus' ability to cause death may be related to the rapid growth of the infant's lungs in relation to the rapid growth of the fungus inside the lungs. Eventually, the fungus consumes healthy lung tissue causing death (Rasmussen, 1996).

When spores become airborne, allergic, respiratory or immune symptoms develop or become worse. These include asthma, irritation or inflammation of the eyes, skin, nasal passages, lungs and sinuses. Other symptoms include central nervous system effects (headache, nausea, inability to concentrate) and fatigue (Giosta, 1996). Microbiologist, C. Yang of New Jersey stated that the key to a microbial contamination is that the spores love moisture and a very wet environment. An important ingredient is wet material such as cellulose and wood or paper products, wall and ceiling tiles and carpeting (Giosta, 1996). Visible mold, water damage and symptoms listed above are indicators that the building should be inspected and ventilation systems should be checked (Giosta, 1996) because in tight or sealed buildings damp cellulose products do not dry.

Much of the current SIDS literature suffers from the "sky is falling" approach. With the exception of the work of Dwyer (1991) and Ponsonby (1993) on a possible linkage between prone sleeping and overheating, each researcher or group of researchers focuses their efforts on finding the metaphorical "silver bullet" which will cure or eliminate SIDS. Nowhere in the literature (with the exception already noted) can we identify a research project which considers multiple factors as influencing each other in the causality of SIDS and few attempts to refute the data were observed. For example, since low socio-economic groups suffer greater levels of poor health than do more affluent groups, is it surprising that they experience higher SIDS incidence? What similarities do non-lower socio-economic groups share with this group? As Hahn (1995) notes, using narrow definitions may prevent us from examining possibly related phenomena, simply because they do not commonly fit into our particular definition. Also missing from the literature is a male/female comparison applied to other risk factors, especially thermal regulation, supine/prone sleeping and maternal age. This absence of co-variance influenced my interest in environmental factors. This broader focus may incorporate variables hidden or missing in a single variable approach.

CHAPTER III

THEORETICAL ORIENTATION

In this chapter, I formulate the relevance of a biocultural model to the research. The historical pertinence of Aboriginal medicine and belief systems juxtaposed upon the power of medical institutions and concepts is explored. The impact of authoritative knowledge of medicine on culture is examined as a transition to, or rejection of, certain aspects of western medicine.

The history of aboriginal health issues is given to set the scene with which to understand current Aboriginal approaches to infant care in opposition to political medicine. The control of knowledge through authoritative knowledge (Jordan and Irwin, 1989) of birth and infant care emerges from this review. The term "authoritative knowledge" in the past has been solely associated with the birthing process (Davis-Floyd and Sargent, 1996; Sesia, 1996; Browner and Press, 1996; Georges, 1996; Heriot, 1996; and Davis-Floyd and Davis, 1996) to name a few. This term, I argue, is also applicable to the changes in infant care. It is my contention that the process of technocratic cultural hegemony practised in the birthing and prenatal experience is applicable to the issue of infant care. The literature on birthing and prenatal care has recently received wide attention (Davis-Floyd, 1996; Jordan & Irwin, 1987; Sesia, 1996; Browner and Press, 1996; Georges, 1996; Heriot, 1996; Fiedler, 1996; and Sargent and Bascope, 1996). I argue that the changes in birthing procedure places women in a dependency role whereby the next linkage is dependency upon infant care experts. In the realm of infant care expertise, women are given feedback about the infant's weight, length and head circumference and this information is plotted to determine if the infant is "on the normal curve". Aspects related to feeding, sleeping, teething, behaviour and development, not to mention immunization, are pre-determined by technology. Women are encouraged to bring the infant in to be observed by the expert on a regular basis. Good mothers are

deemed those who acquiesce, reinforcing the authoritative knowledge and subsequently subverting any cultural or ethnic traditions.

3.1 Aboriginal Medicine

Waldram, *et al.* (1995) suggest that traditional Aboriginal medicine can be understood as a set of coherent beliefs and practices integrated in societal and religious aspects of everyday existence that is structured on a coherent, rational understanding of the universe and the location of humans within the universe. The world is seen as a place in which balance and harmony exist. Serious illness is seen as a disruption of this balance. Aboriginal medicine utilizes a holistic approach to healing which views the mind, body and spirit as an integrated whole. Aboriginal medicine and what non-Aboriginals call the religious realm are almost non-distinguishable, blurring and blending with many healers also involved in religious activities. Medicine in this environment exceeds but also incorporates drugs and healing by the inclusion of a kind of "power" in a spiritual sense. Disruptive influences on the lives of the community required knowledge or power to extrapolate the source of the disturbance. Illness was not categorized into somatic and psychic disorders. Disease causation included spirit intrusion, soul loss and sorcery (bad medicine).

While a non-diametrical approach to physical health and mental illness is incorporated in Aboriginal general disease theory, a dialectical approach is taken regarding causation of disease. A disease is perceived to be a product of natural or supernatural occurrences. Within Aboriginal medical systems "...the distinction between natural and supernatural is not the same as it is in Euro-Canadian cultures and the western scientific tradition. The term 'supernatural' is somewhat inappropriate to the description of Aboriginal spirituality" according toWaldram, *et al.*

"Medicine" was partly within the realm of what we would call the "religious," and many healers were also involved in religious activities. Protection from disease or illness

therefore was predicated upon the assistance of "other-than-human beings" such as "grandfathers." Human beings shared some knowledge or "power" with the "grandfathers"; however, it required humans to behave in the socially prescribed manner. The "power" to heal also incorporated the ability to cause harm or misfortune to be directed to a particular person (Waldram, *et al.*, 1995).

According to Hultkrantz (1992), there are basically three types of healers: herbalists, medicine men and shamans. This grouping is differentiated by the degree of spiritual assistance required in the healing. The Cree of Canada are credited as being "highly knowledgeable herbalists" (Williams, *et al.*, 1969). They were able to reduce pain (with salicin, similar to aspirin found in willow extract) and were knowledgeable about various kinds of anaesthetics, emetics, diuretics and medicine that could induce labour or diminish labour pains. Through trial and error over years of environmental adaptation, they developed an understanding for the application of plant extracts on wounds which tended to act as an antibiotic inhibiting the spread of infection. Several methods were utilized to diagnose or heal. These included "sucking" or "cupping" (to remove cause of imbalance), shaking tent ceremony (to communicate with the spiritual world), sweat lodge (prayers to maintain health or address a health problem) and laying hands on, to locate the point or cause of health problems.

Illnesses such as colds, headaches and digestive disorders were treated with herbal remedies and considered minor illnesses. Serious illness was viewed as a penalty for a prior transgression of the moral order and required a specialized healer to assist in recovery according to Waldram, *et al.* (1995). In cases of serious illness, the cause was surmised to exist in a web of relationships. These interpersonal relationships were composed of human beings and through a less than exegetical approach as "other-than-human beings." The power which enabled a human to heal and protect against disease or illness was predicated upon the co-operation of the "other-than-human beings." As a

result of this belief system where balance and harmony are essential to wellness, serious disease served to "reinforce" the social and moral order. The cause of illness often involved a breach of the "normative order" necessitating repairs to the moral fabric as central to healing activities. Children were not usually viewed as being fully socialized into the normative order, and if they became ill it was viewed as the product of a transgression by an adult.

3.1.1 Belief System and Birth Rituals. A society's cultural system of childbirth may be considered an adaptation of its greater belief system to the physiologic events surrounding pregnancy and parturition (Waxman, 1991). A complex interweaving of ritual belief and proscription during the prenatal period led to a traditional way of giving birth that integrated both mother and infant into the cultural and religious fabric of the community. In other words, disharmony was deemed a consequence of the violation of the many taboos which exist in every day life, a disharmony which manifested itself most often in sickness. The nature of the non-well condition is determined and frequently patterned after the nature of the transgression (Bailey, 1948).

Bailey (1950) gives as an example of "like produces like" the case of a pregnant woman ignoring the proscription against tying knots while pregnant. By continuation of this practice, it is predicted that the baby will be tied up in the womb and childbirth will be difficult. Taboos involved both husband and wife and could affect the woman during labour or the child before or after birth. Illness in later life was frequently attributed to taboos unknowingly violated by a parent before birth (Bailey, 1950; Kluckhohn and Leighton, 1962). The pregnant woman who doesn't think happy thoughts would have difficulty with her pregnancy, labour and delivery (Waxman, 1991). For many Aboriginal groups, there exists a taboo against women preparing for the child in advance of labour and birth which has implications for seeking prenatal care. Prenatal help would violate taboos against expressing concern about possible adverse outcomes (Begay, 1985).

Herbalists of the community had plant medicine knowledge which could induce labour or numb labor pains (Waldram, *et al.*, 1995).

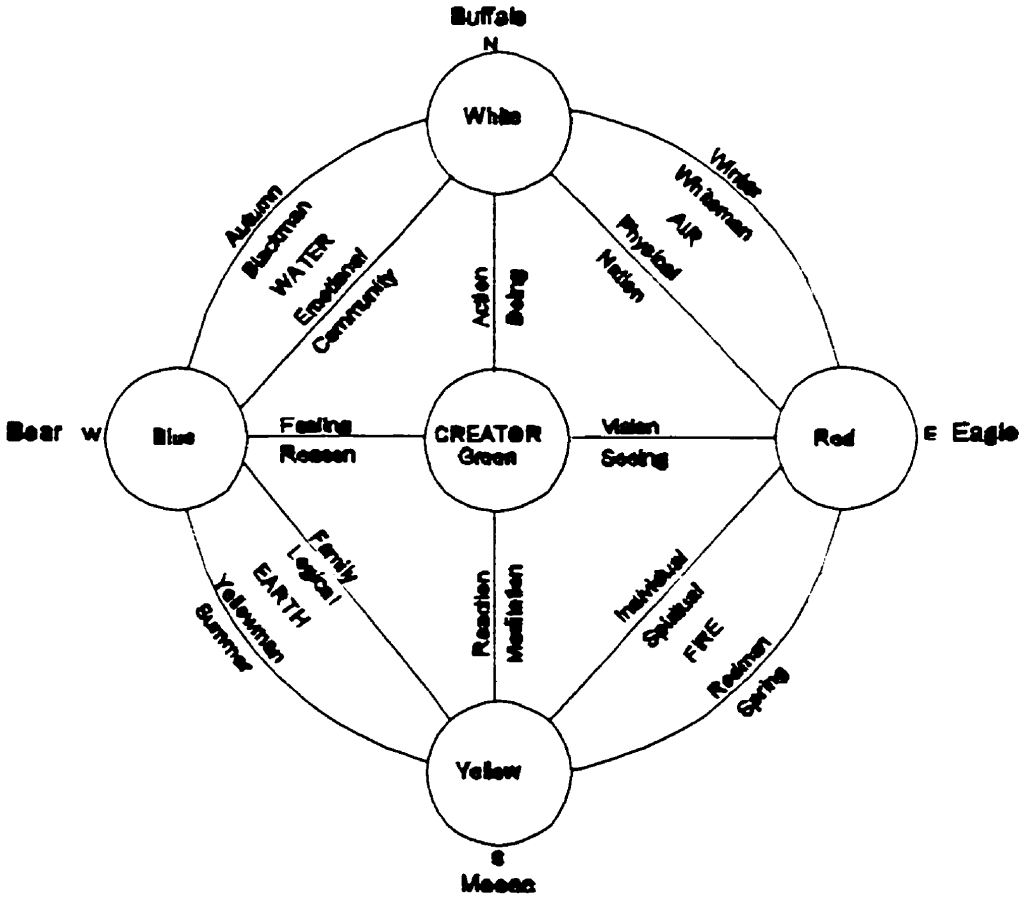
3.1.2 The Medicine Wheel. The Medicine Wheel (Figure 1) contains the symbolic representation of the realm of wellness. Among Alberta Cree communities, the wheel is influenced by the number four. Outside the circle of the Medicine Wheel are the four directions of the world, north, south, east and west, each of which is represented by a certain animal: North is honoured by Buffalo, South by Moose, West by Bear and East by Eagle. The four seasons also outline the circle, autumn, winter, summer, and spring. The direction for the wheel follows from right to left. At the centre of the entire wheel is "Creator." All emotions, elements, and people move in harmony with the Creator. Included in most healing prayers is the opening phrase "In the Creator's Name" or "Creator, I ask . . ." Frequently prayers of assistance in healing conclude by the phrase "All my relations".

The next level of the Medicine Wheel incorporates all the peoples of the world by the symbolic use of four colours for four circles. The colors are Red (for Redman), Yellow (for Yellowman), Blue (for Blackman) and White (for Whiteman). The Creator's symbolic circle is a green colour. Green may represent the colour of nature, grass, trees, leaves--the essential food for animals which represent a significant proportion of the food supply for humans.

The adjacent level expresses the elements of nature--water, air, earth and fire--the environment necessary for the survival of humans. Inside this level, representing triangles of support, are the four elements of harmony--the emotional, physical, spiritual and logical. The community coordinates are placed in relation to the elements of harmony such that spiritual supports the "individual", logical supports "family", the community supports the "emotional" and the nations supports the "physical". When an individual

experiences illness from disharmony, the healing process re-establishes the normality for the community.

Figure 1 - Medicine Wheel



Four lines directly emerging from the Creator's Circle are also double sided representing an inner level of support. The four lines represent "feeling", "vision", "action" and "reaction". The elements are supported by a series of activities such that "feeling" is balanced by "reason"; "vision" is supported by "seeing"; while "action" is balanced by "doing" and "reaction" is balanced by "meditation". The four human–attributes, feeling, action, vision and reaction–are also juxtaposed to other elements of life by their situation in the triangle. Thus we see meditation coupled with "individual and

spiritual", "reaction" and "reason" triangulated with family and logic. "Feeling" and "action" complete the triangle of "emotion" and "community", while "doing" and "vision" complete the triangle of "physical" and "nation".

Clearly "medicine" and the social aspects of an Aboriginal community are interwoven and are paramount to the infrastructure of their culture. The intrusion of Western medicine into the fabric of such a belief system can cause cultural havoc, especially when the exigencies of modern birthing demand that Aboriginal women be removed from the context of this belief system for the delivery. In the case of the project community, this removal constitutes both cultural and geographical distancing from their normal support system. The geographic distance is several hundred kilometers and the cultural distance is as yet unmeasured.

3.2 Health History of Aboriginals

A report in 1767 by a Hudson Bay Company employee (quoted by Young, 1994) states that "Indians in general exceed the middling stature of Europeans; are straight well made people, large boned, but not corpulent...Their constitution is strong and healthy; their disorders few, the chief of which are the flu, consumption, and pain in the breast." Widely scattered, small bands of Aboriginals in North America may have had parasitic infections, probably of low virulence. The level of health declined once Europeans, (immuned in childhood) with their own set of diseases mingled with Aboriginals. Epidemics occur when the complex relationship between human population and their social and physical environment is altered, disrupted, or conducive to the flourishing of micro-organisms (Waldram, Herring and Young, 1995). From the introduction of Europeans (in the seventeenth century) disease flourished in what Dobyns (1983) called a "virgin soil atmosphere". Smallpox, measles, influenza, dysentery, diphtheria, typhus, yellow fever, whooping cough, tuberculosis and syphilis caused death or depleted resistance to further infections. A large body of literature has compiled routes of disease

spread (following the trade route and Aboriginals return from contamination at trading posts) and the social and biological impact on Aboriginal societies (Helm, 1980; Dobyns, 1983, 1989; Hurlich, 1983; Krech, 1983; Crosby, 1986; Ramenofsky, 1987; Decker, 1988; Snow and Lanphear, 1987; Thornton, *et al.*, 1991; Ray, 1976; Herring, 1993, 1994; Ubelaker, 1992; Young, 1988, 1994; and Waldram, *et al.*, 1995.) During the "contact shock" period, birth rate declined while mortality rate increased (Young, 1988).

Traditional Aboriginal treatments were ineffective in the face of the new onslaught of recycling epidemics. The Aboriginal interlocking segments of health, treatment and religiosity have been discussed earlier. As their indigenous healing methodology was neutralized by the waves of death and morbidity, reliance upon traditional cures wavered.

The Canadian Federal Government imposed cultural change on Aboriginals when they were moved to designated reserves where most of their cultural beliefs were denied. Alberta Aboriginals signed a treaty in 1876 and were relocated to reserves. No longer able to practice their nomadic life style, they were continually under the force of external medical technology. It follows that if a traditional source of medicine is ineffective and another source appears to be "stronger" or more "powerful" loyalties would be altered. As Young (1988) stated, the "impotence" of indigenous healing to respond to the onslaught of destruction from death and morbidity persuaded surviving Aboriginals to approach the "imported" medical strategies.

In the late nineteenth century, nuns became involved in delivering infants in a small newly constructed hospital on the research site. For the new religious/medical influence to have "power" through consensus as the "authoritative model", a devaluation of indigenous obstetric wisdom and skills occurred and obstacles were constructed to deter communicating indigenous knowledge and skill acquisition (Jordan, 1989).

Aboriginal medical beliefs were outlawed and those who practised them were ridiculed by whites and even arrested. The imposition of an external medical system

became a vehicle by which Aboriginal culture was displaced and dependency on a foreign culture through medicine was fostered. The magnitude of that imposition, and the need for compliance, is illustrated by Culhane-Speck (1987):

> One of the major obstacles to the development of the medical profession's exclusive jurisdiction over the human body was the knowledge and skill in the practice of folk medicine possessed by many non-professionals, frequently women. Many of these healers and their remedies were outlawed, some were declared witches and executed, and all efforts were made to prevent them from passing their knowledge on to subsequent generations.

The Aboriginal model of birth that gives authority to the "inner knowing" of the birthing mother and her caregivers who utilize both their technical skills and their own intuitive knowledge to assist the mother to access that "inner knowledge" was ridiculed (Davis-Floyd and Sargent, 1996). Within a short time span women had been relocated from their semi-nomadic life to a sedentary reserve existence. Along the way not only life style was changed, with the move of land bases, the structure of belief systems integral to "medicine" was undermined by the imposition of biomedicine. Biomedicine introduced nurse-assisted births and physician-assisted infant care practices. Many changes, both dramatic and common, were occurring. According to Oliver-Smith (1992) changes can represent:

> . . . a process (of change which) is both difficult and fraught with ambivalence because it may involve not only a venture into uncharted waters, but also the loss of familiar meanings and symbols as well as the acquisition of new ones. Successful adaptation to change then requires innovative behaviour reformulation and reinterpretation of past knowledge to render present context meaningful.

As noted earlier (Culhane-Speck, 1987), Aboriginal practices were outlawed, practitioners declared witches and continuity of Aboriginal knowledge was thwarted. Common features to all Aboriginal healing practices were their public nature and the required attendance of the elders of the village at curing ceremonies with societal support essential

to the healing process. The beginning of institutionalized medical care displaced the responsibility for the community's contribution to healing the individual to outside experts.

Administration and surveillance of every detail of Aboriginal life including birth, child-rearing, health and death were conducted under the auspices of the Indian Act. Unable to lawfully practice Aboriginal birth and infant care and the interchange of this knowledge fostered a growing dependency on Western medicine. Non-Aboriginal health care workers, as Culhane-Speck (1987) states, were conferred a certain degree of moral superiority "...where health care personnel are non-Indian, and patients are Indian, assumptions of cultural or racial superiority intensify individual self-righteousness and professional snobbery and most often add an element of paternalism to the relationship between professional and patient." Several quotes by Culhane-Speck (1987) from members from a reserve community represent the intolerance experienced through the agency of medicine:

> ". . . now we have dental health, mental health and all sorts of other categories and rarely is a patient looked at as a total human being."
>
> "when children were taken away from their parents and placed in missionary schools, this traditional kind of learning decreased, but there was not a corresponding growth of knowledge of white man's medicine at the same time."
>
> "We were colonized by white people who were convinced that whatever practices they saw among us, because they were different, had to be inferior, uncivilized, heathen. it was ethnocentricity at its most destructive level."

As noted by Jordan and Irwin (1989), when referring to changes in birthing practices and subsequent infant care practices, "...[The] power of authoritative knowledge is not that it is correct, but that it counts." Foucault (1980) extends this observation saying, "....there is no power that is exercised without a series of aims and objectives". One of the salient points made by Foucault is that "power" is "a way in which certain actions modify others"

(Dreyfus and Rabinow, 1982; 219). Nowhere is this more poignant than when we analyze the outlawing of birth and infant care practices as a watershed in the world of authoritative knowledge housed in the medical bag of Western medicine. Reliance upon the new medicine regime represented a dynamic source of assistance to acculturation and assimilation. In his discussion on life and growth and care of populations, Foucault perceives the human body as an object to be manipulated and controlled by "...[A] new set of operations, of procedures--those joinings of knowledge and power called 'technologies'--come together around the objectification of the body" (Rabinow, 1984).

Women exposing their breasts to feed their hungry infant, or giving birth at home using a birthing stick were deemed "uncivilized" and efforts were made through medicine to alter traditional methods associated with women and infants. However, employing and retaining the new "status experts" to work in the harsh allocated environments of reserves fostered the use of experts less respected in the non-Aboriginal communities. For example Culhane-Speck (1987) writes that the Federal Indian Health Nurse assigned to the Alert Bay area "...made herself known by her outspoken condemnation of Dr. Pickup and the hospital administration and nursing staff. She was equally critical of her own superiors and colleagues in the Medical Services/Indian Health Division of National Health and Welfare Canada for their collusion in the situation." Deprived of reliance upon traditional "ways", the Aboriginal community were dependent upon a medical system which they did not understand but were skeptical of. However, with the rapid demise of traditional knowledge, Aboriginals were left with few alternatives for medical care.

3.3 Historical Overview of Infant Care

3.3.1 Visibility of Infant Mortality. Infant care in England remained a matter of "common sense" until change was fostered by the intersection of diverse economical/political issues (Loudon, 1992, 1997). These initiated a chain of events which subsequently altered the approach and representative skills mothers were deemed to

contribute to infant care. These changes, paradoxically, were to influence the approach to birthing and infant care among Aboriginals in Canada.

Around 1850 to 1900, there was a tendency to equate infant death as "normal" and a part of the "natural order" of events. Parents understood a baby's life to be a provisional thing -- a candle whose flame is as likely to flicker or go out as to burn brightly and continually (Schepher-Hughes, 1987). General practitioners (then the major sphere for doctors of the day) did not have direct contact with the sicknesses most affecting infants (Smith, 1979) until death was imminent (*cf.* Loudon, 1992).

According to Wright (1988), the complexity of causation leading to the changes in infant care and the emergence of a specialized field of medicine represents a growing pre-occupation with politics, infant welfare and "redefinition of working-class family and working-class mothers." Consequently, by 1914, child rearing (or infant care) had become a technical, medical field.

3.3.2 Medical Intervention Into Infant Care. By the turn of the century advice on infant care was becoming precise, authoritative, specific and self-consciously based on scientific knowledge. Infancy became appropriated as a field based on "scientific principles" to which medical training was deemed a necessary pre-requisite. In conjunction with this determination, the institutional position of the British Medical Officers of Health (BMOsH), whose relationship with the medical profession was "ambiguous", had by 1900 completed a body of epidemiological research on infant mortality which found association between infant deaths and urban poverty. The features of poverty seen as attributes of high infant mortality included, according to Wright (1988), "....poor housing, bottle-feeding of babies, unpaved streets, hot, dry summers and the absence of drainage via mains." The environment explicitly came to be perceived as a major "causative" factor associated with infant mortality. The BMOsH's epistemology

represented a litany beyond the scope of public health which required major political and social changes establishing the linkage of medicine and politics.

3.3.3 Power in the Germ Model. While the germ theory may have provided legitimacy for the new infant welfare movement, we must ask what were the source or sources of its power? To the general public of the period, pathogenicity came to represent the benefits of the application of scientific knowledge to medicine. Although indirect, it symbolized the claims of infant welfare advice to "scientificity" and to the extent, overall, of the ascent of science (Tansey, 1997).

Metaphorically the pathogen had power in its imagery to place human affairs within a convincing frame of meaning (Wright, 1988). The categories related to "purity and boundary maintenance" were paramount during this time frame as the Edwardian journalism and politics depict. Examples include words and phrases such as "social purity", "mothers of the race", "the imperial race", "British stock", "degeneration" and "purification of the race" (Davin, 1978). Two themes are depicted by this imagery. Central importance is placed on the boundary between inside and outside; such as between "the imperial race" and "aliens" and the "nation" and "enemies". The second theme is fear of internal decay or dissent (Wright, 1988). The model made sense of disease by representation to "war", "soldiers" and the body as a "fortress" or "vessel". The skill used to integrate germs, war and nation is found in Hood's (1916) hygiene reader Fighting Dirt: The World's Greatest Warfare.

> Your body is a great fortress, and contains yards of trenches in which are ranged countless invisible soldiers to defend it . . . while the comparatively small submarine can destroy huge vessels, so the tiny germ of disease can lay low the strongest of men.

More specifically directed to mothers of infants is the following dialogue in support of breast feeding:

> Thousands of babies die quite needlessly every year from diarrhoea. Where the infant draws its food straight from the mother's breast there is no danger of the milk becoming contaminated by flies or filth, but with cow's milk . . . there are opportunities for the enemy to enter the milk and so be carried to the delicate stomach of the baby. There the usual plan of campaign is adopted -- poisons are produced by every member of the invisible invaders, and unless the doctor is at once summoned to check their ravages, the baby soon surrenders its weak little body into the hands of the foe (Hood, 1916).

The history of medicine is frequently expressed in triumphal terms; as a process of refining, of separating the pure, neutral, scientific essence from everything that had contaminated it. Further, since the precepts of science are perceived to be incontrovertible, a professional group acquires a technical status and power if the knowledge they employ is seen to be clearly linked to science (Wright and Treacher, 1982).

In a rather short span of time and under the aegis of complex interlocking events, the common sense approach of women and mothers to infant care was subverted by technology and specialization of medicine. It is important as well to place these changes in the context of Aboriginals in Canada. The infant care events in England had implications for Canadian Aboriginals. It was during this time period that the move to reservation residence was occurring. Canadian physicians frequently received some or all of their medical training in England and British medical practitioners migrated to Canada to set up their practices, thereby transmitting the contemporary aspects of medicalization of infant care to mothers in Aboriginal societies. In the following pages, I illustrate how medicine has become incorporated into realm of political power for the non-Aboriginal, while Aboriginal societies have largely resisted this intrusion into their spiritual understanding of health.

3.4 The Political Power of Medicine

"Medicine" for Aboriginals represents a pivotal variable of their culture, which, when displaced significantly de-powers the interlocking components. While for non-Aboriginals, medicine represents the scientific approach to health issues. Thus, health, and subsequently medicine, is inextricably linked to, and assumes a proprietary classification (Campbell, 1989) within the realm of politics. Others, Jordan (1993), Davis-Floyd (1992), Harkness and Super (1994) and Scheper-Hughes (1987) have illustrated the subtlety by which birth and infant care are representations of the "knowledge" of modern technology and examine the aspects of medicine as a persuasive tool for politics. "The social construction of child survival as a medical problem about which something could and should be done is fairly recent" and concern for child survival is now considered a social and political problem, according to Scheper-Hughes(1987). Political persuasion, in conjunction with the armamentarium of the new "experts" in this area, changed the knowledge base and authority associated with infant care. This systematization of knowledge received validation under the advocatory political sanctioning power.

A central theme in this dialogue is the overarching effect of medicine to convert, especially in the birthing process and infant care, the client into the folds of technology with medicine as the dominant force responsible for the survival of the infant. From the moment of birth, human infants are dependent on others for biological survival (Leiderman, Talkin and Rosenfeld (1977). How that care is administered in industrialized societies is dictated by the medical representatives. This environmental normality and the resultant "culture of medical technology" pre-empts other cultural norms. How has this change transpired? Davis-Floyd (1992) and Jordan (1993) help illustrate this assimilation by examining the birthing process.

3.4.1 Technology and Birth. The survival of infants is necessary to ensure a society's future. Therefore, as Jordan (1993) notes, birthing as a life crisis event is

everywhere a socially marked event that is consensually shaped. Parturition is perceived as a phenomenon that is produced jointly and reflexively by (universal) biology and (particular) society. The particular patterning associated with birth depends on local history, ecology, social structure and technological development. Jordan says that people produce a set of "internally consistent and mutually dependent" practices/rituals and beliefs designed to manage the aspects of parturition in a way that makes sense in that particular culture and, according to Davis-Floyd (1992), to align the belief system of the individual with that of the social group conducting the ritual. Therefore, survival of a society incorporates not only the physical continuation but "...the continuation of the belief system that shapes the way its members cognize the world around them" (Davis-Floyd, 1994). However, in North America, the enormous religious, philosophical as well as ethnic and belief systems "...necessitates special efforts on the part of the representatives of the society-at-large to preserve and perpetuate its dominant value system" (Davis-Floyd, 1992). Social institutions which touch the lives of a majority of citizens and founded on the principle of that system become socializing agents for inculcating main stream beliefs into citizens and is intensively exhibited in the cultural arena of birth and infant care.

Around the world, major life transitions are ritualized and differ accordingly. However, in North America a standardization surrounding the birthing process exists. A ritual is a patterned, repetitive and symbolic enactment of cultural belief, the purpose of which is alignment of the individual's belief system to that of society (Davis-Floyd, 1994). Birth is an ideal candidate for ritualization because a society can ensure transmittal of its values to three new members: the infant, the woman reborn into the social role of mother, and the man reborn as father. The new mother is the individual generally responsible for teaching these values to her children, who will be society's new members and its subsequent future.

3.4.2 Technocratic Model. Reynolds (1991) outlines and analyzes modern technology as emerging from the mythological system that depends on the ritual transformation of nature to conform to culturally constructed images (Reynolds, 1991). Labeling the act of ritual transformation in technocratic culture as the "One-Two Punch", he illustrates how a natural act is rendered dysfunctional with technology and then fixes it with technology. For example, salmon swimming upstream to spawn.

Punch One consists of rendering it dysfunctional with technology. Damming the stream prevents the salmon from reaching their spawning destination. Punch Two consists of rectifying this situation with technology. Remove the salmon from the water by the use of machines, make the salmon spawn artificially, and have humans oversee the growing of the fertilized eggs in trays. When the humans consider it safe, they release the infant salmon down-stream near the ocean.

For Reynolds, the One-Two Punch is identified as an intervention that destroys a natural process, then re-intervenes to rebuild it as a cultural process, as an integral "result of technocratic society's supervaluation of science and technology over nature".

How was this transformation of the birth process accomplished by society in North America? Davis-Floyd states that the forces shaping the change "stem from the conceptual foundations" of the American society. These beliefs centre around "science, technology, patriarchy and the institutes that control and disseminate them" (Davis-Floyd, 1994:324). Recipients may not be aware of incorporating the symbol's message; however, its ultimate processing may be extremely powerful. For Reynolds, the essence of scientific research and description is:

> [S]eparation of elements from the whole they compose, of humans from nature, of mind from body, of mother from child. Such conceptual distinctions are implemented through ritual acts that produce physical embodiments of the underlying world view (1991: 3).

3.4.3 Body and Technology The "body-as-machine" metaphor occurred in conjunction with the demise of the midwife and the rise of male-attended, mechanically manipulated births. The practice of obstetrics was "enjoined" to develop tools and technologies for manipulation and improvement of the anomalous and subsequently dangerous process of birth (Davis-Floyd, 1994). Intervention in the birth process by specialists stems from the perception that because the female body deviated from the male standard, it was regarded as abnormal, and inherently defective. Davis-Floyd illustrates the way routine obstetric management is symbolic, such as: wheelchair upon arriving at a hospital indicates "disabled"; put in bed "sick"; the intravenous attached to women represent umbilical cords to the hospital which represents the "dependency on institutions for our lives". The birthing woman in the hospital is not "in control", she does not give life, rather the institution does. The new social member, the baby, "the perfect baby" is the desired end product. However, it is implicitly understood that this result is possible because of technology. However, if something unforeseen transpires, the woman's acceptance of a defective body is blamed, it is her body's fault, not technology. Davis-Floyd notes that "Like all cohesive and hegemonic mythologies, the technocratic model functions as a powerful agent of social control, shaping and channeling individual values, beliefs and behaviors" (1994).

Acting as a catalyst for this model is the need to make the body appear to be as mechanistic as possible. Doctors assume the responsibility of what was considered "priestly" duties by inculcating members of society with the basic tenets of this belief system. The principles of this technocratic model is "separation". This includes separation between mind and body, mother and baby, parents and child, and human and nature. These conceptual distinctions are implemented through ritual acts that produce physical embodiment of the underlying world view.

The transformations associated with child birth and infant care practices are seen by Jordan (1989) as instrumental in the redefinition of what constitutes *authoritative knowledge*, not only in the distribution of expertise, but also the distribution of power and authority in a given social system. Although seen to be ostensibly about the transmission of knowledge and skills, "...in a hierarchically organized society it is also about the imposition, extension and reproduction of lines of power and authority" (Jordan, 1989).

Of greater relevance here is the deeper political issue of information as power. These rituals (birth and child care) serve to augment the given power system (Davis-Floyd, 1992). Reynolds concurs in his definition of the term technocracy as "...use of ideology of technological progress as a source of political power (1991: 47). Natural child birth is seen to function as a non-technocratic event, which although difficult, when a woman births without drugs, anaesthesia or medical intervention, she learns that she is strong and powerful and can place her trust in herself, even in the face of powerful authority figures (Davis-Floyd, 1992).

According to Harkness and Super (1994), promotion of child survival can be analyzed through the household production of health. Two of the three tenets of their theoretical framework include the physical and social setting of the child's everyday life and the culturally regulated customs of child care and child rearing. Data collected and analyzed on reserve infant care illustrates the closeness between Harkness and Super's theoretical paradigm and the reality of infant life on the reserve. Similar to Oliver-Smith's (1992) comments on reliance on continuity and the past, Harkness and Super state that "...it becomes clear that consistent patterns of health outcome for particular groups of people are actually dependent on the stability of the niche as a system". The resistance to change in infant care by Aboriginals is understood when viewed from within the context of the external system as "...elements from outside enter into the system (niche) to create perturbations, leading to new attempts to re-establish equilibrium by participants in the

system" (1994). Further, they note that the initial cultural response to change is an attempt to preserve as many elements as possible of the traditional ways. What is significant about their approach to analyzing the household production of health is the focus on the household niche as the control factor in the maintenance of health, pungently articulated in this quote:

> [T]here is now increasing awareness that eliminating specific disease threats, for example through vertically organized immunization programs, may not greatly reduce mortality in environments where children's health is at risk from multiple sources (Chen, 1986 and Harkness, *et al.*, 1988).

3.4.4 Authoritative Knowledge The notion of authoritative knowledge (Jordan, 1977, 1984, 1988, 1989; Jordan and Irwin, 1987; Suchman and Jordan, 1991) holds as its central observation that for any "particular domain" (Jordan, 1993) several knowledge systems exist, some of which by consensus, come to carry more weight than others. The "weight" is appropriated because they either explain the state of the world better for the purpose at hand ("efficacy") or because they are associated with a stronger power base ("structural superiority") and usually both. Sometimes parallel knowledge systems co-exist. However, frequently one kind of knowledge gains ascendance. Those who adhere to alternative knowledge tend to be seen as backward or ignorant with their input being espoused as irrelevant, unfounded or not to the point. The constitution of authoritative knowledge is an ongoing social process that both builds and reflects power relationships within a community of practice (Lave and Wenger, 1991; Wenger, 1990 and Jordan, 1993: 152).

How did this "knowledge system" achieve power? Jordan (1993) identifies three issues which help to cement a monolithic system: First, the devaluation of non-authoritative knowledge which generates and maintains hierarchical social structures. Second, the process whereby the authority of any particular knowledge system and the power relations supporting and benefiting from it come to be perceived as natural and

legitimate. Third, because it seems natural, reasonable and consensually constructed, authoritative knowledge is persuasive and carries the possibility of powerful sanctions, ranging from exclusions from the social group to physical coercion.

The consequence of the limitation of one kind of "knowing" as authoritative is the devaluation, often the dismissal, of all other kinds of knowing (Davis-Floyd and Sargent, 1996). Espousing alternative knowledge systems is seen as backward, ignorant, and naive, or worse simply as troublemaking. Statements made by non-experts about the issue at hand are judged irrelevant, unfounded and not to the point (Jordan, 1989). Authoritative knowledge is an ongoing social process that both builds and reflects power relationships (Lave and Wenger, 1991) in such a way that all participants come to see the current social order as a natural order, i.e., the way things (obviously) are (Davis-Floyd and Sargent, 1996). As Jordan (1993) says, "The power of authoritative knowledge is not that it's correct but that it counts."

Authoritative knowledge, therefore, is the knowledge that within a community is considered legitimate, consequential, official, worthy of discussion, and appropriate for justifying particular actions by people engaged in accomplishing the task at hand. Birthing and infant care were considered healthy and a natural "event".

In a collection of articles in the *Medical Anthropology Quarterly* (Guest Editors, Davis-Floyd and Sargent; 1996), the focus is on authoritative knowledge. The contributors show how authoritative knowledge is produced, displayed, resisted and challenged in social, clinical and political interactions. Illumination is given to the links between control of technology and the hierarchy of relations between specialists and patients and clarify the articulation between the production of authoritative knowledge and the distribution of power in societal institutions (Davis-Floyd, 1996; Georges, 1996; Browner and Press, 1996; Fiedler, 1996; Sargeant and Bascope, 1996).

Lave and Wenger (1991) see knowledge not as a substance that is possessed by individuals but as a state that is collaboratively achieved within a community. They could have also stated that for a community of authoritative knowledge to have this power it had to be at the expense of another community not considered to be able to resist the takeover. A clarifying statement is given by a female obstetrician who notes that she is "...nudged by the system to take control of birth in a thousand visible and invisible ways – a nudging often reinforced by patients who choose to 'give themselves over' to her authority and control" (Davis-Floyd and Sargeant, 1996). Authoritative knowledge is analyzed by Jordan (1992) as the construction of knowledge in very complex technological settings which illuminates the relationship between processes of teaching and learning and the reproduction of power and authority. She argues that in technologically sophisticated social settings, such as the delivery room in a US hospital, unequal access to information and technology works to exclude laboring women from generating knowledge that "counts" (Sesia, 1996) serving to devalue any alternative source of information.

The concept of authoritative knowledge is not limited in application to birth and labor, it can serve as a paradigm for infant care practices. Thus, women who give birth with experts, take the next perceived logical step to have experts in infant care in charge of their infant's well being. A schedule is detailed regarding weight and height, teething, inoculations, formula, sleeping habits, etc. The natural happenings of infants becomes an "event" pre-determined by "experts".

The precepts of the infant care movement were presented not as natural, social norms derived from desirable values (communicative action), but rather as "instrumental recommendations derived from technical rules" (Habermas, 1969). Davis-Floyd (1994) employs this theory of separation in association with child birth. She states: "[This] separation is given tangible expression after births...when the baby is placed in a plastic bassinet in the nursery for four hours of 'observation' before being returned to the mother,

in this way, society demonstrates conceptual ownership of its product. The mother's womb is replaced not by her arms, but by the plastic womb of culture".

Wright (1988) suggests that women originally were the primary infant care authorities, but have been displaced by a medical regime dependent on technology which tends to separate women from culturally ascribed infant care practices. With the emphasis on becoming a new and future member of the technocratic community, new recruits (parturient women) are neophytes with the hospital stay representing the initial training period which equates to a period of liminality (Creighton, 1995) with the desired end product to integrate women into the "biomedical cultural system" articulated by separation and reliance upon experts.

This then alters birth and infant care from a mere happening (natural) to an event (technocratic). If an event is to be distinguished from a mere happening (Molotch and Lester, 1974; Moore, 1987; Sahlins, 1983 and Strathern, 1990), an event being a happening that we give meaning to, giving birth and infant care is determined as a technocratic-dependent situation (or event) rather than a mere happening in the scheme of evolution. Put another way, Giddens (1990) refers to it as "our capability to disturb the fixity of things." Underlying the change of birth and infant care from a mere "happening" to an event is to focus the source of "power" and reliance away from the existing traditional cultural ways to reliance to and dependency upon the technocratic paradigm as purported by the institutionalization of medicine under the dominant political schema. Jordan's (1987, 1989) emphasis on the association between authoritative knowledge and the distribution of power within a social group, notes that authoritative knowledge is not only re-created through discourse, but is embedded in status and social position.

The ability to reason is reflected in human existence (Oliver-Smith 1986). Essential to the ability to reason is the ability "to use knowledge gained from past experience to act on the present". While life is never a precise repetition of the past, it

involves a "normal" cycle of events, a "certain patterned consistency of problems faced and solutions implemented". Solutions to familiar problems are used over and over again because they are "time-tested". This predictability allows us to understand, to make sense of reality, to perceive a logic through our own sets of "categories" and thereby both understand and shape experience for our future and continued understanding. "In situations of massive change, people will attempt to gain understanding of or control over changed conditions by structuring them in terms of familiar concepts and working out new solutions, to new problems, with tested understandings from the past" (1986). Understandings from the past become the "thread of continuity". Survival in an altered environment depends upon this 'thread of continuity' to interpret the meaning of events in the altered environment. Continuity therefore provides a degree of confidence in the altered circumstances. Therefore, the past becomes crucial for coping with change. Successful adaptation to changed circumstances, according to Oliver-Smith (1986), is dependent upon: "[A] continuity of meaning, tying what may be a lost or disappearing past, and a confusing, bewildering present to a frighteningly uncertain future". Humans will embrace change if they have a sense of understanding it, or a degree of control over it. Resistance to change may provide survivors a sense of participation in and control over their own lives and society. Strategies of resistance to change constituted an adherence to the known, the proven, the secure and ultimately became an affirmation of their identity and a defense against cultural collapse. Through culture's institutionalized forms, we are able to satisfy our needs and wants. By supplying solutions to problems, they lend order, stability and predictability to life. When order is threatened, we hasten to defend it. When patterns of life are suddenly altered, humans attempt to place the events into "existing structures in order to preserve the continuity of understanding" (Oliver-Smith, 1986). However, when the alteration is seen to threaten the basic assumptions of a culture, the loss of that fundamental sense of order is at risk. According to Morria (1975):

> When a pattern of relationships is disrupted in any way for which we are not fully prepared, the thread of continuity in the interpretation of life becomes attenuated or altogether lost. The loss may threaten the integrity of the structure of meanings on which the continuity rests and cannot be acknowledged without distress. But if life is to go on the continuity must somehow be restored (1975:24).

Slowly over time Aboriginal women lost the knowledge, confidence and power to successfully deliver and nurture their new infants in familiar surroundings. This loss can be explained by reference to Foucault's concept of bio-power in which he links political technologies of the body, the discourses of human science and the structure of domination (Foucault, 1980). The functioning of these political rituals of power is exactly what sets up a non-equalitarian, asymmetrical relationship (Dreyfus and Rainbow, 1982). Power relations, Foucault claims, are "intentional and non-subjective. They are imbued, through and through, with calculation: there is no power that is exercised without a series of aims and objectives " (Foucault, 1980). We must then ask, what was to be accomplished by transporting pregnant Aboriginals to hospitals to give birth? Was this an altruistic act performed to save infants lives? We have no documentation attesting to high neonatal/maternal deaths during delivery, whereas senior women interviewed in Northern Alberta stated their infants were all born alive and healthy. Midwifery of the time was obviously skilled to a high degree because they could change the position of the fetus to avoid breach births. As Jordan (1993) noted earlier, natural birthing provides women with a sense of power and strength. The cultural traits associated with the biology of birth and infant care represented stability for those in a society besieged by many other changes.

The linkage between biology and culture is nowhere more fragile than when it coalesces in the experience of an infant. For example, a twenty percent rate of low birthweight infants, recorded by Calgary Health Services (1996), was attributed to women being concerned about gaining weight during pregnancy and subsequently depriving the

fetus of adequate caloric intake. This is directly related to a cultural perception that "thin is attractive". While these women knew not to drink or smoke and that they must eat properly, they did not appear to know that they should be gaining weight as part of a healthy pregnancy.

3.5 Biocultural Model

A biocultural paradigm has been used by several researchers to investigate infant care issues such as birthing (Jordan, 1993), breast feeding (Allen and Pelto, 1985), infant care (Harkness and Super, 1994) and birthing and technology (Davis-Floyd, 1992). At a symposium organized to explore biocultural issues relating to body size and shape, McElroy's (1990) definition of biocultural anthropology was the focus of the presentations. McElroy defines:

> Biocultural anthropology (as) the discipline at the interface of cultural anthropology and human biology, an interface that has traditionally been associated with an adaptational or ecological perspective. Biocultural studies are research on questions of human biology and medical ecology (1990).

For Jordan (1993), birthing is viewed as a phenomenon that is produced jointly and reflexively by biology (universal) and society (particular). She states that there is no known society where birth is treated as a mere physiological process, because it is everywhere socially marked and consensually shaped. By comparing birthing in Sweden, Holland, Yucatan and the United States, Jordan addresses the identical biological process as culturally perceived. She also shows that the outcomes of birthing are as diverse as the cultural processes themselves, ranging from a natural home event to a medical problem. The model is referred to as "biosocial" rather than "biocultural", a semantic difference since both models view the interconnectedness of the strategies employed. As Jordan notes: "[T]o speak of birth as a biosocial event, then suggests and recognizes at the same time this universal biological function and the culture-specific social matrix within which

human biology is embedded" (1993). When cultural systems are stable, cultural practices are internally perceived as appropriate and make sense in that cultural context. According to Jordan, these patterns depend on local history, ecology, social structure and technological development.

In research on determinants of breast feeding duration, Allen and Pelto (1985) identify "bioculture" as a holding container for all those variables for which a link between socio-behavioural and biological factors can be postulated. The authors define many of the biocultural factors that influence the duration of breast feeding. Such linkages are related to the mother's perception of the adequacy of her milk to maintain infant growth and development, her previous experience and the extent of supplementary feeding. They state that biocultural research will give significant insight into the dynamics of human adaptation.

Harkness and Super (1994) identify the development niche as a profitable framework for analyzing the household of health, which is also, in reality, a biocultural approach. They explore the physical and social settings of the infant's everyday life and the culturally regulated customs of infant care and child-rearing. The components, seen as different aspects of the same reality, operate as a system with "homeostatic mechanisms that promote consonance". For the authors, infant survival and development depend on the harmony and relative stability which the system produces within the community. Their model also accommodates change to infant care practices. They suggest that:

> ...when change is introduced through one of the components, the cultural response is likely to be 'conservative,' in that attempts are made to preserve as many elements as possible of the subsystem altered and the other two components may not change at all (Harkness and Super, 1994).

The Aboriginal world was subjected to a series of disruptions. These included introduction of unknown illnesses which killed or caused severe morbidity, decrease in fecundity, loss of control over land, and re-location to reserves. Reserve life inhibited the

normal transhumance life to a rural sedentary existence under the auspices of governmental branches of health. The Aboriginal woman lost control over the familial-oriented birth process and was inculcated into hospital birthing as an event. She had little choice or power, since, according to Culhane-Speck (1987), "...resistance or lack of co-operation was interpreted as an inability or unwillingness to adapt to a superior way of life, and this in itself constituted evidence of either biological or cultural inferiority or both".

When rapid, unpredictable changes occur in a society, humans rely on the past for their survival. According to Oliver-Smith (1986), in times of social stress "we need our past". We are dependent upon our past for understanding the present and adapting to the uncertainties of the future. Oliver-Smith concludes that "It is hardly surprising that when people are faced with catastrophic change, many of their actions appear to be attempts to reconstitute the social patterns and institutions of the past".

In the research completed by Jordan (1993), Allen and Pelto (1985), Harkness and Super (1994) and Davis-Floyd (1992), the authors were aware of the cultural norms in each case and could relate the cultural aspects to their various theories. Recent SIDS research has focused on various infant care practices, such as, sleeping position, room temperature and infant wrapping. This particular approach has had positive results in specific areas where mothers altered their practices, e.g., changing sleeping position from prone to supine. In my research project, which by necessity (see literature review) is steeped in biocultural interaction, we lack actual knowledge about contemporary Aboriginal practices. Do contemporary Aboriginal women follow medical advice on infant care? How do they sleep their infants and why? Biomedicine of the 1930's advised sleeping infants in the prone position. Did Aboriginal women follow this advice? Unfortunately, the actual answers to these questions are not known. Nevertheless, within Canada, Aboriginal groups have a reported high SIDS incidence, which suggests that

answering such questions is a priority. We need to establish what Aboriginal child care culture is and what implications this may have on SIDS incidence within this community.

CHAPTER IV

MATERIALS AND METHODS

Considerations of culture and its relationship to infant survival illustrate the desirability of using a biocultural model. A biocultural framework incorporates biological measures of growth, reproduction and disease within the context of culture and socioeconomic factors, including acculturation, settlement and subsistence patterns (Ritenbaugh, 1991). The various elements associated with the biocultural paradigm seem appropriate to a study of infant care practices in an Aboriginal community and SIDS risk factors since both (i.e., infant care practices and SIDS risk factors) involve similar patterns of culture and socioeconomic factors, the latter because of the potential biological effects of malnutrition, smoking, and poverty-based disease.

I applied the model by collecting data on infant care practices used by contemporary Aboriginal women living permanently on a reserve. Since I was unable to determine whether these practices are a combination of traditional practices and influences of western medicine, I used an ethnographic approach to document what senior reserve women considered to be traditional infant care practices and then compared their perceptions with those of contemporary-aged mothers. This helped me to establish whether or not traditional practices predominate and helped to determine if such practices protect Aboriginal infants or put them at further risk.

Results of SIDS research indicate that sleeping infants in a supine (on the back) position reduces the incidence of SIDS. In settings where patient and physicians share similar cultures, linguistic backgrounds and explanatory models of illness, the change in sleeping position likely will be non-problematic. This change, as a preventative measure against SIDS, could have the greatest impact on Aboriginal infants where the SIDS incidence is reported to be significantly higher than among other groups. The receptiveness to a change in infant sleeping position and the degree to which it would

actually be implemented depends on the perceived credibility, by a mother or mothers, of the clinician or clinicians recommending the change. Aboriginal women are exposed to information from medical clinics and clinical well-baby talks, instructions by personnel at the nurse's station and radio messages promoting Western strategies for prenatal and postnatal care. Amongst Aboriginals, there is a significant historical relationship of inequality with the medical establishment (Kaufert and O'Neil, 1990). Further, cross-cultural communication barriers have been linked to non-compliance, client dissatisfaction and unequal access to care (Kaufert, 1990). Therefore, Aboriginal women may make decisions regarding current changes to infant care strategies based on perceptions of historical medical changes.

Determining the implications of infant care practices on SIDS incidence can only be achieved by documenting contemporary infant care practices and relating this knowledge to known SIDS risk factors to establish any possible correlation. I have collected Aboriginal SIDS incidence data for on-reserve and off-reserve Aboriginals to determine if there is a difference in incidence attributable to location. If traditional infant care is revealed to influence contemporary women in their day-to-day practices, it is possible that dislocation from the reserve may adversely affect the practices of non-reserve Aboriginal women. In either case, the biocultural model is appropriate in making such comparisons.

Given the importance to be placed on establishing the cultural norm, the responses of senior women about infant care practices are examined to determine if a cultural norm emerged. Senior women often left their parent's home and reserve to move to their partner's reserve, which may actually represent a different band and, therefore, different perceptions as to what constitutes traditional infant care. This same concern relates to contemporary-aged women, who, through marriage, also may have moved to a different reserve. As suggested above, an understanding of the cultural practices and an assurance

of the accuracy of the informants' perceptions needs to be established before any significant linkage can be made between Aboriginal infant care practices and SIDS incidence. Therefore, a biocultural model, consisting of mutual feedback between biology and what is determined as culture, was used as the theoretical foundation for this project.

In this chapter, I present, in chronological order, materials and methods used to conduct the investigation of infant care practices and environment in northern Alberta. The chapter is divided into three time sequences: pre-investigation, during the investigation and the post investigation period. Before the investigation, the first decision I had to make was to select a research site. My second decision was to advertise for a local interpreter/researcher. My next step was a door-to-door census to establish a population count and to establish criteria for selection of informants/research subjects.

During the investigation, information about infant care practices was elicited from senior and contemporary-aged women. Senior Cree women were interviewed using an open-ended conversational method. They were asked to talk about traditional infant care. A pre-designed questionnaire (Appendix A) was my tool to gather infant care information from contemporary-aged mothers. Other environmental factors, such as house temperature, humidity, carbon monoxide, carbon dioxide, air and surface particulates (to determine levels of contaminants in the infant's environment), were collected and recorded. Readings from the instruments were recorded on the front page of the questionnaire. Infants' body temperatures were recorded in the home at the time of the interviews. Most infants were awake while the questionnaire was being administered and their temperature was recorded. In a few cases, the infant went to sleep in the mother's arms and a second reading of their sleeping temperature was recorded. A model (the Bolton theoretical model) was applied to the clothing used to swaddle an infant to determine the degree, if any, of overheating experienced by Aboriginal infants.

After leaving the reserve, five steps were completed. First, the contamination strips were taken to the laboratory for analysis. Then, a survey of Alberta SIDS for the period 1990 to 1994 was conducted by me at the Chief Medical Examiner's Office to review Aboriginal SIDS incidence. To establish a basis for demographic comparison, a review of Alberta SIDS for the past five years was conducted with the co-operation and approval of the deputy Medical Examiner in Calgary, Dr. Lloyd Denmark. Then, statistical data from the Department of Indian Affairs was used to generate an Aboriginal/non-Aboriginal comparison of SIDS incidence. Next, a birth/death certificate comparison was conducted for me by the Medical Services Branch of Health Canada in Edmonton. Then, births for the three treaty bands of Alberta (Treaties 6, 7 and 8) were obtained from Indian and Northern Affairs Canada, since my research site is part of Treaty 8. Finally, a model to determine the degree of infant overheating was applied to the infant temperature data collected. This method is explained in greater detail below. The formal stage of my research ended with a close-out meeting on the reserve where I presented my findings to the community.

4.1 Instruments

4.1.1 Questionnaire (Appendix A) The questionnaire was developed to incoporate variables discussed in the literature review and to include the infant's environment to be investigated. The questionnaire was influenced by the Global Strategy Committee's questionnaire developed by the epidemiology sub-committee of the infant care committee of SIDS International to be administered in as many countries as possible. I was involved in the development of this questionnaire as a member of both the committee and the subcommittee and made major modifications to their questionnaire to make it appropriate to various cultures. The final outcome was a questionnaire specifically designed to investigate the infant care practices and environment of Northern Aboriginals.

4.1.2 Consent form (Appendix B) Before the interview process commenced, two copies of the consent form were signed by the interviewee. One was retained by her and one was for the researcher's files. If she could read, the interviewee read it herself. If she could not read, the translator read it for her.

4.1.3 Confidentiality form (Appendix C) To ensure confidence in the privacy of the process, the researcher or translator read the confidentiality form to the interviewee and both the researcher and the translator signed the form in front of the interviewee. A copy of the confidentiality form was given to the interviewee and a second copy retained by the researcher.

4.2 Equipment

4.2.1 Thermometer: An ear thermometer was determined to be the least invasive type to record infant awake and asleep temperatures and did not require undressing the infant. The Thermascan Pro-series Instant thermometer, Model No. HM2, SA LR 98412 C 22 No. 125, Risk Class 2, listed IK 41, was used with probe cover #5,088,834.

Due to the personal time scheduling of the interviewees, the hours of temperature recordings were immediately prior to noon and in the afternoon until four-thirty. Temperatures of infants fall by about 0.5 degrees C by night or day, but at around eleven weeks old infants temperatures fall further with sleep at night producing a daily pattern like the adult (Petersen, Murray, Jackson and Wailoo, 1996). The authors conclude that "given the precision with which body temperature is controlled, even small changes in rectal temperature imply a large physiological disturbance" (Peterson *et al.*, 1996).

A problematic factor associated with infant temperatures is age. Babies examined ranged in age from a few weeks to twenty-four months of age. Sleeping temperatures were recorded for infants under twelve months. However, the data collected is unique in that it presents for the first time, Aboriginal infants temperatures in their own

environment. The children over the selected target age would raise their hands to their ears and run away when the ear thermometer was taken out of the case. Numerous ear infections, according to their mothers, have caused this reaction. Separate sterilized plastic covers were placed over the sensitive area of the thermometer and discarded after the reading was taken. The probe section of the thermometer was swabbed with an antiseptic saturated towel and a new plastic shield was attached prior to returning the instrument to its case. At one home, the thermometer malfunctioned because it was too cold. After that the thermometer was kept in the inside pocket of my jacket when not in use to avoid temperature drops experienced from car to house.

All infant ear temperatures were taken by the principal researcher to avoid any differences in the style used in taking temperatures. The actual sleeping time, in hours, for most infants was difficult to assess and remains problematic. Three infants went to sleep during the interview while their mothers were holding them. The infant would be awake at the start of the interview and if the mother agreed to demonstrate how she wrapped her infant for us, we were given the opportunity to watch the infant go to sleep on its mother's lap as the interview was taking place. At these special times, two ear temperatures, awake and asleep, were taken. For the three recordings taken in this manner, we know they were asleep for less than one hour. Taking infant ear temperatures was limited by the conditions at the time of the interview. I wanted to collect both awake and sleeping infant temperatures. If the baby was awake it was not feasible to wait around for the infant to go to sleep. Aboriginal infants are not raised on a schedule set by a clock, but rather a schedule set by their own needs and desires. If the infant was asleep at the time of the interview, its ear temperature was recorded, and on a few occasions the infant awoke while the interview was taking place, allowing two recordings.

According to the Cohen, *et al.* (1991) normal body temperature varies from person to person and from hour to hour. The daily oral temperature ranges from a low of

36.1 C (97 F) between 2:00 a.m. and 4:00 a.m., to a high of 37.2 C (99 F) between 6:00 p.m. and 10:00 p.m. Hot baths, exercise or hot weather can cause body temperatures to vary 0.5 C (1 F). Average normal temperature is given in Table 1.

Table 1
Normal and Fever Temperature Ranges

	Normal	Fever
Oral	37.0 C (98.6 F)	38.0 C (100.4 F) or higher
Rectal	37.5 C (99.5 F)	38.5 C (101.3F) or higher
Axillary (under armpit)	36.4 C (97.5 F)	38.0 C (100.4 F) or higher

To document various aspects of the infant environment, data on the following environmental variables were collected:

The environment of an infant relates not only to infant care practices used by caregivers, but encompasses other variables in the immediate environment. Therefore, residence temperature, humidity levels, record external temperatures, and CO and CO_2 levels were recorded.

Early CO_2 levels were erratic and it was decided to obtain an instrument to measure air borne particles. From the first reading taken it became apparent that further investigation was indicated. Instruments to measure bacterial and fungal counts were obtained. The recording instruments used were:

4.2.2 A Smart^2 LCD Indoor/Outdoor Thermometer, catalogue number 63854, for establishing and recording of indoor-outdoor temperatures.

4.2.3 A. Smart^2 LCD Indoor Hygrometer, catalogue number 63855 was used to record residential humidity.

4.2.4 A Telaire CO_2 Monitor Model 1050 was used to record residential levels of CO_2. Carbon dioxide is a colourless, odourless and non-flammable gas, which is produced by metabolic processes and by the combustion of fossil fuels.

An increase in the ambient level of carbon dioxide brings about a rise in the acidity of the blood and an increase in the rate and depth of breathing. Symptoms such as fatigue, headaches, and an increased perception of warmth and unpleasant odors have been associated with carbon dioxide levels of 500 ppm. Experts such as Dr. T. Lee, environmental specialist for 20 years and Professor at the University of Calgary, stated that the standard measurement is that "CO_2 levels above 800 ppm. affect mental abilities of residents".

The CO_2 levels recorder did not function properly and an identical replacement machine was obtained from Calgary together with an air borne particle counter recorder to verify and establish some spectrum of what was transpiring in the homes. Unfortunately, previous instrumental rental bookings were honoured by the owner and my time-frame with this equipment was brief since I could not pre-book. I did, however, register double instrumentational recordings for six houses. While this may be considered a small sample, it nevertheless gives an indication of the Aboriginal infant's environment which has not previously been identified.

4.2.5 A Crowcon Gasman EX ia Class 1 instrument was used for detecting the CO levels in the residence. CO (carbon monoxide) and CO_2 (carbon dioxide) instruments were set up to initiate readings. Carbon monoxide is a colourless, odourless and toxic gas that is produced by the combustion of carbonaceous materials and also in human metabolism. It combines with haemoglobin to form carboxyhaemoglobin (COH_6), which reduces the oxygen supply to body tissues. Sources of carbon monoxide in indoor air include gas and oil appliances, tobacco smoke, and the infiltration of carbon monoxide in polluted outdoor air.

Mothers were interested in the instruments because they felt some of the various illnesses experienced on the reserve and amongst their family may be related to the residential environment. The homes tested (30) recorded unusual readings for CO_2 and in consultation with environmental expert, Dr. T. Lee of the University of Calgary, an air borne particles reading instrument would determine more closely what was transpiring in the homes. I returned to Calgary and obtained the instrument to record the second stage of this now extended aspect of data collection. Six houses were targeted for more discriminatory testing.

4.2.6 An Atcor Airborne Particle Counter APC-1000 Serial No. A0194-0672 Mft. January 1994, was used to test for airborne particle detection. This instrument complies with FDA performance standards for laser products 21 CFR 1040.10 and 1040.11 Mfg by Atcor Instrumentation Division, San Jose, California. The recent interest in environmental factors as possible contributors to SIDS prompted this sample collection. Two types of collection samples were used, air borne and contact slides. A total of six houses were visited for air and contact collection. The process followed was to sample air born fungi and bacteria in the room the infant slept in. This room normally also accommodated the parents (or mom if a single parent) and other siblings. Two agar air strips were used to test the bedroom. Contact strips were placed where the air pollutants would fall and remain undisturbed for a time, such as window strips, high shelves or a selected place in the kitchen.

After removal of the contact strips (one for bacteria and one for fungi), the contact area was wiped with an alcohol saturated disposable towel. Each house tested contributed four samples: air borne bacteria and fungi and contact strips for bacteria and fungi. Crawl spaces were also considered an appropriate venue for bacteria and fungi. One mother requested testing of the crawl space under her newly constructed three bedroom home.

The air borne bacteria and fungi strips and the contact strips were placed in coolers and transported to an international laboratory in Calgary for incubation and reading of the bacteria and fungi colonies. The Occupational Hygiene Consultant at the lab examined the packaging prior to incubation to ensure the obtained results would be an accurate representation of the environment tested. At the time of collection, air borne samples for bacteria were labeled C and fungi labeled D. The house number was given as H1, H2, etc. The complete label for the bacteria for House No. 1 read H1C for bacteria and H1D for fungi. By contrast, the contact strips were labelled A for bacteria and B for fungi. The contact strip labels read H1A and H1B. The air borne readings were taken for eight consecutive minutes each. The contact strips were adhered to a surface also for eight minutes.

Surface testing was taken in places in the residence which would give an accumulation of contaminants. Instructions from the labratory instructor and the Environmentalist were to gather these data from places which were hard to "dust". This would give a reading of contaminations which had sat undisturbed. Collection was taken from high shelves or any lower areas which had not been polished or dusted the previous week.

If the mother was willing, slide photos were taken of her infant wrapped or sleeping in a swing or sitting up awake and alert. Other children in the homes ran to be included in the photos. Second photos were often taken to include the infant's older siblings.

None of the instruments were used in the seniors' residences, on those visits only information was gathered. The long interview session was felt to be a large stress on these senior women without making them nervous by employing the instrumentation portion of the process.

4.2.7 A Biotest Centrifugal Air Sampler, obtained from AGAT Laboratories of Calgary was used for Microbial Evaluation of the air. AGAT Laboratories is accredited by the American Industrial Hygiene Association. The Biotest RCS Air Sampler operates by the impaction principle. The air under examination is drawn into the sampler head by the action of rotating impeller blades at a rate of 40 litres/minute. The air enters the impeller drum and the particles in the air are impacted by centrifugal force onto a plastic strip containing a suitable culture medium. The culture strips are incubated for an appropriate time at a temperature determined by the culture medium. The number of colony-forming units (CFU's) in a given sample of air is calculated using the following formula:

$$CFU/m^3 = \frac{\text{number of colonies on strip}}{\text{sampling period (min)}} \times \frac{\text{minutes}}{40\ L} \times \frac{1000L}{m^3}$$

All testing was standardized at 8 minutes. The site of the airborne particle collection was the infant's sleeping area.

The instrument, which resembles a large flashlight, was used to sample total bacteria and fungi in the air by the use of agar strips. For counting the total number of microbial particles Agar Strips GK-A (Art.-No. 941100) were used. GK-A Agar Strips are suitable for counting the total number of aerobic and facultative anaerobic bacteria and fungi in the air. The culture medium has a high nutrient value and thus offers suitable growing conditions even for the more demanding organisms. Composition of these strips is Pancreatic digest of casein 15,0 g; soy bean peptone 5,0 g; K_2HPO_4 9,3 g; KH_2PO_4 3,7 g; agar 16,0 g; water 1000 ml final pH7,3±0.2. After collection strips were sealed with tape, labelled with an identification number and placed in a small cooler (which was stocked with two frozen ice packs) and removed from any light source. Between and prior to collecting a new sample the Biotest RCS Air Sampler was sterilized using ethanol. Immediately before sampling, an agar strip was positioned in the impeller drum so that the

agar surface was exposed to the impeller. Sampling was performed for 8 minutes at a rate of 40 litres/minute for a total air volume of 320 litres.

Agar Strips HS (Art.-No. 941200) were used for counting the number of yeasts and moulds in the infants' sleeping area. The substances Rosa Bengal and Streptomycin inhibit the growth of bacteria to a large extent and thus allow for the unimpaired development of moulds and yeasts. Rosa Bengal inhibits the growth of gram-positive bacteria and prevents the proliferation of mycelin, without having any negative effect on the germination of the conidia. Streptomycin has above all an extensive growth inhibiting property with regard to gram-negative bacteria. Composition of the strips consists of special peptone 6,0 g; D(+)-glucose 10,0 g; K_2HPO_4 9,3 g; KH_2PO_4 3,7 g; $MgSO_47H_2O$ 0,5 g; Rosa Bengal 50 mg; streptomycinsulfate 40 mg; agar 16,0 g; water 1000 ml final pH7,3±0.2.

4.2.8. Biotest Hycon Contact Slides were used to evaluate surface contamination. The contact slides for the determination of microbial levels on surfaces consist of a flexible culture "tray" containing culture medium which is sealed in a plastic case. The total surface area of a contact slide is 23 cm^2.

Biotest Hycon contact slides GK-A and HS were used to sample for bacterial and fungi respectively. Immediately before sampling the contact slide was removed from the sterile case and the agar surface was applied to the test surface so that the agar medium made total contact with the area being tested.

All agar strips were sealed with tape after returning the used contact strip to its tray and labelled. They were then placed on an angle in a small cooler with frozen ice-packs. Ice packs were replaced as required to maintain cooling during transportation to the collection site, at the site and to avoid heating during the long transportation process to Calgary, where the strips were handed over to the Occupational Hygiene Consultant at AGAT Laboratories for incubation and colony counting. The contact slides used for

bacterial determination were incubated at 35 C for 48 hours, and the contact slides for fungal determination were incubated at room temperature (21 C) for 5 days. Colonies were enumerated using a Fisher Colony Counter, and the number of colony-forming units per 100 square centimeters were calculated using the formula below:

$$\text{CFU/100 cm}^2 = \frac{\text{number of colonies on slide} \times 100}{23\text{cm}^2}$$

4.2.9 An Olympus camera, model Super Zoom 300 and ASA 100 and 400 slide films were used to capture events associated with the infant care on the reserve. However, temperatures of minus 40 to minus 50 Centigrade affected the quality control of the slides which were mailed off for development and a second camera was used.

4.2.10 A Pentax ESP10 928 camera with a wider range of options was used with ASA 100 and ASA 400 slide film. The second camera facilitated needs for close-up shots with its 28-90 mm lens.

4.2.11 A Mituloyo Digital Calibrator Model CD-8"P, Code 500-352, was used to measure the sleeper and blanket to obtain thermal weight. These measurements were calibrated by Dr. K. Burg of the Physics Department at the University of Calgary. The instruments were set up away from where the interview was taking place and continued to record information while administration of the questionnaire was being completed.

4.2.12 Plates: To illustrate the infant environment, slides used as plates were reproduced as photos, then scanned for importation into the dissertation text.

4.3 Research Site

There were two requirements for selecting the research site. The community should be semi-isolated geographically, while at the same time maintain interaction with outside communities to provide diversity in experiences during parturition and the subsequent infant care strategies practised by professional health caregivers. The extent of

influence these experiences have on Aboriginal women's perceptions about infant care and "traditional" strategies may also be determined. A Cree community situated in Northern Alberta fulfilled these requirements and was selected as the research site.

Contact with the Reserve Health Unit on the reserve was made months prior to the commencement of the research. This was necessary to gain approval of the Chief and Council, as well as to familiarize the Health Unit staff with the project. The Director of the Health Unit, an active member of Council, ascribed value to the study and agreed to provide office space and post advertisements for a Research Assistant for the project. Chief and Council approval was obtained and this helped to gain community acceptance of the project.

This community, according to the information provided by the band, is composed of a reported 5,000 Treaty Indians situated on 55,000 acres of land located 150 kilometers from a small town. The small town which has expanded recently under the thrust of oil and gas explorations is 450 kilometers north of the capital city of Edmonton, Alberta. Community residents are all Cree First Nation. The central reserve is divided into four sub-reserves identified as A, B, C and D (Figure 2, page 71). The Band also has members in 3 parcels of crown-held land, about 100 kilometers north of the reserve and on another parcel located 15 kilometers south. The community members located on crown-held land have different environments and isolation factors than the main reserve members. In order to examine the environmental niche of Aboriginal infants, it seemed more feasible to restrict the site selection to the central community composed of A, B, C and D sub-divisions. In an effort to comply with the request of the community for anonymity, sources of identification have been removed. The site location will be identified under the general term of a Northern Alberta Cree community.

The community is situated between and around two lakes. The lakes are approximately six kilometers apart. The water serves as a community focus for the local

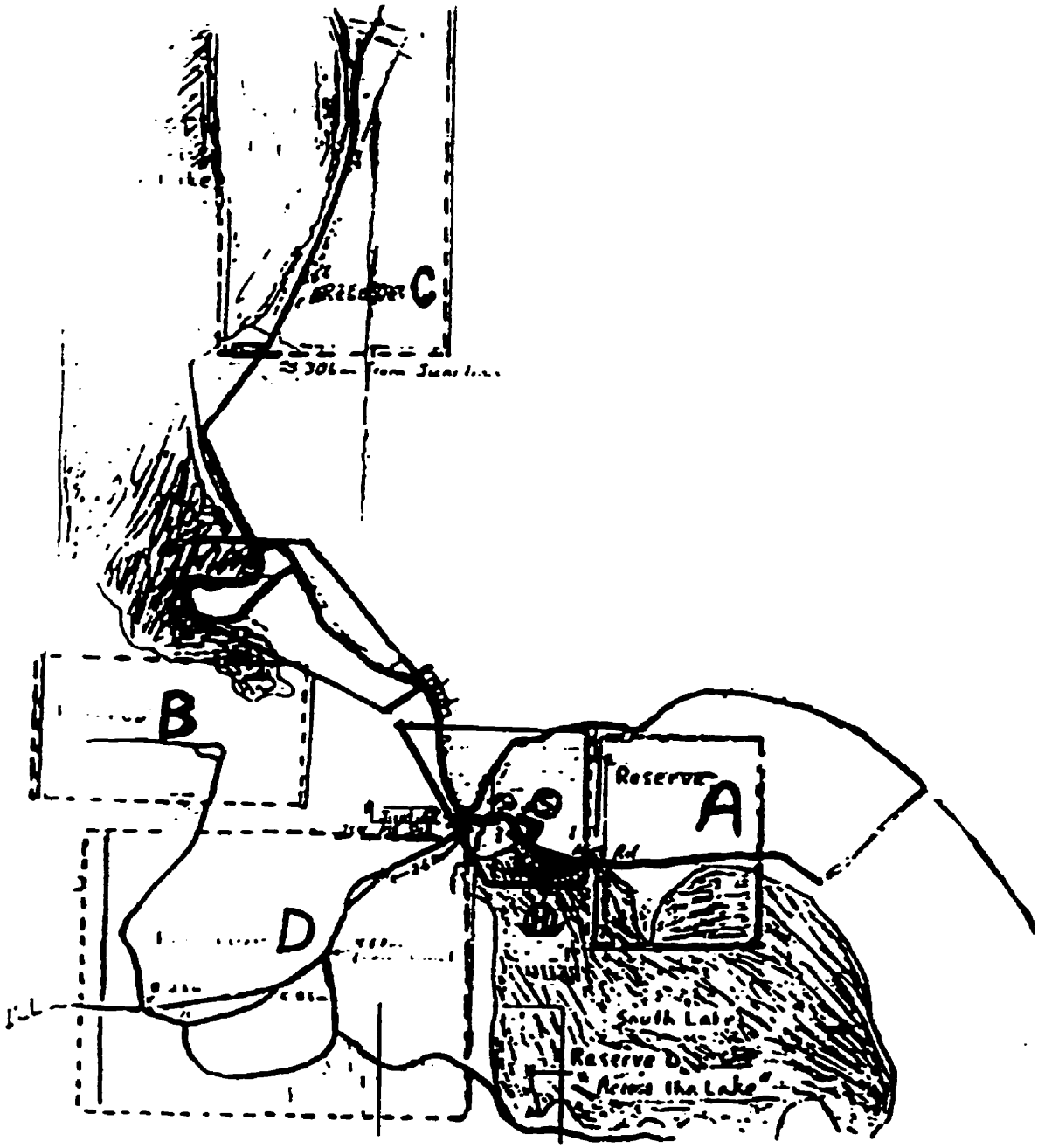
Cree Society. The surrounding area is heavily populated by birch, willow and poplar and coniferous trees, such as spruce, pine and fir. The lakes supply the inhabitants with "white fish" (or Tickameg) and lake trout. White fish was the source of winter food for local Aboriginals. The woods contained moose, deer, caribou and smaller game. Historically this area was travelled by David Thompson in 1799. By the late eighteen hundreds the Hudson Bay Company had two posts in the area of the town situated south of the reserve. As well, the competitive fur trading company the "Canadians" or North Westerners (NWC) were similarly situated. The Church of England and the Roman Catholic Church set up religious houses and proselytization of the Aboriginals was initiated.

There is a community hospital on the reserve which has beds for six adults and four pediatric patients. One doctor, who had been in the community for four years at time of my research, is on call full-time. There is a district office of the Athabasca Health Unit and a pharmacist. In the 1980's, the government initiated a health transfer program which is slowly moving the responsibility for health and its various associated areas, dental, infant and elderly care and ambulance service, to the Cree First Nation. At the moment, some services are duplicated as Aboriginals initiate operations for take over and government operations diminish.

The Cree First Nation Health Clinic had its official opening in the fall of 1995, and is staffed at all levels by Aboriginal Community members. However, the rapid expansion of work has required that two non-Aboriginal medically trained personnel be assigned duties in the Unit.

Figure 2

Overview of Research Site (four sub-reserves)



Several Aboriginal women have upgraded their education and are employed as Community Health Representatives (CHRs). The CHRs have office allocation in the Unit. They spend considerable time travelling to visit homes and supply medical assistance. The scope of their duties covers an enormous range from clipping toe nails for senior citizens to checking on new infants. They supply considerable information to younger women during pregnancy on physical and psychological changes to be experienced. The CHRs are also knowledgeable about social events on the reserve. They are intimately involved with their designated reserve clientele and know the relationship of each household member to others in the community. It was from this group of knowledgeable workers that my Research Assistant was drawn. She had worked as a CHR on a part-time basis.

A water treatment plant draws water from the local lake which is distributed by a pipe system after treatment. Electricity is supplied to all residences.

Under the legalities of Bill C31, ten new families recently have established residency on the reserve. Their little community is in Reserve B and their trailers sit in a row directly behind each other. Eight trailers form a single row from the road with two additional trailers establishing a second row.

On Reserve C, seven attached homes are allocated to single parents. The population occupying this area stay short periods of time before moving to an allocated permanent home. The Council make all decisions on allocation of residence. Persons wishing accommodation changes first make application to the Council. If the outcome is not acceptable, the party or parties then visit the Council members to appeal their case personally. Also located on the reserve is a modern, although inconspicuous woman's shelter house.

From this Northern site, all parturient Aboriginal women are removed to facilities in other locations to give birth. The local doctor, since his arrival in the area four years ago, has refused to deliver babies because he considers it too risky. Pregnancies which are

constituted low or non-risk status by the local physician are transported by plane or road vehicle to a small town 150 kilometers south of the Cree reserve. Pregnancies which are determined to have the possibility of complications are deemed "high risk" requiring facilities and technology beyond that available at the town hospital and are transported further away to the city of Edmonton. The constant uncertainty surrounding "due dates" result in women being moved from the reserve earlier than they would like.

4.3.1 Features of Residences on the Reserve Thirty-five percent (25) of the seventy homes in which I did interviews had six windows. The minimum number of windows was two, while the maximum was fourteen in one large home. Windows were the source of ventilation in 98.5 percent of the homes. One home had an exhaust fan in the kitchen which was hooked-up to vent to the outside. Exhaust fans in other homes were not ventilated to the outside and served to recirculate the residence air. Eighty-eight percent of the residences had running water; however, sixteen percent were without a flush toilet. Fourteen percent used a bucket or pail for human excrement.

Ninety-two percent of the mothers interviewed were without male partners. Mother's brothers and nieces were the most common permanent residents after mother and her children. Twenty-three percent of the homes had four children and thirty-three percent had five children. Seventy-five percent of the households had male infants.

Thirty-six percent of the households had pets. Nineteen percent of the households had one pet, with ten percent of the households having two pets. Cats made up seventeen percent of the pets, while dogs accounted for twenty-three percent. Two homes had fish and two had birds in cages. Twenty percent of all cats, birds and fish remained in the house during night hours. What was interesting in this category is that all residences had two or three dogs running after and biting the wheels of my car. However, dogs and cats that eat and sleep outside the home are not considered pets.

4.3.3 Demographics of Research Site Inhabitants on the reserve are younger (overall) than the rest of Canada, have less formal education than non-reserve persons and register lower income levels (Table 2).

In Canada, natives are classified on the basis of registration under the Indian Act of 1876. The Federal Government provides health care to registered Indians. Classification of native groups is on the basis of language, with ten major language groups across the country and 58 separate dialects. There are 576 registered bands ranging in size from two persons to 9,950 (Boxhill, 1985). The Native Indian Register, established by the Indian Act of 1951 to list all registered Indians in Canada, is maintained by the Department of Indian and Northern Affairs (DIAND). The major purposes of the Register are to determine eligibility for benefits, population size and distribution. For the reserve on which a status Indian lives, annual registration is used to determine the band roll, on which federal funding to the reserve is based. Thus, it is advantageous to the band to enrol individuals living on the reserve and a disincentive to register deaths promptly. A band number is assigned to male members of a family upon reaching eighteen years of age and after completing an application for a band number. The same number is given to his spouse after marriage and to any children born of the union. The children maintain this number until old enough to apply for their own number. To register an event, DIAND requires a formal application in addition to specific valid documentation. For a birth, documentation would be a birth certificate; for a death, a death certificate or statement from the funeral director is required.

Table 2

Demographic and Social Aspects of Research Site (by sub-reserves)[1]

	A	B	C	D	Canada
Average Age in Community	26.7	21.8	21.0	25.5	35.5
MALE:					
Male population	50% (175)	50% (20)	50% (35)	53% (215)	49%
Age 0-19[2]	27%	5%	30%	26%	
Age 20-49	19%	24%	0%	21%	
Age 50+	3%	0%	0%	25%	
FEMALE:					
Female population	49% (170)	50% (20)	50% (35)	47% (90)	51% 12%
Age 0-19[3]	24%	48%	21%	24%	24%
Age 20-49	20%	24%	14%	18%	13%
Age 50+	5%	0%	10%	20%	
Couple with 3+ children	36%	0%	33%	47%	11%
Single male parent families 3+ children	29%	100	33%	12%	13%
Single Female Parent	21%	%	0%	12%	11%
Average children/family	2.4%	0% 4%	1.7%	2.2%	1.2%
Household size 4 - 5 persons	44% 4.4	100 %	25% 3.8	35% 4.0	25% 2.7
Average person per house	93% 40%	5.0 100	75% 25%	89% 5%	-- 2%
Band houses/trailers		% 0%			
Education:					
Less than grade 9	57%	80%	60%	53%	14%
Grades 9 - 13	30%	40%	40%	27%	39%
Trade certificate	5%	0%	0%	0%	4%
Income:					
Average income	$9,283				54,153[4]
Median income	$6,802				48,091

[1] Stats Canada 1991 Census [2] 39% of this category age 0-4 years compared to 4% for rest of Canada. [3] 29% of this category age 0-4 compared to 3% for rest of Canada. [4]Income Distribution by Size in Canada, 1994, Cat 13,207 In Alberta, average is $55,355, median is $49,870

Prior to 1951, band rolls were maintained by individual bands. This function was assumed by DIAND in 1951. From 1951 to 1984, all records were maintained manually. In 1984, the system was computerized. Despite this, DIAND officials admit that there are individuals on the register who cannot be alive. No attempt has been made to identify persons on the register who are unlikely to be alive. Of particular concern is the fact that infants die without either their birth or death being recorded in the register (Statistics Canada, 1985). Clearly, the accuracy of the numbers in the Native Indian Register is a matter of concern both for DIAND and Statistics Canada, to say nothing of researchers trying to make demographic conclusions based on the Register.

After I set up residence on the reserve, it soon became evident that there were fewer infants on the reserve than the Indian and Nothern Affairs and Canada Census data suggested. Demographic data regarding Aboriginal residence is historically problematic. Families and individuals are transient during parts of their lives, while stable families sometimes decline to answer questions regarding particular aspects of a government census. Since I needed definitive numerical information, I conducted a house-by-house survey to find mothers aged thirty-six years or younger with infants. Table 3 gives the total number of women of reproductive age with infants on the research site:

Table 3

Enumeration of Reproductive-Aged Females with Infants on the Research Site

Reserve	Number of Females Aged 15 to 36
A	38
B	2
C	21
D	75
Total:	136

This was completed with the co-operation of the Community Health Representative (CHR) for the specific reserve. Each CHR has first-hand knowledge of the reserve sub-sections they represent. The CHRs are local females who have taken educational up-

grading over a period of several years to meet the requirements of a CHR. They keep up-to-date records for each household by means of monthly, sometimes weekly, visits. Home visit schedules depend on the specific needs of each household. Weekly visits are made to homes with new infants to weight the infants, check on their general development and to schedule innoculations by the nurse-in-charge at the health unit. The close ties between the families and their CHR's provided a good source of first-hand information regarding location of infants, their care-givers and the location of senior women. If a family moves from one sub-reserve to another, the CHR transfers the family's records to the appropriate CHR in the new location. Since the CHRs share an office in the health unit, verbal exchanges of information are used to ensure a smooth transition. They occupy a unique status as both members of the community and representatives of the health unit. The loyalty of the CHRs to the community is recognized and appreciated by the families since they have chosen to stay in the community.

A house-to-house census was necessary because the 1991 Census lists female population as total number between ages 15-24 and then total number of females between 15-49. Our age cut-off of 36 (a number suggested by my committee at the proposal stage) was problematic in the documentation format which used 15 to 49 years. Also, there seemed to be fewer infants under one year of age on the reserve than the 1991 Census indicated. Women who had new infants and/or young toddlers up to 36 months were the target sample. The sample groups of women with infants younger than twelve months were expanded to include women with children under three years of age. It was deemed acceptable to make this inclusion since many women with three year old children would be contemplating future births and would, in all practical ways, continue their existing infant care.

When gathering data about relationships, I have incorporated the actual responses of the women being interviewed in terms of relationship labels. For example, if they

referred to the adult male in the house as "husband", I used that terminology. If, on the other hand, they referred to the adult male as "Dad", or "Father", or, as in some cases, "partner", I used those terms. I chose this method of labelling the relationship to reflect the interviewees response, rather than attempt to formulate labels, such as "married", "single", "common-law" or divorced", unless such terms were chosen by the respondent. In one case, as the table below indicates, the adult male was referred to as a "common-law" relationship. Also, in some cases, the adult male in the house may have been the father of some or all the children, but may not have been married to the mother, who might actually have a legal husband living separately on or off the reserve. Part of my terms of reference with the Band Council was that I would not inquire into what was considered personal information apart from what had been agreed to in the questionnaire. Since such terms as "married" and "divorced" can have different meanings in Aboriginal and other cultures, I did not feel it appropriate for the purposes of my research to attempt to solve this particular dilemma. For purposes of this table, the relationships column uses a number of letters to indicate status: For example, "M" stands for "Mother", "D" for "Dad", "F" for "Father", "C" for "Children" (usually with a number in front to indicate how many), "GP" for "Grandparents", "GM" for "Grandmother", "MB" or "MS" for "Mother's Brother" or "Mother's Sister", "MBF" for "Mother's Boyfriend", "Nw" and "Nc" for "Nephew" and "Niece", "SD" for "Step-daughter", "SDH" for "Step-daughter's husband", "VC" for "Visiting Child", "AF" for "Adult Friend" and "Pr" for "Pregnant" (referring to the Mother).

Table 4

Households with Infants by Size of Household and Age of Mother

Sub-Reserve	Mother's Age at First Birth	Mother's Age Now	Household Size	Household Relationships
A	20	27	6	"M, 5C"
A	17	35	6	"M, 5C"
A	21	23	6	"M,S,3C,MB"
A	20	31	5	"M,D,3C"
A	18	18	5	"M,GM,MB,MS,1C"
A	17	36	5	"M,D,2C,Nw"
A	19	24	5	"M,MGF,3C"
A	17	33	3	"M,D,4C"
A	20	26	6	"M,D,3C"
A	20	31	5	"M,D,3C"
A	19	31	6	"M,D,4C"
A	16	26	5	"M,D,3C"
A	19	23	5	"M,D,2C,MB"
A	19	27	5	"M,D,3C"
A	15	15	3	"M,1C,MB"
A	19	27	4	"M,3C"
A	16	25	5	"M,H,3C"
A	21	26	8	"M,D,4C,2AF(C)"
A	17	28	13	"M,D,6C,2Nc&1C,2MS,1SH,3C"
A	21	23	6	"M,GM,3C,MB"
A	17	18	12	"M,D,1C, GP2,6MS,MB"
A	16	19	9	"M,2C,5MS&1C"
A	17	36	5	"M,D,2C,GM"
A	20	34	7	"M,D,5C"
A	18	29	5	"M,D,3C"
A	28	28	7	"M,1C,2Nw,3MB"
A	18	21	4	"M,D,2C"
B	19	26	5	"M,D,3C"
C	19	22	4	"M,MS&M,1C"
C	17	25	5	"M,D,4C"
C	17	23	5	"M,P,3C"
C	20	24	4	"M,3C"
C	18	30	5	"M,D,3C"
C	21	31	7	"M,D,5C"
C	19	23	4	"M,D,2C"
C	19	29	4	"M,D,2C"

Table 4 (Cont'd)

Sub-Reserve	Mother's Age at First Birth	Mother's Age Now	Household Size	Household Relationships
D	21	24	4	"M, C-L, 2 C"
D	18	23	4	"M,GP2,1C,Pr"
D	28	31	4	"M,H,2C"
D	27	33	6	"M,P,4C"
D	18	26	6	"M,GM,3C,1O"
D	29	34	4	"M,H,2C"
D	25	33	5	"M,D,3C"
D	17	27	5	"M,D,3C"
D	19	24	6	"M,D,3C"
D	18	24	4	"M,P,2C"
D	20	23	4	"M,D,2C"
D	20	23	2	"M,1C"
D	18	19	7	"M,GP2,2MB,MBF,1C"
D	19	27	5	"M,D,3C"
D	22	32	5	"M,D,3C"
D	25	30	6	"M,H,2C,SD&SDH"
D	17	22	4	"M,D,2C"
D	18	19	7	"M,P,2C,GP2&1C"
D	17	27	7	"M,P,5C"
D	20	24	4	"M,D,2C"
D	17	31	8	"M,7C"
D	19	19	5	"M,1C,GP2,MB"
D	17	36	9	"M,P,3C,MS&1C,Nc,Nw"
D	17	19	7	"M,3C,GP2,MB2&1Fr"
D	20	23	3	"M,2C"
Averages	19.19	25.93	5.37	

4.4 Senior Women

Since the questionnaire to be used was designed for mothers with infants, many of the questions were inappropriate for the senior women. Therefore, it was decided to conduct open-ended interviews with the senior women to discover what, in their view, were the traditions associated with infant care. A list of senior women was obtained from the Community Health Representatives. All but two of these were interviewed. The

remaining two were in hospital and the nurses strongly advised against interviewing them due to deteriorated mental states. Notes of the interviews were taken by the interviewer at the time of the interviews.

Environmental readings were not taken in the homes of the senior women since those readings were designed to record the infant environment. Senior women still able to adequately communicate past memories were interviewed. The age range of the senior informants was between 56 and 87 years of age. It was originally thought we could select senior informants from the list at the Reserve Health Unit, phone the potential candidates and set up interview times. However, that proved fruitless. Most senior women do not like or do not have telephones. Hence, we had to drive to their residence, explain the project and, if permission was obtained, get the consent form signed. The first interviewee was the first senior woman we found at home.

She was asked to discuss infant care in general. Her two hour non-stop recollection started with the birthing process and moved consequently to the infant care strategies utilized during her reproductive years. After cases two to five were interviewed, it became apparent that the responses of the first senior woman interviewed were virtually identical. Therefore, her responses were catalogued as an informal check-list for interviews six to nineteen. All post-reproductive women were interviewed in Cree.

One of the oldest and most communicative of the senior informants (who was also the first senior to be interviewed) became the model for a vignette describing traditional birth/infant care strategies. Variables discussed in these open-ended interviews were put into table form (Appendix F). The interviews, facilitated by an interpreter, were long and tiring for the senior women. Photos were taken of all senior women, as well as of some of the infant care paraphenalia spontaneously displayed by the women to illustrate points they were making. Others reconstructed swings of the type they had used. Where seniors

could not recall or did not mention certain practices, a question mark was used to indicate a non-specific response. Case numbers were assigned to retain anonymity.

4.5 Sample Selection of Contemporary-aged Women

My original criterion was to interview as many contemporary women as we could find on the reserve. My research assistant had first-hand knowledge of all four reserves. A list of homes with infants born within the last year was provided by the Community Health Representatives. The list gave the baby's name, parents' names, birth date of the infant and reserve at time of birth. Each day, we met at the health unit office and drove to the next reserve on the list. This was necessary because street names and house addresses are not used on the reserve. We would drive along a road until she said, "That house." The assistant knew from the infant list which house we were looking for because she knew the family name. Then we would try to find the almost invisible driveway in the deep snow. If the family were home, (indicated by a car or truck in the drive way or children looking out the window) the interpreter approached the residence, knocked and entered. She informed the mother about the research and the next step in the process was for the woman to look through her window at me sitting in the vehicle and give her initial approval. While this approach is time consuming and full of logistical problems, the difficulties were not insurmountable and the outcome was a set of 70 case studies out of a possible 136.

There are several issues which impede data collection of this kind in this particular research site. First, when unemployment/welfare, pension and band cheques arrive at the local post office branch, there is considerable disruption in day-to-day practices. During these time periods, people go to the local off-reserve town for supplies or to visit the Social Services offices to tend to business. Frequently they stay overnight and/or arrive home late and do not re-establish their regular routine until past noon on the next day. Second, infants who appear apparently healthy one minute can be rushed off to the

hospital within the next half hour. A third feature which acts as a regulator for interviews is the health of the contemporary mothers. They too would be off to the hospital or local physician's office and the subsequent protracted wait for prescription to be filled by the local pharmacist. Troubled domestic situations are also reflected in the absence or presence of women in the home. Weekends were also found to be a fruitless time to contact mothers. Therefore, the actual days of the week to find women available to interview were limited to Tuesday, Wednesday and Thursday between noon and six p.m.

4.6 Review of SIDS Files at Chief Medical Examiner's Office - Calgary

A five year file review of infant deaths ultimately attributed as SIDS was conducted at the office of the Deputy Chief Medical Examiners Office (CMO) in Calgary. Completed SIDS death files for the northern half of Alberta are physically located in Edmonton. These files were requisitioned and sent by bus to Calgary for review.

Under the category for identifying "race of the infant" the CMO's forms have three choices. They are: caucasian, native or other. The CMO designates four geographic areas within the province: Two rural areas dividing northern and southern rural splitting the province at Hobbema, and two metropolitan areas, namely the City of Edmonton (which is within the boundaries of the northern rural area) and the City of Calgary (which is within the southern area). A special numbering code is used by the CMO's office to identify these geographic areas. Numbers 0 to 29000 represent what is called the "Calgary" area. Numbers in the 30000 range represent "Rural Southern" area, while 50000 to 60000 are the "Edmonton" designated numbers. The "Rural Northern" area cases are found under the 70000 to 80000 numbers.

4.7 Distribution of SIDS Incidence In Alberta. In order to determine Aboriginal SIDS incidence in Alberta, births by reserve for the forty-two Aboriginal bands in Alberta were obtained from Indian and Northern Affairs Canada . These bands were then plotted by location (National Atlas of Canada, Fifth Edition, 15.1 Indian and Inuit Communities

and Languages, Energy Mines and Resources, 1980) to enable separation into southern and northern Alberta categories to coincide with the designation used by the Chief Medical Examiner's (CMO) office for the reporting of rural incidence of SIDS (See Figure 3). This is necessary because Aborignal Treaty infants are registered by parental band affiliation.

Therefore, with no bands existent in Calgary or Edmonton, infants are either registered with a band or are assumed to belong to a band located outside the two cities. All other cities are designated either rural north or rural south. The north/south division used by the CMO runs east to west from Wainwright through Hobbema to just south of Jasper. Total Alberta births (both Aboriginal and non-Aboriginal) for the five years (1990-94) were obtained from the Alberta Health Surveillance Branch, Alberta Vital Statistics Birth Registration. While dealing with statistics relating to Aboriginal peoples accuracy of numbers is always problematic due to the fact that some bands do not take part in the reporting and reporting is not always done on a consistent basis. The other mitigating feature is the mobility factor with families moving on and off reserve for educational, medical, occupational and personal reasons. In order to present as pristine a picture as possible, I have used the numbers provided by Medical Services Branch (MSB) for the years 1990 to 1994 for Aboriginal births, the numbers provided by Alberta Health Surveillance Branch for total births and the CMO's numbers for SIDS. These numbers have had four to eight years to stablilize and for MSB and Indian Affairs to fine tune the numbers with the result that they are very close.

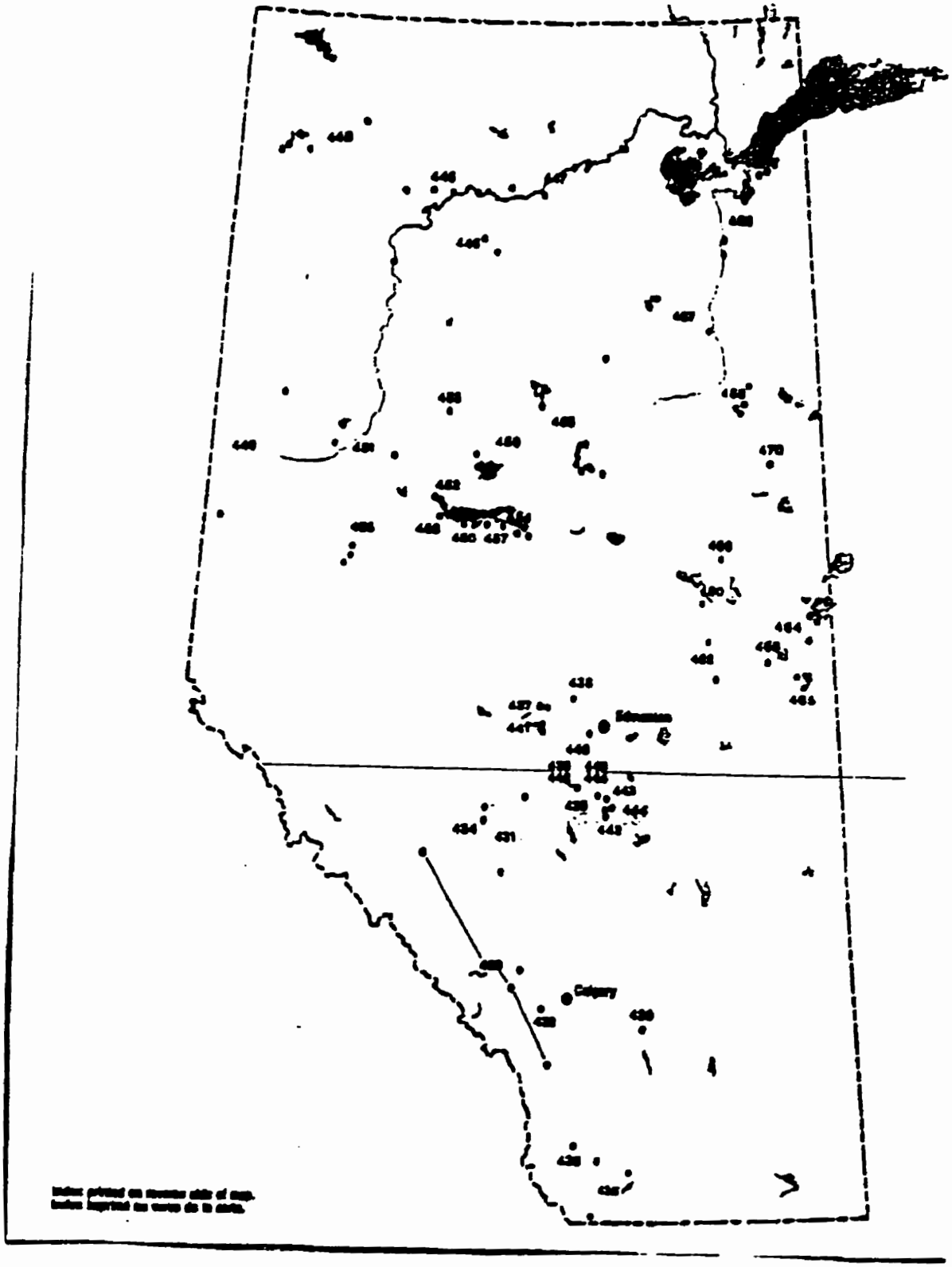
In Alberta, Aboriginal births are identified by legal birth registration. If the mother had Aboriginal status, the mother's birth date is used in conjunction with the name given to Vital Statistics. Although the infant may have many names, the infant is counted only once because it is cross-checked with the mother's birth date.

One additional task was necessary to ensure the validity of the numbers. As noted earlier, the decision to attribute racial origins lies within the CMO's jurisdiction. In the event of an emergency, the R.C.M.P., ambulance staff or police who are first on the scene make a judgement as to what racial description best suits the situation. At times, this category will be maintained throughout the development of the victim's file, up to and including the autopsy report, which will state, for example, "This five-month old Native infant...." The case then becomes part of the tabulation by race generated by the request of, for example, a SIDS researcher asking about SIDS cases by race. It is not uncommon for other infants to be identified during initial contact as "Native," only to be changed later in the autopsy process to "caucasian" or "other."

Being aware of these problems in correct classification, I held aside all files for the years 1990 to 1994 which had been reported as "Native" on any of the forms. A total of 64 cases were identiified as "Native". Upon request, I was granted permission from the Medical Services Branch in Edmonton to obtain further clarification on the status of these 64 cases. While they would not reveal actual names or individual identification, for the purposes of accuracy in this research, they checked the actual status of the 64 cases. Their results were surprising. Only 31 of the 64 cases of Alberta Native SIDS deaths were actually Alberta status Natives. One of the others was a status Native, but from Saskatchewan and therefore could not be counted as an Alberta Native SIDS death. Others were Metis and some were caucasian.

One further difficulty encountered when working with these documents is the awareness of the phenomenon of late registration. Some infants are registered two or three years after their death. The question that must be answered is: "If an Aboriginal infant dies before it is registered, how is that birth/death counted?" A Health Canada official advised me in a personal communication (March 1997):

Figure 3 - Location of Alberta Aboriginal Bands with North/South Division Line:



> "...for our purposes, when we are able to identify an event, i.e. a death from the Vital Statistics file, we can then cross reference the birth file when the death is [that of] an infant. We are then able to determine that the birth occurred and the infant's status, therefore, we count both the birth and the death..."

It would appear that the verification completed by Medical Services Branch is as accurate as can be obtained at this time. As noted earlier, death certificates do not contain racial identification. By providing names and birth and death dates, the MSB could cross-check status registration.

4.8 Socio-Economic Status of Other Alberta Treaty Bands

Socio-economic data was obtained from the 1991 Aboriginal Peoples Survey conducted by Statistics Canada which contains the most thorough and recent data available. Total income levels were selected for all Northern and Southern Alberta Bands which had responded to the survey. The Alberta Medical Examiner's geographic designation of North and South was used to ensure consistency in classification. This resulted in records for 7 of 9 Southern Bands and 43 of 57 Northern Bands which represents the most accurate data yet recorded. The data were categorized in the database by the following levels of income: no income, $1 to $1,999; $2,000 to $9,999; $10,000 to $19,999 and $20,000 to $39,999.

CHAPTER V

EPIDEMIOLOGY OF SIDS IN ALBERTA

At this point, I take a closer look at Aboriginal and non-Aboriginal SIDS deaths in Alberta. SIDS is a significant problem for Aboriginals, because published data indicates a greater risk of the syndrome for Aboriginal peoples, a risk not related to biological factors. The focus of this dissertation is on cultural infant care practices associated with Aboriginal peoples. For the purposes of this discussion, Aboriginal means Treaty Aboriginals and registered status Indians as defined by Indian and Northern Affairs Canada. Ascertaining the actual number of Aboriginal births is problematic. Most birth reporting for the general population is for the current year, with a small number of late registrations. Aboriginal birth reporting, according to Indian and Northern Affairs Canada, includes those births reported for the current year, plus a larger number of births prior to the current year, plus birth reinstatement, which is the registration of a child born to non-registered parents, who later became entitled to registration under Bill C-31. Indian and Northern Affairs Canada use five definitions to categorize status Aboriginals:

1. Birth-Current Year: The registration of a child born to registered parent(s) where the registration takes place in the same year as the birth.

2. Birth-Prior to Current Year: The registration of a child born to a registered parent(s) where the registration takes place in a year subsequent to the birth.

3. Birth-Reinstatement: The registration of a child born to non-registered parents, but whose parent(s) later (after April 17, 1985) became entitled to be registered as a result of Bill C-31 changes to the Indian Act. This event will cease to be used by the year 2003, as all such persons will be adults, rather than children.

4. Addition-Reinstatement: The registration of an adult who was once registered/entitled but who lost the entitlement to be registered for one reason or another,

and who now (after April 17, 1985) is once again entitled to be registered following the Bill C-31 changes to the Indian Act.

5. Addition-First Generation: The registration of an adult who was born to non-registered parents, but whose parent(s) later (after April 17, 1985) became entitled to be registered as a result of the Bill C-31 changes to the Indian Act.

While the last two categories have some impact on Aboriginal birth numbers, the first three, particularly category two (Birth-Prior to Current Year) affect those numbers significantly as can be seen in Table 5:

Table 5
Indian Registration System-Alberta Region
For the years 1990 to 1994

Year	Birth-Current Year	Birth-Prior to Current Year	Birth-Reinstatement	Total Births**	Addition-Reinstatement	Addition-First Generation*
1990	643	1371	240	2254	121	633
1991	791	1677	135	2603	65	390
1992	776	1449	104	2329	60	334
1993	752	1602	71	2425	34	378
1994	789	1634	94	2517	39	394
Totals	3751	7733	644	12128	319	2129

*Addition-First Generation is the registration of an adult born to non-registered parents, but later became entitled to registration under Bill C31
**Total Births is total of Birth-Current Year, Birth-Prior to Current Year and Birth Reinstatement

As has been noted in Chapter IV, the numbers of Aboriginal births reported by Indian and Northern Affairs Canada varies as illustrated in Tables 9 and 10. The incidence of SIDS amongst Aboriginals varies according to how denominators are constructed. Dividing Alberta into northern and southern geographical divisions at Hobema, as does the

Chief Medical Examiner, I present the geographical differences in SIDS in Table 11. In subsequent tables, I present demographic variables, such as mother's age, birthweight and sex distribution. I next give socioeconomic information for Aboriginals using the North/South divisions, plus overall income levels for all Albertans and approximate income status for the specific area of Edmonton where a number of Aboriginal SIDS deaths took place.

5.1 Alberta Births and SIDS Deaths

Since births are tabulated by Vital Statistics Alberta on a non-discriminatory basis, we must deduct the number of Aboriginal births from the total number of births for any year in order to arrive at the number of non-Aboriginal births. If we calculate Aboriginal births exclusively from births registered in a specific year and deduct this figure from total births in Alberta for that year, we can then calculate non-Aboriginal and Aboriginal SIDS rates for each year. Using this method (Table 6), non-Aboriginal rates range from a low of 0.93 per 1,000 births for 1992 to a high of 1.23 in 1991, with a five year average of 1.10. Using Aboriginal births per year as a denominator, the SIDS rate for a five year average is 8.26 per 1,000 births, with a high rate of 11.60 in 1992 and a low rate of 4.67 in 1990. These are distressingly high rates for Aboriginals. However, they may reflect an inaccurate handling of the relevant numbers.

If we calculate Aboriginal births per year to include actual registered births per year, plus births which took place in that year but were registered later, plus births to Aboriginal mothers who claimed band affiliation under Bill C-31 (and who would therefore be classified as treaty Aboriginals at the time of the SIDS death), we end up with a higher number of Aboriginal births (Table 7), which also alters calculations of the non-Aboriginal birth/SIDS rates as well. For Aboriginal SIDS rates, the calculations used in Table 7 change the five year average incidence to 2.97, with a high rate of 5.63 in 1992

and a low rate of 1.33 in 1990. Non-Aboriginal rates change to a five year average of 1.14, with a high rate of 1.28 in 1991 and a low rate of 0.95 in 1992.

Alberta Aboriginal births recorded on an annual basis are given in Table 6. Table 7 shows Aboriginal births recorded in each year, plus births recorded late and births to Aboriginal mothers who have claimed band affiliation under Bill C-31 and would be viewed as treaty Aboriginals at the time of a SIDS death. As can be seen, the impact on the SIDS rate for Aboriginals differs according to which method of birth recording is used.

Aboriginal SIDS rates are higher than non-Aboriginal rates, but less than had been anticipated. The inclusion of Bill C-31 infants and late registrations give a different view of Aboriginal SIDS deaths. In other words, using only current recorded births (as in Table 6) gives a higher incidence of Aboriginal SIDS in Alberta. Determination of race was made by RCMP in the rural areas, by ambulance crews or police in small towns and by the police department in the large cities. As a check of the cases revealed, only thirty-one of the sixty-four cases recorded as "Native" were actually Treaty Aboriginals. In all likelihood, many Metis infants were identified as "Native". Since Metis have both Aboriginal and Caucasian ancestry, it is often difficult for those who fill out the forms at the scene of death to determine whether an infant is Metis or has treaty status. If the infant looks like an Aboriginal infant, the observer is likely to put a checkmark in the "Native" column on the form. Conversely, if the parent on the scene and the infant appear to be Caucasian, they may be recorded as such despite their Aboriginal status. This determination is changed only if the parent informs the Chief Medical Examiner that the infant has a treaty number. Otherwise, the status remains as that determined by the original observer.

Table 6: Non-Aboriginal and Aboriginal Births
SIDS Deaths and SIDS Incidence (deaths per 1,000 live births)
for the Province of Alberta, 1990-94

	Provincial Totals			Non-Aboriginal Totals			Aboriginal Totals		
Year	Births#	SIDS Deaths*	SIDS Incidence	Births	SIDS Deaths	SIDS Incidence	Births^	SIDS Deaths	SIDS Incidence
1990	42,605	51	1.20	41,962	48	1.14	643	3	4.67
1991	42,346	58	1.37	41,555	51	1.23	791	7	8.85
1992	41,659	47	1.13	40,883	38	0.93	776	9	11.60
1993	39,869	49	1.23	39,117	44	1.12	752	5	6.65
1994	39,434	48	1.22	38,645	41	1.06	789	7	8.87
Totals	205,913	253	1.23	202,162	222	1.10	3,751	31	8.26

Total includes all births in Alberta, source: Statistics Canada
* Chief Medical Examiner's Office, Calgary
^ Births registered by Treaty mothers during year of birth with Medical Services Branch

Table 7: Adjusted** Aboriginal and Non-aboriginal
Births, SIDS Deaths and SIDS Incidence (deaths per 1,000 live births)
for the Province of Alberta, 1990-94

	Provincial Totals			Non-Aboriginal Totals			Aboriginal Totals		
Year	Births#	SIDS Deaths*	SIDS Incidence	Births	SIDS Deaths	SIDS Incidence	Births^	SIDS Deaths	SIDS Incidence
1990	42,605	51	1.20	40,351	48	1.19	2254	3	1.33
1991	42,346	58	1.37	39,743	51	1.28	2603	7	2.69
1992	41,659	47	1.13	40,059	38	0.95	1600	9	5.63
1993	39,869	49	1.23	37,908	44	1.16	1961	5	2.55
1994	39,434	48	1.22	37,429	41	1.10	2005	7	3.49
Totals	205,913	253	1.23	195,490	222	1.14	10,423	31	2.97

** Includes late registration and Bill C-31 infants according to Medical Services Branch.
NOTE that the provincial totals already include these infants through registration with Vital Statistics
Total includes all births in Alberta (source, Statistics Canada)
* Chief Medical Examiner's Office, Calgary
^ Medical Services Branch, Alberta

For purposes of this investigation, I have identified as Aboriginal only those cases where the Medical Services Branch verified Treaty status. By analyzing only confirmed Aboriginal SIDS death, we can relate treaty deaths to treaty births. Such information is not available for Metis births and deaths and therefore analysis which does not make this distinction may well reach an incorrect conclusion. This investigation also led me to change the number of SIDS deaths recorded for the province for the five year period (1990-94) from 256 to 253, since three of the recorded deaths (two non-Aboriginal and one Aboriginal) were not born in Alberta. Out of province births are not excluded from the Chief Medical Examiner's list of total SIDS deaths within Alberta resulting in inflated SIDS rates. Since this information is passed along to researchers as official data the numbers are not generally questioned. In any event, balance is maintained by children from other provinces who die in Alberta.

Twenty-five of the thirty-one Aboriginal SIDS deaths were recorded in Northern Alberta, with seven cases recorded within the city of Edmonton (Table 8).

Table 8
Alberta Total non-Aboriginal and Aboriginal SIDS Related Deaths
by Geographical Location

		Calgary/Rural South		Edmonton/Rural North			
Year	Yearly Totals	Non-Aboriginal	Aboriginal	Non-Aboriginal	Aboriginal	Total Aboriginal SIDS	Total Non Aboriginal SIDS
1990	51	24	0	24	3	3	48
1991	58	23	0	32	7	7	51
1992	47	13	1	25	8	9	38
1993	49	14	5	26	0	5	44
1994	48	21	0	24	7	7	41
Total	253	95	6	131	25	31	222

5.2 Data On Alberta SIDS Cases (1990-1994)

The information contained in the SIDS files under the jurisdiction of the Alberta Attorney General's office is composed of a background report of the SIDS family, plus an autopsy report. Two hundred and fifty-six case files were examined covering the years 1990 to 1994, three of which were excluded as explained above. Most of the Calgary cases have relatively full information because two investigators complete a standardized SIDS information sheet. For cases in Edmonton, the information varies due to the fact that no standardized form is used. Cases outside of the two major cities vary in the amount of information reported, some giving little more than the name, age and address of the infant. This impacts greatly on the overall statistical value of the data in the files.

Because of these anomalies in the amount of data available, the following tables report the information available for maternal age only. The number (N) of cases in each table varies depending on how much information was provided in each file. However, we have complete data for Aboriginal SIDS cases for 1992 to 1994, since it was obtained from the Medical Services Branch. For non-Aboriginals, the data were taken from the files of the Alberta Chief Medical Examiner. Figure 4 illustrates the different ages of mothers of SIDS victims. Since a high number of the coroner's Aboriginal files did not contain mother's age, Health Canada, Medical Services Branch, Edmonton, completed a match between birth and death certificates and provided virtually all the missing data for all treaty SIDS cases for the years 1992 to 1994.

Of the thirty-one SIDS cases identified as treaty Aborginals for the years 1990 to 1994, maternal age was available for only twenty (95%) of the twenty-one cases recorded in the years 1992 to 1994. Two mothers were 18 years of age or younger . The majority of mothers (ten) were between 19 and 24 years of age, while eight cases were recorded for the 25 years of age and older group (Figure 4). The proportion for Aboriginals by

maternal age groupings was 10.% for the 18 years of age and under group, 50% for the 19 to 24 age group, and 40% for the 25 and older age group.

Figure 4:

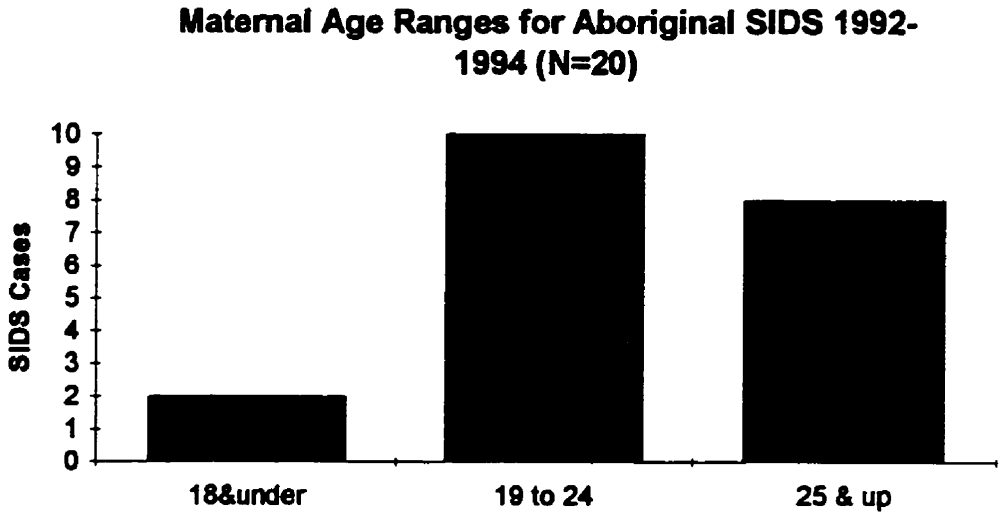
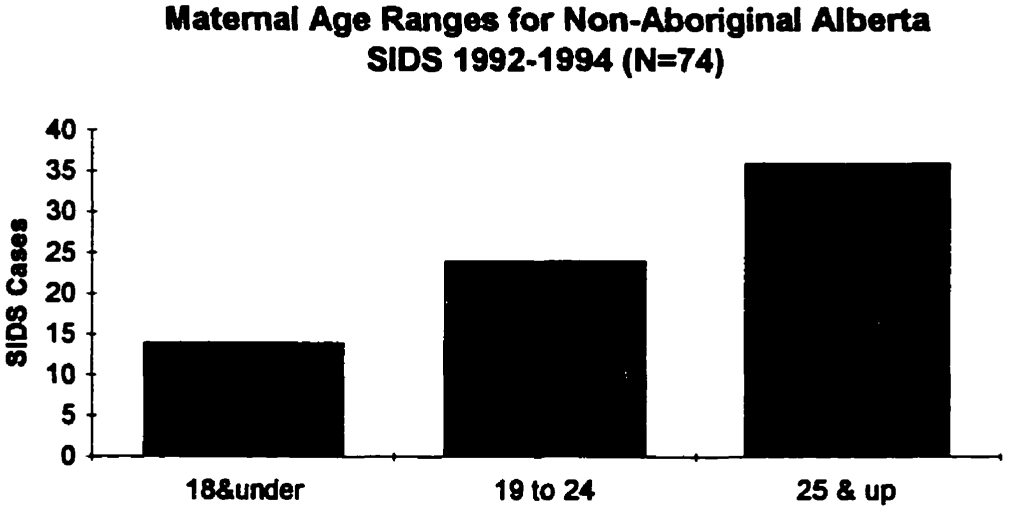


Figure 5 gives the age range profile for the 73% of the non-Aboriginal SIDS mothers for the years 1992 to 1994 for which maternal age was recorded in the autopsy files. 19% of the women were aged 18 years and under, 32% were 19 to 24, while 49% were 25 years of age and over (Figure 5). Although the ages for non-Aboriginal mothers were listed in 74 of the 102 cases reported for 1992 to 1994, we are still able to make an Aboriginal/non-Aboriginal comparison of mothers' age ranges for Alberta SIDS cases.

Figure 5:



Calculation of SIDS incidence per 1000 live births by maternal age group among Aboriginal and non-Aboriginal Albertans yielded the following results. The highest SIDS incidence was observed within the youngest age group for both the Aboriginal (4.1) and non-Aboriginal (0.9) populations, respectively. Incidence among mothers aged 19-24 years declined in each population, to 3.9 among Aboriginals and 0.6 among non-Aboriginals. Among the oldest maternal age group (25+ years of age) only slight decline in incidence was observed among Aboriginals (3.8), whereas among non-Aboriginals the incidence declined to 0.3 SIDS deaths/1000 live births. Calculation of relative risks among Aboriginal maternal age groups failed to demonstrate ratios significantly different than 1.0 (<19 to 19-24, 1.05; <19 to 25+, 1.08; 19-24 to 25+, 1.03). In contrast, among non-Aboriginals the risk ratio among the youngest maternal age group relative to mothers 19-24 was 1.57 and relative to mothers 25+ years of age was 3.5 times greater. Thus, within each population the highest incidence and relative risk occurred in the youngest maternal age groups and declined with the age of the mother. Age category with age category comparisons of relative risk between the populations demonstrated greater risk

among Aboriginals (<19, 4.6 times greater risk; 19-24, 6.5 times greater; and 25+, 12.7 times greater risk than comparably aged non-Aboriginal mothers).

Relative risk calculations were based upon 1998 adjusted total births for the years 1992 through 1994, supplied by Statistics Canada and the Medical Services Branch of Health Canada (1998, personal communication). Statistics Canada provided the maternally age-categorized total number of births for the province. Medical Services Branch supplied comparable total births by maternal age and these have been subtracted from the Alberta totals to arrive at the data for the non-Aboriginal population (see Table 8a).

Since these data conform to the SIDS profile, it seems to me that the decline in incidence with maternal age is in conformity with results presented by others. Similarly, the greater relative risk among Aboriginals is consistent with earlier reports and, in its consistency, represents evidential support for my selection of an aboriginal community/population within which to work.

Table 8a
Alberta Total Adjusted* (1998) non-Aboriginal and Aboriginal Births - 1992-94

Age Group	Non-Aboriginal Births	Aboriginal Births
18 & Under	15,715	488
19 to 24	42,251	2,594
25 & up	142,912	2,117

*Represents adjustments made for non-resident and out-of-province births.

5.3 Sex Distribution of SIDS in Alberta

The SIDS literature identifies a higher SIDS incidence for males. However, as demonstrated in Table 9, Alberta Aboriginal SIDS from 1990 to 1994 is 17 males to 14

females, while the non-Aboriginal totals are 127 males to 99 females. The ratio of Aboriginal male to female deaths is 1.21 and the percentage of male deaths is 54.8%. Among non-Aboriginals, the ratio of male to female deaths is 1.28 and the percentage of male deaths is 56.3%. There is no significant difference between males and females or between populations.

Table 9
1990-1994 Gender Distribution of SIDS
in Alberta Aboriginal and non-Aboriginal Infants
(N=253)

	Aboriginal		Non-Aboriginal	
	Male	Female	Male	Female
1990	5	1	31	22
1991	2	2	24	24
1992	5	4	25	17
1993	4	5	23	18
1994	1	2	22	16
Totals	17	14	125	97

5.4 Socioeconomic Perspective

From a socioeconomic perspective, there does not appear to be a significant difference between levels of income of northern Alberta Aboriginals compared with those from southern Alberta. The following figures (6 and 7) compare the socio-economic picture of northern and southern Alberta Aboriginals (Statistics Canada, 1994, Aboriginal Peoples Survey, 1991): (To provide a basis for comparison with non-Aboriginal peoples, the average non-Aboriginal Alberta family income is $55,355 and the median is $49,870. Source: Statistics Canada, 1991).

As figures 6 and 7 indicate, two-thirds of the band population have incomes under $10,000 per year, with approximately 90% under $20,000 per year. Statistics Canada

suggests an income of $17,130 and lower per year in the city indicates lower socio-economic status, with $13,577 and lower per year for town dwellers and $11,839 and lower per year for communities under 1,000 population.

Figure 6:

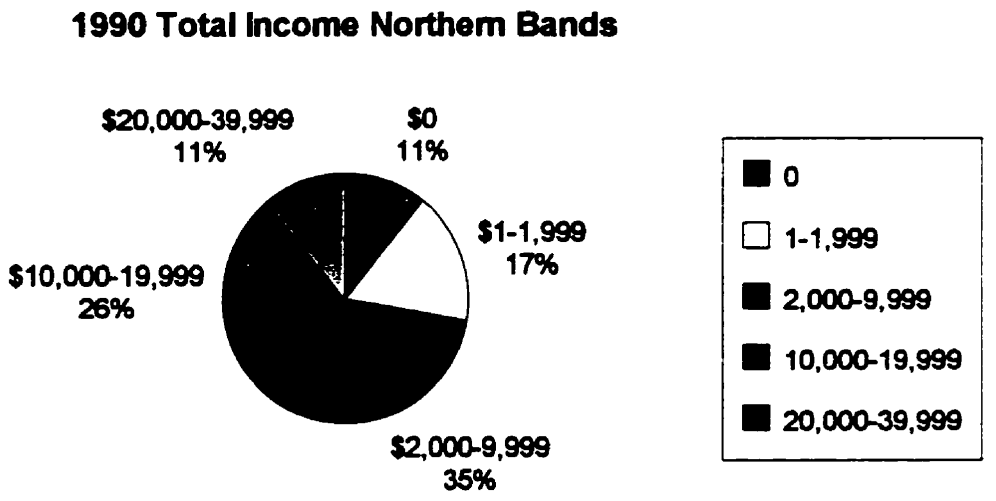
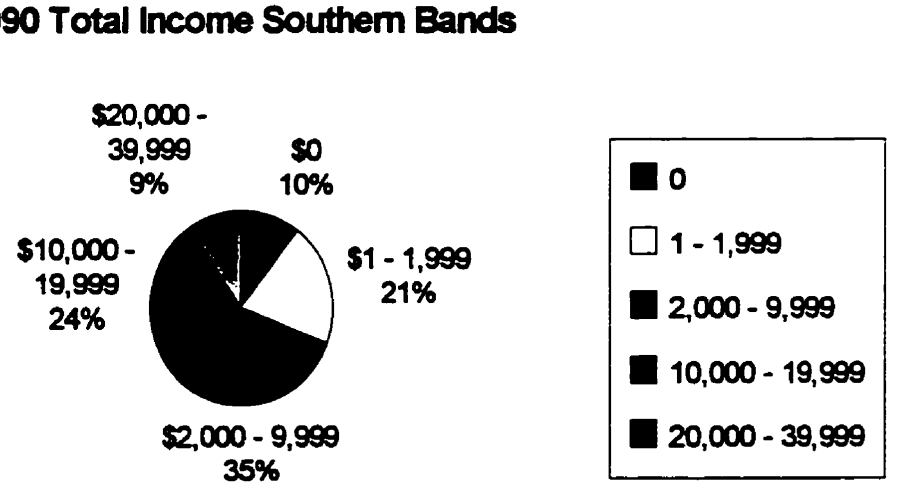


Figure 7:



While we cannot definitively pronounce that most Aboriginal mothers of SIDS victims are of lower socio-economic class, the general economic profile would suggest that is a fair assumption. According to the Canadian Public Health Association (1997), in 1993 47.2% of Aboriginal families on reserves lived below the poverty line, triple the overall poverty proportion for Canada.

On the SIDS forms in the Chief Medical Examiner's Office, only sixty-one cases contained a stated income level. Seventeen families were deemed middle-classed, while fifty-four were on social assistance and were categorized as low income families. Four of the fifty-four cases were city dwelling Aboriginal women. I inquired of the C.M.O employees who functioned as SIDS investigators how they determined income level. They told me that, since they couldn't ask too many questions of the family, they estimated income level by "eye-balling the living quarters."

Initially, I was skeptical of these conclusions since no assessment was made of a monetary level. However, in further conversation it became clear that the investigators knew the city and could distinguish likely income level by geographic location. Once inside the living quarters, the investigators would check for drugs, alcohol, level of cleanliness, and social features, such as, stable partners and/or involvement of social agencies in the family situation. The investigators were also knowledgeable about where subsidized housing was located. Overall, it seemed that the investigators based their conclusions on fairly substantive evidence.

As the following table indicates (Table 10), a high percentage of Aboriginal SIDS mothers in Edmonton are single and also have low incomes. This table was constructed by plotting the addresses of SIDS victims on a map which gives socioeconomic levels for each area.

Table 10
Socio-economic Status by Location of Aboriginal SIDS Victims
Born to Single Mothers in Edmonton - 1990-94 (N=7)

Case No	Maternal Age	Income ($)
1	24	15,115
2	16	11,463
3	28	13,101
4	19	13,101
5	25	15,765
6	23	15,765
7	29	13,510
	Average:	13,974

As can be seen, these income levels are well below the $17,130 bench-mark which Statistics Canada uses to designate lower socioeconomic status.

Associated with low socio-economic status is poor quality housing. While the question of reserve housing is discussed in greater detail later, it is generally recognized that Aboriginal peoples suffer from substandard housing (Canadian Public Health Association, 1997). The areas covered by the cases in Table 10 had high incidence of low income housing units according to Statistics Canada, 1992. The condition of the dwellings was rated by a Statistics Canada reporter in the Canada 1991 Census. Three categories were used:

> **[R]egular maintenance** refers to painting, furnace cleaning, etc. **Minor repairs** refers to missing or loose floor tiles, bricks or shingles, defective steps, railings or siding, etc. **Major repairs** refers to defective plumbing or electrical wiring, structural repairs to walls, floors or ceilings, etc. (Statistics Canada Profiles - Cat. No. 95-378;202).

As noted in Table 11, considerable home repairs are needed in the general location of the SIDS victims. Low socio-economic, single mothers stand a relatively high degree

of chance to be living in the minor or major repair category homes. These dwellings frequently record pipes, roofs and windows leaking which create the conditions conducive to fungus and bacteria growth. Also available from the Census 1991 Profile is the fact that a high percentage of unattached individuals reside in the Edmonton SIDS geographical area.

Table 11
Condition of Dwellings of
Urban Aboriginal SIDS Victims by Area
(N=7)

	Repairs		
Case	Regular	Minor	Major
1	2005	875	260
2	480	225	110
3	2140	885	310
4	2140	885	310
5	1575	610	265
6	1575	610	265
7	650	265	205

Source: Statistics Canada Census, 1991

It would be informative to determine the level of air pollutants in the homes of urban Aboriginal SIDS victims with a view to comparing them with those recorded on the reserve reported in Chapter VII. However, a signed contract by me at the Chief Medical Examiners Office stipulates that no contact is to be made by the researcher with any of the next of kin of the victims listed. Although no personal contact is feasible, we can determine the general condition of the homes in the geographical area of urban Aboriginal SIDS victims.

Aboriginal SIDS victims tend to be born to single mothers, residing in low socio-economic areas, in dwellings which require minor and major repairs. These findings are consistent with the existing overall environment of infants residing on the reserve.

CHAPTER VI

RESEARCH SITE, BIRTH AND INFANT CARE

In this chapter, I present the specific details about the research site, the results of my interviews with the senior Aboriginal women establishing what is deemed to be traditional infant care practices and what are the infant care practices used by contemporary aged Aboriginal mothers. The comparison between traditional and contemporary practices enables us to determine the level of continuity and/or change which has transpired during the last three generations at this particular reserve.

6.1 General Information About Research Site

The severe temperatures during the winter discourages venturing outside. Infants experience consistently longer hours inside the residence. Any negative effect of residential environments would impact particularly the infants and young children. Parents travel by car to shop and visit, and older children travel to school by bus. The buses stop picking up students when the outside temperature drops below -35 C. Young infants are frequently left at home with a sitter and/or grandparent. Table 12 gives temperatures recorded during the research project.

Table 12
1995-96 External Northern Alberta Winter Temperatures (Celsius)at Research Site*

Readings	Nov	Dec	Jan	Feb
High Temp	-16.3	-25.0	-08.0	-03.0
Low Temp	-20.0	-49.5	-44.0	-29.0

Only temperatures for day of interview are listed.
*Temperatures reached -50 at times.

6.2 House Temperatures and Humidity: The house temperatures were taken to determine the heat factor thought to contribute to overheating during nocturnal sleep. Women stated they turned the heat up when "the floor feels cold" or "when I feel cold". As seen in Table 13, the internal temperatures appear higher than would have been predicted. Residential temperatures taken at all homes were recorded at the conclusion of the questionnaire:

Table 13
Recorded Residential Temperatures
at Research Site in Northern Alberta (1995-96)

Year	Month	Average
1995	November	24.0 C
	December	24.0 C
1996	January	24.5 C
	February	24.0 C

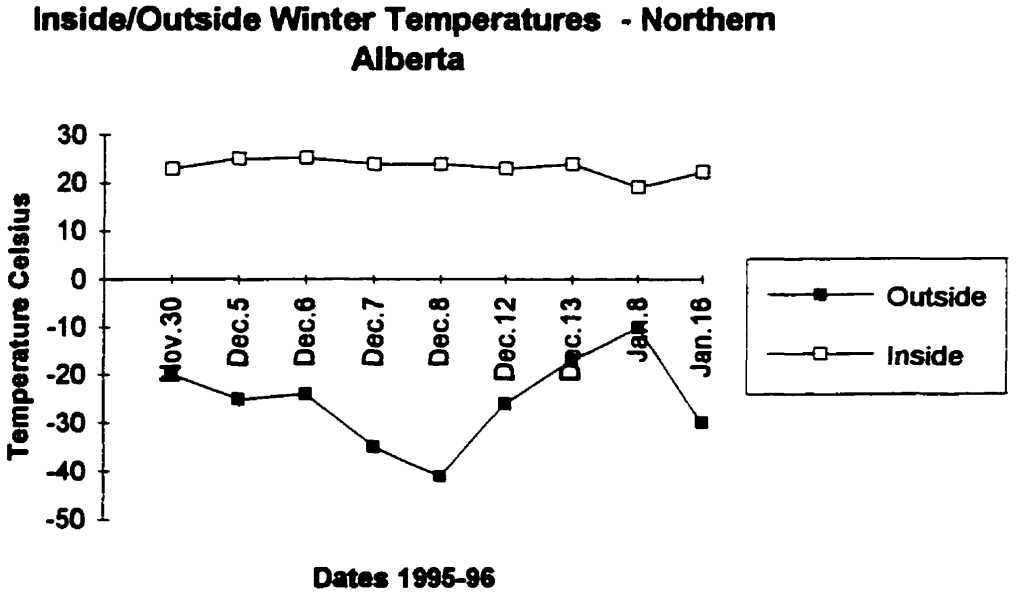
Humidity levels varied from home to home. The humidity ranges are given in Table 14:

Table 14
Humidity Levels in Residences on Research Site
in Northern Alberta (1995-96)

Year	Month	Humidity	
1995	November	23	to
	December	35%	
1996	January	36	to
	February	45%	

A comparison of internal and external temperatures is given in Figure 8:

Figure 8:



The range of outside temperatures during this six week period over the winter of 1995-96 is fairly extreme, from approximately minus 10 degrees Celsius to minus 40 degrees Celsius, but not unusual for this far north. What is more significant is the difference between the average inside and outside temperatures during this period. As can be seen from the graph, inside temperatures range narrowly between 22 degrees Celsius and 26 degrees Celsius, but the difference between inside and outside temperatures ranges from approximately 30 degrees to 60 degrees Celsius. The extreme night temperatures tend to produce cold floors in trailers and houses with unprotected crawl spaces under the main floor. Women constantly complain about the cold floors and worry about their infants getting sick. They keep the thermostats set high to guard against this potential. As will be noted later, this large temperature difference also is instrumental in producing the conditions for dampness and subsequent mold growth in Northern residences.

6.3 Bolton Model on Thermoregulation

Nelson (1989) proposed a thermoregulation measurement which is unfortunately complex and difficult to use. A modified version by Bolton, *et al.* (1996), established a spread sheet formulation which generates data based on input from actual infants and their environment. By entering an infant's birth weight and weights for subsequent months, the Bolton model can determine:

1. The highest tolerable ambient temperature (HTAT)
2. The lower critical temperature (LCT)
3. The lowest tolerable ambient temperature (LTAT)

The author's definitions for these three categories follows: HTAT is the highest ambient temperature at which the infant can avoid a progressive rise in body temperature. An infant would be sweating heavily at this temperature. This is a higher temperature than the Bligh and Johnson (1973) 'upper critical temperature,' which includes actual sweating. The LCT is the lowest ambient temperature at which the standard metabolic rate is sufficient to maintain body temperature. The LTAT is the ambient temperature that will require a doubling of metabolic rate to maintain body temperature (Bolton, *et al.*, 1996). Metabolic rate has been estimated as being directly related to body weight. However, the authors note that unlike the HTAT, the definition for LCT is an arbitrary definition. It is unknown what the maximum metabolic input would be for a given infant, but it is assumed that a metabolic rate double that of standard metabolic rate (SMR) would be possible and in the short term would not be life threatening (Bolton, *et al.*, 1996: 2234).

According to Bolton, *et al.* (1996) the individual components of heat loss and gain can be estimated by the use of a theoretical heat balance model. The model facilitates the matching of infant wrapping with their enviornment and can best be stated as quantitative descriptions of the components of a sleeping infant. Eleven segments of the infant's body are divided into two separate categories: in contact with the underbedding or not in

contact. The authors call these 'exposed and unexposed' parts. In the model, the relative 'exposed and unexposed' size is estimated for scalp, forehead, lower face and neck, trunk, upper arms, hands, forearms, pelvis, thighs, legs and feet, after which the recorded ambient temperature is factored in. Included in the 'balance equation' is the metabolic heat input, conductive and radiant heat loss or gain, heat loss by evaporation of water and the influence of ambient convection on conductive and evaporate loss (Bolton, *et al.*, 1996).

How can we tell if an infant is too warm? If we can measure sleeper and blanket density, a model exists which plots these variables (using infant weight and length) to determine body heat. The Bolton, *et al.* (1996) model on thermal balance in infants was used to measure hyperthermia. Bolton's spread sheet formulation (see Appendix D) was used to generate data based on infant birth to six month weight and length supplied by the Health Unit staff for two random, anonymous, representative infants. Since few infants were weighed and measured on a monthly basis, we asked the health unit staff to provide us with such data as met the criteria. Typical blankets and sleeping garments of reserve infants were measured for density. A digital calibrator was used by Dr. Burg of the Physics Department of the University of Calgary to take the measurments and those measurements were entered into the model by one of the authors, Dr. Bolton. Subsequently, the representative data was entered into the model spreadsheet to generate the results.

In certain conditions, maintaining the ability to dissipate heat from the head is important in the prevention of hyperthermia. Dramatic effects on heat loss are found when an infant's head is placed in a face-down position or is covered with bedding when placed to sleep in the prone position (Bolton, *et al.*, 1996). The authors concluded:

> Our calculations also clearly show the importance of sleep position in determining thermal balance in infants...and give support to the statement that if a baby is lying supine with the face clear of over-bedding, then the

> risk of hyperthermia is minimal however overwrapped the trunk may be (Bolton, Nelson, Taylor, Weatherall, 1996: 2241).

As Nelson (1989) notes in his discussion of hyperthermia and sudden death:

> [T]hermoregulatory controls aim to optimize the balance between heat production and heat loss. To maintain thermal balance, the body can increase or reduce both metabolic heat production and heat loss (Nelson, 1989).

The head/neck area and especially the face area are relatively important in the regulation of body temperature (Crawshaw, *et al.*, 1975), while the nasal mucosa and facial skin subserving selective brain cooling are the most effective heat dissipaters in the body (Caputa, 1980).

In this chapter, I use a vignette of an 87 year old women to describe traditional birthing and infant care practices. This is followed by the recollections of the remaining 18 senior women interviewed regarding the variables identified in the initial senior interview. Thereafter, I report the infant care practices of contemporary aged women and relevant factors associated with the infant. Data in both sections are compared and contrasted to establish similarities and differences within age categories and between them.

6.4 Traditional Infant Care As Told By Senior Aboriginal Women

6.4.1 Agatha's Story: Age 87 in 1995 (Winter). Agatha gave birth to sixteen children, all born in the "wilderness." Her complete and open discussion enabled me to construct questions and probes for the less verbal senior interviewees. Agatha's infants were all born alive and healthy and her births were assisted by local midwives. Two of her infants died before they were one year old from what Agatha described as "whooping cough".

6.4.2 Beliefs Attached To Pregnancy In this interview, two repetitive themes associated with behaviour during pregnancy emerged, each of which was deemed to affect the infant: one was related to what could be ingested during pregnancy and the other to how thoughts of pregnant women may affect their unborn infants, usually manifested in

physical deformities. For example, if a pregnant cow moose was killed, then a pregnant woman could not eat the calf. To eat the unborn calf could result in the woman's infant having "sloppy bones" and not walking "right". During pregnancy, other beliefs applied, such as, the dark skin of prairie chicken and the head of muskrat should not be consumed. Muskrat head was prohibited because "baby will bite you all the time". Agatha told a story about an "angry man ate a rabbit and his daughter was born that way. . .cleft pallet and lip". Other actions during pregnancy that were believed to affect the woman's unborn child consist of "not to stare or laugh" at anyone deformed because the unborn "will be deformed". A more general belief was "watch what you laugh at because it could influence baby".

6.4.3 Birthing Strategy. The birth itself traditionally took place at the parturient woman's residence. Her first four infants were born in what Agatha called a "teepee". A birthing stick was selected from the bush by the midwives. Each birth had its own separate "birthing stick". The stick was placed at an angle half-way up the side of the tent and the other end on the floor. A square shaped pillow filled with hay or dry leaves was placed toward the lower end of the birthing stick. During the hours of labour, she alternately sat on this pillow, then put her elbows over the birthing stick to kneel on the pillow during contractions.

The hay-filled pillow offered a place to kneel during labour and delivery, and an absorbent surface to catch the amniotic fluid, blood and placenta. If the placenta was slow in coming down, midwives traditionally followed the umbilical cord up into the vagina and used massage and slow pressure to assist the expulsion of the placenta. The birth process was generally attended by female family members, of which one might have some experience in assisting at childbirth, but who did not practice midwifery as her full-time occupation. At other times, a practicing midwife, who was not a family member, would be in attendance. Agatha's two sisters acted as midwives for all her deliveries.

"Native medicine" was administered in liquid form as a tea during labour, which was made from roots of a local bush, described as "black and large". The roots of a dark tree called "swamp" was boiled. The roots had to be boiled in the same direction as they grew in the ground to retain their medicinal effect. This preparation eased labour and was perceived to control bleeding. The midwife or family attendant would select the root from the nearby woods. The root mentioned may be the Black Cohosh (*Cimicifugal racemosa, L.*), common name "Squawroot". Black Cohosh can be found in upland woods. It is a perennial herb with a large knotty root. The roots contain a resin known as cimicifugin (macrotin), starch, gum, and tannic acid. According to Hutchens:

> The American Indian women knew of Black Cohosh for relieving pain during the menstrual period and used its properties extensively during childbirth (Hutchens, 1991:47).

After delivery, the infant was placed in a "swing" until the placenta was expelled. The placenta was wrapped in the "kneeling" pillow and this package was then wrapped around the birthing stick and carried by one of the birthing assistants into the bush to be "left in nature". Although there was no indication of danger or witchcraft associated with the birth discharge, the actual disposal process is given in vague terms.

Immediately after birth and expulsion of the placenta, women moved from the birth stick/kneeling position to a supine position on a thin mattress. Midwives or familial females sponged off the newborn and placed it near the mother's breast for the first nursing. It was also traditional to bind breasts to ensure an adequate supply of milk. Bindings to the hip area and breast were then secured by the midwives. The bindings consisted of two large squares of material folded horizontally to approximately ten to twelve inches in width and pulled tight across her midsection. Demonstrating for us, she placed the folded binder on her hip bones and cinched it tightly while wrapping it twice around her body. The binder was then tied or pinned on her left hip area. The bindings "help to make sure the stomach not flop out" by giving needed support to the weakened

muscles. Agatha stated that after giving birth her hips were tightly wrapped to help strengthen her back and stomach muscles. The binder served as a preventative of "falling stomach muscles" or big stomachs after birth.

The infant was sponged off after delivery and a thin piece of cord, (Agatha stated that it was close to "thread" in thickness) was tied around the infant's umbilical cord until it dried and fell off. Special leaves (called mushy leaves) were then placed on the "belly button" area to help it heal. If the navel appeared to "pop out", a binder was wrapped around the infant's stomach.

The first step in navel binding was to select a small circle of hard substance, either a hard tanned skin piece or in later years a piece of cardboard which was cut in the shape of a small circle, wrapped in soft clean material and placed over the navel area. This was held in place by a long folded piece of material wrapped several times around the entire middle stomach area and back of the infant. The "binder" was then tied at the side of the infant's body.

After the umbilical cord dried and fell off it was taken to the bush and a ritual/symbolic ceremony followed that would direct the baby's future. The cords of male infants were placed on moose tracks or an indentation in the ground left by a sleeping moose. This was done to ensure the male infant would be a good hunter. The cords of female infants were placed on "rotten Spruce tree" to ensure she would always find the necessary substance with which to smoke hides. Rotten Spruce wood was used exclusively to smoke hides for clothing and foot wear. The symbolic ritual of cord disposal was carried out by family members, either male or female.

6.4.4 Infant Care. Agatha swaddled her infants for approximately the first nine months. The swaddling system consisted of two thin sheets of material and a soft back pad. For swaddling, the infant's arms were placed straight down at the side of their torso. One arm was wrapped separately with the top soft cloth nearest the infant's body. The

opposite arm was then wrapped in the same layer of soft cloth and covered by the bottom layer of cloth. The legs were held straight down and separately wrapped with the top layer of cloth. The second layer of cloth was wrapped from left to right over the infant's body and tucked in under the right arm and leg. The right side of the bottom cloth was then pulled tightly across the right arm and leg and over the left wrapped arm and leg. This was then wrapped several times around the new born infant. Swaddling of babies represented a form of protection for infant's head/neck area and back support to prevent their heads "bobbing and flopping" and to "brace" their backs. To prevent what was called "head grows big", a head gear similar to a bonnet was used for the first three to four weeks.

6.4.5 Moss Bag ("Wasppison"). Her infants were swaddled and at night placed in a moss bag to sleep. A diapering system consisted of "muskeg", which grew wild and was picked in the Fall and stored in bags or hung to dry. In this area, there were two types or variations of "muskeg", a brown and red variety. Only the brown muskeg was used as a diaper for the infants. Agatha changed her infants about three times a day. During changing, the entire diapering muskeg was not removed and replaced. Only the wet or soiled area was replaced. Rashes on buttocks were rare. Her infants slept in a moss bag at night until about their second birthday.

6.4.6 Breastfeeding. Breasts were tightly wrapped to assist in flow of milk after the birth. All Agatha's infants were breastfed and she continued to breastfeed until the infant's second birthday. If no new infant was born she would nurse the infant a further ten or twelve months. Thereby, some infants were nursed three years.

6.4.7 Sleeping Position and Location. At night, Agatha's infants slept on her bed with the infant's head on her arm at the site of her elbow. The infant slept on its back. If the infant became restless during the night, she shifted the infant's position from supine to sleeping on its right or left side.

During the daytime, the infant slept in a "swing". This consisted of a large cord hooked or tied to the walls or sides of the tent. The cord was strung twice across the area providing two sides of a swing. In the lowest point between the two extensions, a regular blanket was looped over the cords with the ends of a blanket placed in the middle of the swing. Two pieces of wood (usually from the wood pile for fuel or heating or cooking) were then forced between the ends of the blanket on the cords to ensure an adequate opening for the infant's body and to prevent the blanket collapsing over the enclosed infant. Into this "swing", the swaddled infant was placed in a supine position and swung until asleep. Crying infants were seldom carried, they were placed in the swing and sung to by the mother.

At night, the swaddled infant was covered with one blanket while sleeping with its mother. Male partners sometimes shared the bed with mother and infant, but this was not the norm. Agatha's infants were put "down" in swings for naps in the day until their first birthday. When they approached their second birthday, their schedule included sleeping through the entire night. Agatha remarked that "all the babies were the same". In other words, the nocturnal sleeping pattern was consistent for all her infants.

6.4.8 Teething. Although nothing was specifically recommended to assist or calm infants during teething, Agatha stated that if the infant was experiencing a high degree of discomfort, she would let the infant "chew on charcoal". Teething was not generally a problem, however, if difficulty did arise, according to Agatha, the infant was given a piece of fat to chew on cut from the hindquarter of a moose. This fat is supple, but also hard enough to maintain its structure during prolonged periods of "gumming".

6.4.9 Post Natal Care. One of the female relatives would act as a support for the mother in teaching breastfeeding techniques, navel binding and general infant care, including swaddling and the use of a swing for "irritable periods" of the infant's day. Moss bag and muskeg were standard infant equipment. Infants slept with mother in a supine or

side position (for convenience in breastfeeding) and/or in swings. Two female relatives of the "birth team" would depart leaving the third assistant as solo helper to care for mother and infant during a short bed confinement time, and the following time of light activities by the new mother.

6.4.10 Infant Care Practices of Other Senior Women. Appendix F provides information by case number from the senior women interviewed. Question marks are used when the senior informant did not mention the variable, or could not recall the details. Mother's age at first and last birth were calculated from the current age or what would be the age of the first-born child whether living or dead. Senior women provided examples of a moss bag infant wrapping (see Plate 1, Appendix H) and a traditional swing (see Plate 2)

The nineteen senior women interviewed are divided into four age groups: eighty to eighty-nine, seventy to seventy-nine; sixty to sixty-nine and fifty to fifty-nine years of age. Four of the interviewees were in their eighties (cases 1, 2, 3 and 18). Agatha's case presents many of the variables associated with this age group. I present anonymous names, plus case numbers, for the senior interviewees.

Some senior interviewees were in wheelchairs, some were bed-ridden and others suffered various degrees of lack of mobility. In all cases, I went to where the senior was located, whether in small bedrooms in the homes of extended families or living rooms in an effort to cause as little disruption as possible. Several women suffered few disabilities and often were the caregiver of one or more grandchildren. Often I sat on a chair squeezed into a tiny bedroom, or if there was even less room, on the bed. If the senior was up for the day, but isolated to a living room chair to gain access to the television, I would sit across from her with my note pad on my lap.

Laughter and joy filled the rooms as grandmothers and great-grandmothers recalled times past and the birth and early days of the infants. All agreed to having photographs taken, but would pose with all the seriousness and dignity of old age. The wheelchair-bound lady asked me to move her to a living room chair for the photography and was concerned lest the empty wheelchair be captured by my camera lens.

Some seniors lived alone in a house or trailer, while others were an integral part of an extended family. Chronic coughing was evident in a number of cases, with a tell-tale spitting cup and roll of toilet paper for wiping the mouth kept close beside the senior. My translator would greet these seniors with a show of respect uttering "tunsi, grandmother" (hello grandmother, how are you?).

"Adele" (case #1): This second eighty-seven year old interviewee differs from Agatha in the birthplace of her babies. She had her first of thirteen infants delivered at home, assisted by her mother-in-law and paternal grandmother. Her twelve other deliveries were at a small nun's hospital located in the area. Her mother was not present at the first birth, but arrived after the birth to assist the mother and the new infant. She used the moss bag (Plate 1) which, according to her, kept her infants "so clean and looked clean too."

"Eleanor" (case #2): Although only one year younger than Agatha, Eleanor did not use the birthing stick for her ten home deliveries, but did use navel and hip binding, as did all the senior women. All four women in their eighties used moss bags, two lined the bags with muskeg, while the other two used cloth diapers. Case #2 stated that male infants were not circumcised.

"Melanie" (case #3): Although five years younger than Agatha, Melanie had ten home deliveries. Her mother assisted at the births. She did not know why the birthing stick and after-birth waste were disposed of in the bush. While she used the moss bag, cloth diapers were used instead of muskeg. The informant said that the babies were

wrapped because "they sleep well and longer like that." She gives traditional child care advice to her daughters, but believes that today's women would be "scared to give birth at home."

For this subset of the senior women, the intervention of biomedicine into traditional birthing practices did not alter breastfeeding, co-sleeping, use of the moss bag or sleeping swing. However, inconsistensies are also found. Age at first birth ranged from 15 years to 23 years of age. The sizes of their families ranged from sixteen to nine children. The end of their reproductive phase, indicated by age at last birth, ranged from forty-one years of age to fifty. Midwives and mothers-in-law were the preferred attendants for home births. When no other option was available, the women's own mother would deliver the child. However, when a midwife and/or mother-in-law was available, the mother would not assist until after the delivery.

Maternal and/or paternal grandmothers disposed of the after-birth materials by making an offering "to nature". Grandmothers also ensured a "safe first year" for their grandchild by puncturing the sole of the infant's first moccasins. This practice was to ensure that the shoes wore out before the infant outgrew them, or, put another way, that the infant would live long enough to wear out the soles of the moccasins.

Six of the senior women interviewed were in their seventies, ranging from seventy-one to seventy-nine years of age. "Margaret", the oldest of this group, was eighteen years of age at her first birth and forty at the birth of her ninth infant. The first birth was born at home, kneeling on a pad (in which the birth wastage was wrapped for disposal) and using a birthing stick. The other births took place in nearby hospitals. She used the traditional moss bag in conjunction with cloth diapers and the swing for day-sleeping. While the use of navel bindings continued, they were used to ensure a "small, flat navel." Margaret continues to tell her female relatives about infant care, especially the importance of breastfeeding.

While two years younger than "Margaret", "Flora" had the first of her fourteen children at twenty years of age. All births took place in her one-room house. Flora advocated cutting back on salt intake during pregnancy and avoiding drinking too much cold water after birth which "would cause her to have less milk and (therefore) less nourishment" for the infant. As long as there was "a flow of blood from the birthing, cold water should be avoided". Root tea was administered if contractions were late in starting to hasten labour. Flora's experience followed Agatha's practice of using the birthing stick and disposing of it and the after-birth waste. She was the only woman to say that the birthing stick was to be stuck in a bush and not buried. She used the moss bag and muskeg for diapering. Flora suggested that solid foods for the infant should begin with rabbit or moose soup, followed later by moose stew.

"Elizabeth," aged seventy-one, had only the first of her eleven children born at home. The birthing stick was not used. Instead, she held onto the top of the bed, with the bedding mattress under her knees. While breast binding was not used, navel binding was. Both the moss bag and muskeg were used for the one infant born at home. Later infants were wrapped in thin blankets secured by pins and cloth diapers replaced the muskeg. She was the first to mention that the "flow after birth was caught by cloth pads." Teething problems for Elizabeth's children were treated with medication dispensed from the hospital.

"Caroline" was the youngest of this second age group at seventy years of age. Three of her five children were born at home, using the birthing stick. She was unaware of what happened to the afterbirth and was vague about cord disposal, suggesting that relatives had done "something in the bush." While beliefs about pregnancy were considered by her to be "old style," she did suggest that if "something or someone annoys you during pregnancy, you should not get mad." Caroline breastfed, used a navel binding and swaddled all of her infants. She also wore a "girdle" for her abdominal muscles and

had her breasts bound. Women aged seventy to seventy-nine represent a transition from all births taking place at home to only the first child being born at home.

"Margaret" was the eldest of the third senior age group, at sixty-eight. Her nine births took place in three different hospitals. Margaret was twenty for her first birth and thirty-nine at her last. She did not use the traditional moss bag, but did "bundle" her infants. She felt that bundling or swaddling her infants was good because it acted as a "brace for the baby's back." The padding placed under the infant was "thick and stiff to protect the infant's neck." The cord was "thrown away." Navel binding was used to prevent a "popped-out" appearance. She breastfed each infant for nine to ten months. Teething powders prescribed by physicians were used when the infants became irritable during teething. The swing was used for day sleeping, while co-sleeping was practiced at night. Cloth diapers were purchased or made.

"Ann", aged sixty-four had twelve births, all hospital deliveries. The after birth and cord "were taken care of at the hospital" or "whatever they do with it." The moss bag was replaced by swaddling with pins and cloth diapers. Navel binding was used for one month. Ann also used breast binding and breastfed for a shorter period of time than the other senior women because she "had less milk." After her return home from the hospital, she was assisted by her two sisters-in-law. She recalled that during pregnancy, her mother had warned her "not to eat baby calf", because her baby would be wobbly.

"Christine" was sixty years old at the time I interviewed her. Her eleven infants were all born in the same hospital. She breastfed her first two infants and bottle fed the other nine during infancy. Her husband helped by boiling water and cleaning bottles. The traditional swing was used for day sleeping and all of her infants were swaddled with pins. Her mother looked after the "cord." In this case, all of the cords were placed in a sewing box. Christine was told by her mother that if the cord "was not put in a proper place, they (the babies) will dig around." Her mother also warned against eating prairie chicken with

dark meat and muskrat heads during pregancy. Christine slept her babies in a small crib located next to her bed. Cloth diapers and a little bath tub were used to keep the infants clean. Teething powder was provided by the nurses. Christine reported smoking cigarettes during all of her pregnancies.

Mrs. "B", the oldest of the fifty year olds was fifty-nine and had delivered seven infants in three different hospitals. The after birth was handled by the hospitals, who did "what hospitals do with it." Cords were disposed of in the bush, with male infant cords being placed on moose tracks and female infant cords were placed where they could "make moose hides." Her infants were breastfed for eighteen months and were swaddled. Day sleeping was in swings, while she co-slept with the infants until they were six to eight months old. Cotton diapers were used. Mrs. B mentioned that English was spoken in the hospitals, but she only spoke Cree. No interpreters were available to help with translation.

Fifty-six year old "Ann" was the youngest of the senior group interviewed. She had eight children, with only the first two born in bed at home assisted by two strangers who acted as midwives. The placenta was taken to the bush and "hung in the wilderness." Cord disposal was on moose tracks for male infants and near a rotten Spruce tree or in a sewing box for females. A swing was hung over her bed for both day and night sleeping for the infants. She breastfed all of her children for approximately twenty-four months. The local medical health nurse provided medication for teething. Ann mentioned that she was frightened when she went to the hospital for deliveries. She still had in her possession the moss bag used for the last three infants.

In summary, women who delivered infants at home were assisted at birth by familial female members. Sometimes males helped, but overall two or three female relatives assisted. One midwife cared for the new mother by applying breast and hip bindings and encouraging intake of tea or light soup. Another member of the "delivery team" (frequently the new born infant's paternal grandmother) would clean up after the

birth. This ritual included the wrapping of birth-waste (blood, placenta, urine, mucus) into the "kneeling pad", securing the "pad" around the "birthing stick", carrying the remnants of the birth into the woods or bush. Once away from the birth site, stick and bundle were "offered up", by placing in a tree above ground level. In areas where this was not feasible, stick and bundle were buried. In either case, the "stick" assisting in the birth and the "bundle", consisting of items which protected the infant, were returned to nature. Birthing was an occasion for female family members to assist at birth or to help the mother during the confinement. The women did not discuss hospital births, nor did they compare or contrast the experiences. Biomedical intervention in the form of hospital birthing did not thwart the strong influence of traditional cultural infant care. With the exception of two of Agatha's infants who died in infancy, all of the other senior women's infants survived infancy.

Women in their sixties mirror a change from home to exclusively hospital deliveries where the "familial birthing team" was excluded. In the transition from home births to hospital, the first hospital births were in religious hospitals on the reserve. Then a policy was adopted whereby pregnant women in the final weeks of their pregnancy were transported to a major cosmopolitan hospital for delivery. Trained nurses delivered their infants. The birthing stick and kneeling bundle were no longer part of birthing rituals. Cloth diapers became the fashion as did shorter duration of breastfeeding. Among the senior women in the research community, infants were born at home and/or in hospital. This diversity of experience and medical intervention may elicit differing, although related, approaches to infant care practices.

What did remain constant was the persistence of traditional infant care in the home which was transmitted through senior familial females. Infants continued to be swaddled, were breastfed, slept with mothers and the swing remained an essential item in infant care. Navel binding also continued, in conjunction with the use of navel pads, until the time the

navel was healed. I accepted this description of traditional infant care practices as the norm for my research site.

The relationships between family females on the reserve site is still evident. Although none of the nineteen senior women interviewed were related to one another, seven had daughters in the nearby areas, two had granddaughters, while two had aunt/niece relationships. Secure in their knowledge about infants as a result of their own experiences, senior women continue to share their cultural practices with younger women.

As seen in Appendix F, a pattern emerges regarding certain issues of infant care such as disposal of the infant's naval cord, breastfeeding, moss bag, position of infant while sleeping, individuals sleeping with infant, use of a swing, wrapping and under pad used during sleeping hours amongst the senior women's descriptions.

6.4.11 Analysis of Rituals Surrounding Traditional Birthing and Infant Care. Among senior women at the research site, certain beliefs and rituals were associated with the birthing process. Some of the beliefs bear a striking resemblance to contagious magic, which holds that "like produces like" and that "an effect resembles its cause" (Frazer, 1979). For example, the swing which receives the infant soon after birth should not be constructed until the birth is about to take place. While waiting for the expulsion of the placenta, which represents the prior resting place of the infant, the swing becomes the external placenta. This lack of preparation before the event is considered a positive method to ensure the safe arrival of the new infant. It could also explain why Aboriginal women do not respond favourably to advice to seek prenatal care. Throughout a person's life, the movement from life to death is "punctuated by a number of critical moments" which all societies ritualize (Turner, 1979). The ritual usage of the birthing stick for home births represents an "outward and visible form of an inward and conceptual process" (Turner, 1979). The medicine wheel illustrates through a continuous circle the interconnectedness of all aspects of life. Through the central creation, Mother Earth

provides all necessities for humans. This concept is visualized by the employment of the birthing stick during the time prior to birth. A tree and its branches are green in color, which is representative of the color appropriated to the creator in the medicine wheel. Tree buds sprout and bring forward new life which evolves into fruit and food through leaves and flowers. Selection of a piece of the tree to assist in the process of new life emphasize the incorporation of the circle into everyday life events such as birthing. The act of leaning on the stick during the pain of labour illuminates the burden of responsibility accepted by nature in assisting both the woman and the creator. As the branch buds forth with new life, the birthing stick metaphorically brings forth the new human life. The energy of the tree sap sustains the woman as she holds the living branch during the birthing process.

After completion of the birthing process, the bodily fluids are absorbed in the kneeling pad which is then wrapped around the birthing stick and subsequently returned to nature. In winter, the pad-wrapped stick is placed in a tree or bush, while in summer they are buried. The return of the birthing stick to nature symbolizes the completion of the circle, which, being an ongoing process, has no beginning and no end. The birthing stick represents a symbolic umbilical cord between the mother and Mother Earth, just as the umbilical cord itself is the connection between the mother and her infant. As the tree nurtures its branches, the mother nurtures the fetus through the umblical cord. The rituals associated with the return to nature of the afterbirth and the birthing stick represent human gratitude directed to Mother Earth. Continuity of rituals during the crisis of birth maintains the network of social relations binding individuals together in an ordered life. The birthing stick and cord placement (dispersal) assist in both the privilege and duty to maintain the order of the universe of which humans and nature are interdependent parts (Radcliffe-Brown and Forde, 1958).

These rituals confirm the embeddedness of the medicine wheel in the creation of life. As a cultural model which forms experience, giving life is equated by women as a natural process which highlights the strength and power of females within the construct of nature. The vulnerability of parts of the body associated with birthing (e.g. afterbirth, blood, mucous) in critical stages of the process (e.g. in utero and at birth) is demonstrated by the need for such parts to be returned to the protection of nature. This connection is reaffirmed by the participation in the process of other concerned females (Schwarz, 1997).

The involvement of grandparents in the disposal of the cord has a profound significance on the child's future. As the physical source of the mother's nutritional attachment to the child is withdrawn (through the natural process of drying and falling off), the grandparents reaffirm the force of nature in the child's future by returning the cord to nature, binding the child to the creator just as it was bound to the mother. As depicted in the medicine wheel, the creatures of nature, such as the buffalo, moose and bear, will provide food, skins for clothing and shelter and bones for tools to the child. The eagle represents a spiritual bridge between earth and the creator carrying emotional requests to the creator. All of these beliefs are represented in the placement of the cord back into nature by the grandparents. A male child's cord is placed on the tracks of a moose or in the grass flattened by a sleeping moose to guarantee that he will be a good hunter. A female child's cord is placed near a rotten Spruce stump to ensure she will have the ingredients to smoke hides for the family. All infant cords are returned to nature to emphasize the connection between humans and nature. The participation of the grandparents in this ritual acknowledges the dependence of humans on Mother Earth by three generations of the family.

Breastfeeding was accepted by senior women as part of the mothering process, having biological and health advantages for both infants and mothers. Women are more likely to continue to breastfeed after six weeks and to breastfeed exclusively if they are in

support groups, underlining the importance of cultural sharing and exchanges of information on health, food, infant care, as well as breastfeeding (Draper, 1996).

Having identified what is traditional infant care, we have established a benchmark to which we can compare contemporary infant care practices. Therefore, my original questionnaire for contemporary mothers was extended to include questions on the use of the swing, cord disposal and navel binding.

6.5 Contemporary Cree Infant Care

A questionnaire was administered to seventy mothers up to thirty-six years of age. Three previously unknown aspects of infant care were investigated and recorded: first, to collect grounded data to determine the current reality of Cree infant care; second, to determine the relationship (if any) to the cultural model articulated by senior women; and third, to acknowledge any SIDS risk factors as illuminated in the literature review.

In contrast to the senior interviews, the contemporary women suggested that we sit at the kitchen table. This gave me a firm surface for the questionnaire and an occasion of fun for the small children in the home who climbed onto chairs, then onto the table to take part in the proceedings. Soon the children would request pencils or pens and paper so as to be able to mimic my actions. When spare paper was not available, my white tee shirt often served as the writing surface for the children. The smaller toddlers who could not scribble were content to sit on the questionnaires. The mothers watched my interaction with their children with great care. At no time was it suggested that the children should get off the table or that they should sit on chairs. Very young infants were breastfed during the interviews or were in the process of being wrapped, while the older children filled the air with the sounds of their enthusiastic play. Most contemporary interviews were conducted in such a setting with the television blaring in the background to add to the general din.

I offer one case to demonstrate the close interaction of the contemporary women. At one home with a new infant, I was introduced to the mother's sister, who had a three year old and an eight month old teething toddler, whom I will call "Ernie." Ernie was chomping on a plastic yellow teething ring, which was shaped like a pretzel. When he dropped it, he would scream and his mother would quickly wipe his runny nose and drooling mouth, then find the teething ring and put it back into his mouth. This happened a number of times over the late afternoon. As it grew darker, I decided to conclude the interview and return to my room for the night.

The next morning, as I searched my coat pockets for my car keys, I discovered Ernie's yellow teething ring. Since I had no idea where Ernie actually lived (his mother and he had simply been visiting my interviewee), I left the teething ring in my pocket and drove to my first interview of the day. At the third interview that day, three children were on the table mimicking my actions and a baby was crying behind a curtained area. I said to the mother "So, you have four children." "No," she said, "Just three. I'm babysitting a little boy while his mother runs errands in town." I looked behind the curtain and recognized the crying infant. It was Ernie. I took the plastic soothing ring out of my pocket, put it in his mouth and the crying stopped immediately.

Later that day, I travelled to the next town to pick up some items being shipped to me on the bus. As usual, the bus was delayed by bad weather. As I waited in the warmth of my car, I saw Ernie's mother exiting a nearby store. I tooted the horn and she came over to the car. I told her about encountering Ernie at the babysitter's house and returning his teething ring. She said he was very attached to the ring. Apparently one of the children had picked up the ring as the mother was leaving and put it in my coat pocket. When the loss of the teething ring had been discovered, she had returned to her sister's house to search for it , but in vain. The story of the lost and found yellow pretzel teething ring is now repeated with much laughter in parts of the reserve.

During my stay on the reserve, I had the opportunity to visit with hospital personnel and senior members of the band health unit. At these times, I mentioned my interest in swings, navel cord disposal and navel binding. I wanted to find out what they knew about these infant care practices. The head nurse at the hospital, an Aboriginal woman with an RN and BA from a large university in the south of the province, informed me that young mothers (under thirty-six years of age) did not employ any of these traditional practices. Two other senior nurses who were non-Aboriginal told me that in the year they had been at the hospital they had seen five swings in use, but knew nothing about cord disposal. However, the female in my host family was a nurse and the mother of three children. She breastfed all her infants, co-slept and had saved the navel cords. The cords of the females were placed behind the kitchen cupboards to ensure the infants would become good cooks when they grew up. While she did not use navel binding, she did adopt the swing for her third infant because of its calming affect. Her husband and a band elder constructed a swing and installed it over the marital bed. While some mothers used hooks to install the swing, this mother obtained two ten inch lengths of moose hide from a senior woman (in exchange for a homemade pie) from which to suspend the swing. She reported that the baby slept longer after being placed in the swing than before.

In order to maintain consistency, I report the contemporary infant care in a fashion similar to that employed to report on the interviews with senior women. Consequently, the interviewees will be grouped into three age categories: under twenty years of age, aged twenty to twenty-nine years of age and those thirty years of age and older. Since the majority of the contemporary interviewees were in the twenty to twenty-nine years of age category, it seemed advisable to break this group into two sub-groups to reflect the potential difference in life experience of those in the younger half of the age group to those in the older half. These categories apply to the age of the women at the time they were interviewed. I then discuss similarities of the reported infant care of these

age groups with the ascribed cultural model of traditional infant care as reported by the senior women. A complete list organized by case number, reporting age at interview, age at first birth and responses to variables associated with the cultural model is attached as Appendix G.

6.5.1 Maternal Age Groups: 30 to 36 Years of Age. All contemporary-aged women gave birth in hospitals located off the reserve. Three mothers were thirty-six years of age when I met them. All three saved the navel cord and put it in a special place (e.g. a sewing box, or the grandmother took the cord to the bush to place it on moose tracks.) All three also used swings for the infant's daytime sleeping. Two of the three were breastfeeding, co-sleeping, slept baby on its back, swaddled the infant (up to its neck) using blanket and pins, were young at first birth (18 and 19 years of age), used navel bindings and were taught about infant care by their mother or grandmother. The remaining thirty-six year old mother had her first infant at age seventeen, but was not taught infant care by a family female. She neither co-slept, nor breastfed, but did put the baby on its back to sleep and wrapped it. No thirty-five year old women were interviewed. One woman was thirty-four years of age and another was thirty-three. Neither of these two breastfed, but both slept their infants on their backs and swaddled them. Only the elder of the two employed co-sleeping and was taught infant care by her mother. However, both used swings, navel binding and disposed of the cords in traditional manner.

Three mothers were thirty-two years of age. All three were taught infant care by their mothers, co-slept (see Plate 3), used the back-sleeping position and swaddled (see Plates 4a, 4b and 4c) their infants. Two mothers used the rope type swing for day sleeping and were young at first birth. The mother who gave birth at twenty years of age was the only one of this sub-group to breastfeed. Two of the mothers saved the navel

cords (one was put in a guitar and the other was placed on moose tracks). No mother in this age group used navel binding.

All five of the thirty-one year old mothers back slept their infants, saved the navel cord for placement in a special place and were taught infant care by a familial female (mother or grandmother). Two used navel binding and two breastfed and co-slept, with one of these two using the rope swing. One other mother breastfed, but did not co-sleep and another co-slept but did not breastfeed. Three were young at first birth.

Four women were thirty years of age when interviewed. All four breastfed, swaddled their infants and used supine sleeping. Three co-slept and three used the rope swing. Three were young at first birth and two were taught infant care by their mother. One woman who didn't co-sleep, nor use a rope swing, was taught by her mother, while another not instructed by a familial female breastfed, co-slept, used the rope swing and put the infant to sleep on its back. Three saved navel cords for special placement and two used navel bindings.

6.5.2 Maternal Age Groups: 20 to 29 Years of Age Since there were forty-seven mothers in this age group, I divided this group into two sub-groups: One consisted of twenty-three mothers aged twenty to twenty-four years of age and the other group had twenty-four mothers aged twenty-five to twenty-nine years. A ten year span at this time of life may encompass so many changes in life experience and knowledge, it seemed advisable to focus separately on those less experienced, the younger group, and those more experienced. A twenty year old may approach infant care from a different perspective than a twenty-nine year old. Comparisons between the two subgroups are presented in Table 15.

6.5.3 Maternal Age Groups: 20 to 24 Years of Age Of this group of twenty-three, 54% co-slept, 58% breastfed, 96% swaddled their infants and 83% used the supine or back-sleeping position; 83% were young at first birth, while 92% were taught infant

care by their mothers. Eighty per cent of these mothers co-slept, used the traditional swing for day sleeping, employed traditional methods of cord disposal and used navel binding.

6.5.4 Maternal Age Groups: 25 to 29 Years of Age In the twenty-five to twenty-nine years of age category which included twenty-four mothers, the largest cluster was at twenty-six years of age. Supine sleeping and swaddled infants was reported for 100% of this group; 86% breastfed and 61% co-slept; 77% were under twenty years of age at first birth and 72% were instructed about infant care by their mother or grandmother; 85% used traditional swings and cord disposal, while only 22% used navel binding.

There is a considerable difference found between the 20 to 24 and 25 to 29 year old age groups in the use of navel binding. This may be due in part to the young group being released from hospital earlier than those in the older group who may have three or more children at home. Although the older women saved the navel cord, they did not appear to use navel binding for a slightly older infant.

Table 15
Comparison of 20-24 and 25-29 Age Groups

20-24 Years of Age (N=23)	Variable	25-29 Years of Age (N=24)
12 (52%)	Co-Sleep	15 (63%)
13 (57%)	Breastfeed	21 (88%)
22 (96%)	Swaddled	24 (100%)
19 (83%)	Back Sleep	24 (100%)
19 (83%)	Young First Birth	19 (79%)
21 (91%)	Taught by Familial	17 (71%)
18 (78%)	Rope Swing	21 (88%)
18 (78%)	Navel Binding	5 (22%)
18 (78%)	Navel Placement	21 (88%)

6.2.5 Maternal Age Group: 15 to 19 Years of Age. Six mothers were in this age group. Three were nineteen years of age, two were eighteen and one was seventeen years of age. All six breastfed, co-slept, put the infant in the supine position to sleep, were young at first birth and were taught by a familial female. Only the youngest did not use the swing. Navel binding was used by five mothers and the grandmothers saved the cords and disposed of them. This age group relies heavily on grandmothers for advice and day-to-day care of the infant.

6.6 Smoking

Nearly half of the mothers interviewed (32 out of 70) smoked cigarettes (45.6%), even though they are aware of the risks to themselves and their infants. When asked how many of the household residents (excluding the mother) smoke, twenty-nine percent reported one smoker in the household, while forty-two percent reported two smokers. Twenty-one percent smoked between fifteen and thirty cigarettes per day, with nine percent smoking five cigarettes and the remaining smokers reported less than five cigarettes per day. Forty-seven percent of the reported smokers went outside the house to smoke, with twenty-nine percent smoking cigarettes in the bathroom with the window opened. The remaining reported smokers consumed cigarettes away from the infant's room, but within the house. Thirteen women of the smokers co-slept and breastfed, while six women did not breastfeed but continued to co-sleep. Seven smoked and breastfed , but did not co-sleep. Six women smoked and co-slept, but did not breastfeed. Six others smoked and neither breastfed nor co-slept. Twenty women smoked and co-slept, highlighting two variables often suggested as placing the infant at high risk. Senior women who smoked (with one exception) stated they had started smoking years after they had raised their families. Table 16 gives the distribution of three variables: smoking, co-sleeping and breastfeeding.

Table 16

Smoking, Breastfeeding and/or Co-sleeping

	Smoke	Co-Sleep	Breastfeed
	13	13	13
	6	6	0
	7	0	7
	6	0	0
Total:	32	19	20

6.7 Analysis of Co-sleeping

Co-sleeping questions were answered "yes" or "no" by mothers. They defined their own interpretation as to whether the questions applied. It became clear that if a crib, in any state of repair existed in the residence, mothers would claim that the infant slept alone. When questioned about the number of hours an infant spent each night co-sleeping, a different scenario emerged. Most infants spent at least five hours co-sleeping each night even if a crib was present. It may be that the mothers' responses to such questions represent a concern about how such information may be used. Several women I interviewed became concerned that their answers would be reported to Social Welfare and that someone might threaten to take their baby away because local nurses check to determine that the infants are sleeping in cribs. Over recent decades, co-sleeping has been disapproved of by clinicians and associated agencies; even being denegrated as a dangerous practice (Scragg, *et al.*, 1995). Women may be giving lip service to the professional advice rather than reveal their actual practices.

McKenna has continuously argued that "bedsharing may offer infants an adaptive advantage and be protective against SIDS" (McKenna, Mosko and Richards, 1996). Two cultural groups who routinely bed share and have low SIDS incidence are Asian immigrants to Great Britain and infants of Mexican-born mothers (Grether, Mosko

and Richards, 1990). While bedsharing and SIDS are high among Aboriginals and Maoris, both of which are reported to be high incidence SIDS groups (Mitchell, 1993), McKenna argues that it is the variable of smoking in conjunction with bedsharing which is the negative factor, not bedsharing *per se*. Therefore, under these circumstances, bedsharing has been scrutinized in ways not previously anticipated (McKenna, *et al.*, 1996). In an examination of breastfeeding and bedsharing, the latter is defined as follows:

> Routine bedsharing (RB)....as bedsharing with the mother for at least four hours per night, five days per week (McKenna, *et al.*, 1996:103)

Solitary or solo sleeping, on the other hand, was defined as:

> RS (solitary sleeping)....as bedsharing no more than one night per week for any part of the night (McKenna, *et al.*, 1996:102)

What appears to take place in Aboriginal homes is that where a crib is available, the infant is put down to sleep solo until time for its first nocturnal feeding. By this time, the parents may be preparing to retire for the night and bring the baby into the parental bed to nurse and to sleep until morning. Alternately, if the infant fusses during the night, it may be placed in the swing to settle down.

There appears to be three sleeping arrangements for Aboriginal infants. The first consists of placing the swaddled infant in a crib (usually located in the same room as the parents' bed), later to be moved to bedshare with the parent(s) for the remainder of the night. In this arrangement, the infant continues to be swaddled. In the second arrangement, the swaddled infant is placed in the swing which is located directly above the parents' bed. This makes it easy for the parent to start the swing in motion without having to get out of bed. The infant is taken from the swing for nocturnal breastfeeding, sometimes remaining in the bed, at other times being placed back in the swing after breastfeeding. The third arrangement is to start the night in the parents' bed with pillows around the infant to avoid rolling off the bed. Later in the evening, the parent(s) join the

infant(s). If the baby fusses, it may be placed in a swing in another room. The mother tries to locate her bed so that the infant can sleep next to the wall. In some situations, the infant is in physical contact with the mother during the night. In other situations, there is physical contact for part of the night and/or only when the infant is brought into the bed for breastfeeding. When the infant sleeps and is nursed exclusively in the parental bed, the mothers think that since the infant can smell the breast milk at such close quarters, the infant will want to keep nursing. To avoid over-nursing, mothers get their partner to take the infant out of the bed and to the couch in the livingroom until the infant goes to sleep. When the male is holding the infant in this situation he puts the infant to sleep in the prone position over his shoulder.

Plate 3 illustrates bedsharing in a contemporary family, which, despite living in a three bedroom home with only two adults and two small children, continues to bedshare in the master bedroom. A new baby has been added to the family since the research was completed and now all three children share the parents' bed. Bedsharing among Aboriginal peoples on the research site is popular due, not to lack of space, but to a desire of both parents to be physically close to the infants, a view expressed by many of the respondents.

While bedsharing appears statistically marginal among mothers 20 to 29 years of age, the responses must be viewed as non-static since this function is in a constant state of transition. Initially, women have been instructed by nurses to sleep infants in a crib. However, I observed that when infants were nursed during an interview, mothers subsequently carried the sleeping infant to a double bed to put it to sleep even though a crib was in plain view. Nevertheless, I recorded a "crib sleeping" response in such instances if the mother so responded. The recorded response may be tainted by fear of retribution from Social Welfare and/or other authorities. My observation was that even school-aged children and toddlers, who had their own rooms and bed, would climb into

the parental double bed with the mother and youngest infant. In the common bedroom used by both adults and young children, the tension between traditional and contemporary practices is seen (see Plate 5) with old style swings frequently located next to modern cribs.

6.8 Familial Relationships

Direct familial relationships were tested to determine homogeneity of culture and infant case.

First, I identified female relatives among mothers (Table 17):

Table 17
Relationship of Female Kin Residing at Research Site*

Mother/daughter	7 diads = 14 women
Grandmother/granddaughter	2 diads = 4 women
Aunt/niece	2 diads = 4 women
Sisters	3 women
Sisters-in-law	4 diads = 8 women
Total:	33 women
Total number of kin relationships: 33 of 90 interviewed	

* of interviewed women only

After establishing female relationships, I matched the relationships and similarities to traditional infant care practices. The outcome indicates the influence of kinship on continuity and belief in traditional infant care practices. One third of the women interviewed had close female relatives living on the reserve. The homogeneity between these women was nearly 100% (Table 18).

Table 18
Association of Infant Care Strategies Found Among Related Females

Relationship	Matches out of Nine[1]
Mother/Daughter	9
Grandmother/Granddaughter	9
Aunt/niece	9
Sister	9
Sisters-in-law	8[2]

[1] Variables included breastfeeding, wrapping, co-sleeping, swing, back sleeping position of infant, taught by familial females regarding infant care practices, navel binding, saving cord and cord disposal
[2] did not use swing.

6.9 Summary of Contemporary Infant Care Practices

Women in the research site reside in the familial home during their first and second pregnancies. By the time of their third pregnancy, they will have set up their own home if they are in a stable relationship. If they are not in such a relationship, frequently the male in the residence is a brother or the husband of a co-resident sister. I recorded the mother's age at first birth to determine if the two births under the grandmother's influence had any lasting effect on later infant care. This may explain why the older interviewees in the twenty-five to twenty-nine year old group return to the ways of their mothers, except for navel binding. Fifty-eight mothers were aged fifteen to nineteen years of age at first birth. The youngest was fifteen and her infant care strategies three years later represented a close fit with the cultural model discussed by the senior women. She did not breastfeed due to educational commitments, but intends to breastfeed future infants. Seven women were sixteen years of age at first birth. Five of these women swaddled and breastfed, while six were taught infant care by their mothers. Six employed the traditional rope swing and adopted the supine sleeping postion. Thirteen women were seventeen years of age at first birth, while eighteen were eighteen years of age and nineteen were nineteen

years of age. All appear to adhere to the infant care practices relayed to them by the senior women by word of mouth and by example.

Young mothers who were daughters of born-again Christian mothers felt that they could not turn to their mothers for advice on traditional infant care practices because the converted mothers perceived traditional care practices to be based on superstitions. The contemporary mothers, therefore, relied on their grandmothers for such advice. In these cases, the grandmother decided on the site for navel cord placement and taught navel binding technique.

Supine sleeping, swaddling, co-sleeping, use of swings and navel binding are not strategies taught by clinicians nor by nurses. The consistently high utilization of these practices confirms a strong familial influence on contemporary Cree infant care practices and suggest that the traditional cultural model remains largely intact among this population.

There is a strong influence of traditional infant care on contemporary women. Five women had 100% agreement with senior women's traditional care practices. There was also intra homogeneity found in the age group "young at first birth". The highest degree of agreement in following traditional infant care is found in "wrapping" (see plates 4a and 4b) which illustrate using one to three pins to secure blanket around infant), "supine sleeping position"(see plate 4a) and being taught about infant care from a familial female. The pin securing the blanket is visible in plate 4c. The traditional swing and navel cord saving has survived modernity.

In the last section of the questionnaire, when asked what they have changed or would change about infant care strategies, women who were under age twenty at their first birth were unanimous in stating "change by breastfeeding now that I know it is better for the infant's health". However, those mothers who co-slept with first and second infant were "trying" to get third or fourth infant to sleep in a crib or cot even though they missed

having the young infant within body contact. Mothers who co-slept did so because they "wanted to check on the breathing of their infant" or felt that the crib or cot caused sudden infant death syndrome and by using co-sleeping the infant would not "catch SIDS".

While the Medical Services Branch of Health Canada produces a SIDS pamphlet designed to be easily understood by Aboriginal women, I found no evidence of the pamphlet anywhere on the reserve, including the reserve Health Unit. It would appear that most knowledge of SIDS came from the infrequent mentions of the syndrome on television, and in magazines and newspapers. I have no firm evidence of how much is known about the syndrome by Aboriginal mothers.

6.10 Analysis of Rituals Surrounding Birthing and Infant Care

Contemporary-aged women nearing the completion of term are flown out of the community to one of three distant hospitals. From that point, they pass from one domain to the other, from the traditional to the modern. The co-ordinated, institutionalized ritual of birth, as articulated by Jordan (1993) and Davis-Floyd (1992), begins for these now transplanted reserve women, who are subjected to a battery of interventions based on their particular category of birth risk. They are mostly deemed to be high risk based on a lack of prenatal care. As noted earlier, birthing is considered by Aboriginal peoples as a natural process which prescribes that one not prepare ahead of time for the birth of an infant. Whereas taboos may be considered a form of preparation, these particular traditions position Aboriginal women in opposition to the norms of biomedicine. The adherence to the traditional Aboriginal model of pregnancy and birth must be addressed in real life terms, not as a cultural model which "may be depicted as neat and orderly, which life characteristically is not because life overflows, messes up things and strains a person's comprehension and powers of endurance" (Wikan, 1990). Females face choices from or shortly after conception. One of the choices traditionally not considered is termination of the pregnancy except by spontaneous abortions. Mothers with reproductive-aged

daughters, while not encouraging sexual activity, do not view a daugther's pregnancy with shame. The biological father, frequently young, is encouraged to move into the young woman's parental home and to maintain a pseudo-husband role. However, in the realm of birthing, mothers do not appear to have made a choice. Cultural birthing norms are dismissed as irrelevant in the face of institutionalized practices.

In my fieldwork, positioning women with respect to age, marital status and life experience predicted diversification of infant care practices. I offer examples in age categories and from specific cases. By and large, most of the teenagers who became pregnant are in school or, if they have left school, are seeking employment. They are financially and emotionally dependant upon their natal group. If they visit physicians at all it is usually around the sixth month of gestation or sometimes only a few weeks prior to the estimated date of delivery. It is important to point out that in the community this late consultation is not deemed to be neglectful on the part of the pregnant woman. Physicians, on the other hand, tend to designate this practice as high risk.

After the birth, the young woman or couple re-establish their family back into the maternal residence. Grandmothers take over virtually all responsibility for infant care, except breastfeeding, even co-sleeping with the infant. When the navel cord detaches, grandmothers advise on the practice of saving the cord and locating it in a special place to influence the infant's future occupation. Women who experience extended hospital stays go so far as to request nursery staff to retain their infant's cord until they leave the hospital. At this juncture, the contemporary-aged mothers bridge the traditional and modern by what site is selected for cord placement. Contemporary women tend to place the cord in kitchen cupboards, sewing kits, cook books, guitars, hockey skates and other sites, indicating a culture adapting to transition. In a few cases, the grandparents determine the disposal and use traditional sites, such as moose tracks or rotten Spruce stumps. This raises the question of whether contemporary women are abandoning

tradition or are they ritualizing tradition in "their lived world". Few young women are gaining experiences as tanners of animal hides, but they do exist in kitchens with microwave ovens, electric stoves and gas furnaces. Cord placement could be an elegant form of continuity coupled with modern transition. It is both relevant and somewhat surprising that this practice has survived and exists today despite changes in form.

If a young woman does not have a permanent partner, she frequently will not breastfeed the first two of her infants. Grandmothers, in these cases, become the sole care provider for the infant, with the young women virtually serving an apprenticeship in infant care. Mothers aged twenty years of age and over do not generally relinquish care to the maternal grandmother, but they do rely solely on the senior women's advice. This reliance stems from recognition of the life experience that the senior woman has accumulated. In the twenty to twenty-nine years of age category, women frequently have experienced significant life changes. First, they may have returned to school to upgrade their education, they may have obtained employment and/or they may have relocated to their home reservation. On their own, sometimes for the first time, contemporary mothers with new infants revert to traditional infant care practices. By the time they have reached their thirties, contemporary women tend to be completely entrenched in traditional infant care. Of course, it can be argued that they do not all use all of the nine infant care strategies articulated by the seniors. However, Hobart (1985) has noted that "culture is not a text, nor a set of rules, nor even a discussion. Culture is complex and cannot be captured in any single metaphor." It is not a convincing argument to suggest that because a contemporary woman has abandoned the use of a swing or some other practice, despite adhering to the rest of the practices, that she therefore has abandoned the culture. I would argue rather that contemporary mothers are conforming to traditional practices despite the intervention of hospital deliveries. A specific case illustrates my point.

"Dorothy" is a Registered Nurse with a university degree. According to community norms, her first birth was late at twenty-eight years of age. She had more than the normal community number of prenatal visits and had natural childbirth in the hospital, where the husband cut the umbilical cord. The infant's care followed the instructions she had learned in her nursing training, except that she did co-sleep. The child was not wrapped, nor placed in a swing, nor was a navel binder used. Her grandmother expressed her desire to place the cord on moose tracks, however, the mother placed it in a medical book hoping to influence the boy towards medicine. The mother worked during and after the pregnancy. Two years later, a second pregnancy was completed with only two prenatal visits. The mother decided to stay home with both children, where she breastfed the second child for eighteen months and co-slept with her two children. For the third pregnancy, no prenatal visits took place and the mother opted for home birth with the assistance of a midwife. Since this type of delivery was not covered by medical insurance, the mother had to pay for the delivery. The third infant was breastfed, co-slept, wrapped, and placed in a swing for day sleeping. The mother, who does not have close contact with her own mother, asked a young woman who had learned infant care from her grandmother to teach her how to do traditional wrapping. With the exception of using a modern diapering system, mother and infant reflect community traditions of infant care.

While this case could simply exemplify tradition revisited, it represents the tenacity of traditional beliefs. Not surprising, the two year old infant girl now uses towels to wrap her doll in the traditional way and attempts to breastfeed the doll. Thus, traditional infant care, partly lost in a few cases for a short time, comes full circle to dominate once more in this community.

6.11 Infant Temperatures

In the north, where babies are swaddled, what factors prompt mothers to turn up the thermostat? Thirty-five percent of contemporary mothers interviewed told me that they turned up the thermostat when they felt cold. Thirty-three percent stated they would feel the infant's face and its hands, if they were unwrapped, and then increase the room temperature if the infant's skin felt cold. Twenty percent would increase the heat when the trailer or home floor felt cold. Twelve percent reacted to the infant shivering or its skin turning "motley colored", which they felt meant the infant was cold. Conversely, they felt the infant was too warm when their cheeks were flushed or they started to sweat in the head area. Rather than turn down the thermostat, mothers changed the infant's clothing to something lighter in weight and substituted a thinner wrapping blanket. They also stated that infants cry more when they are too warm. Most swaddled infants were dressed in plastic diapers and underwear shirts under their wrapping blanket. Although, the wrapping blanket is thin, it is usually double-wrapped around the infant.

Where I ran into difficulty in questions regarding infant body temperature was when I asked "How do you know the temperature is just right for your infant?" This question was met with shrugs or laughter. In other words, mothers could determine if the infant was too warm or too cold, but could not measure "just right" temperature. This question was eliminated after ten futile attempts to elicit an answer.

In the research project on Aboriginal infant care, fifteen cases had both awake and sleeping temperatures recorded. In thirteen cases the sleeping temperature was higher than the awake temperature. In one case the temperature was identical for sleeping and awake, while the second case of non sleep raised temperature showed a decline from the awake temperature. All infants were "wrapped" in rooms which had temperature recordings from 20 to 28.2 C. Normally, infant temperatures drop during sleeping hours. My data include thirteen cases with elevated temperatures during sleep (Appendix E).

The higher interior temperatures and swaddling may result in elevated sleeping temperatures. However, in case #8, the house is cooler than the others and the swaddled infant does not have an elevated body temperature. In case #4, another cooler home, the swaddled infant has a lower sleeping than awake body temperature. While it is premature to draw conclusions from these data, it could be suggested that residential heating influences body temperatures. The uncovered head may assist infants to avoid over-heating. This subject calls for more thorough research. Figure 14 illustrates infant awake/sleeping temperatures and the house temperature. The ages of infants with double temperature recordings ranged from one to five months.

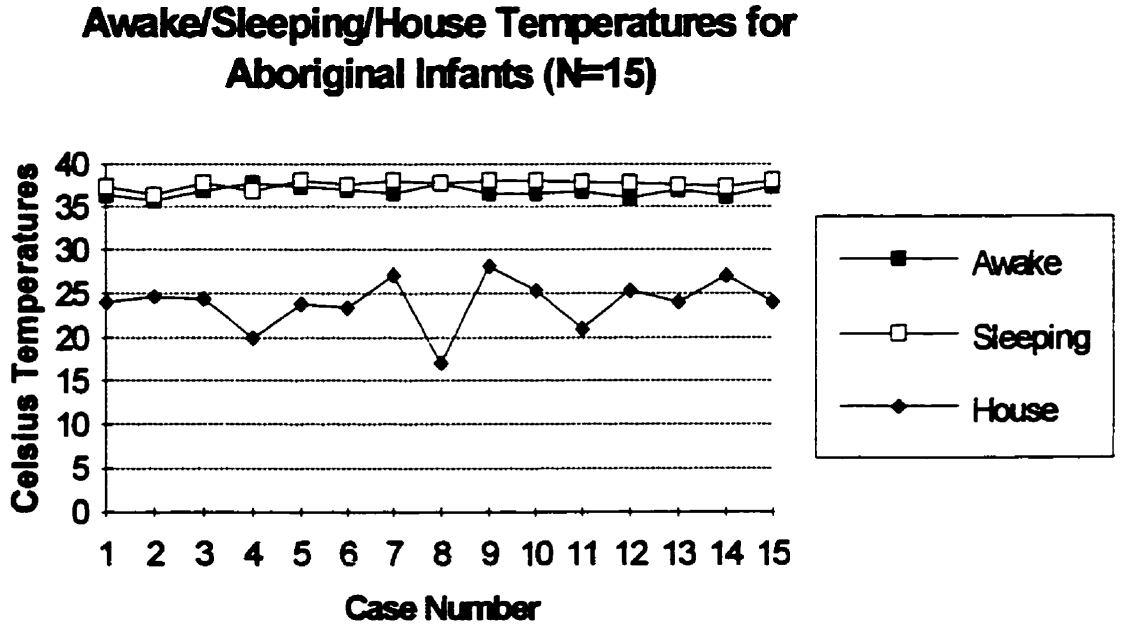
Another relevant aspect of the temperature environment is how and with what material infants are wrapped. A typical sleeper and blanket combination, randomly selected on the reserve, were measured at the University of Calgary to facilitate usage of the Bolton model described in Chapter IV. The weights of two Aboriginal infants (one male and one female) from birth to six months of age were obtained from the research site's Health Unit. The nurse attempted to select two cases from infants on the reserve who had attended the clinic for six regular infant check-ups in the first six months and were part of my research project. Since regular check-up visits are not deemed a health requirement by the research site mothers, she could only select a male who had four visits and a female with three visits. The male was 3.36 kg at birth and was 48 cm long. At one month old, he was 3.68 kg and 54.2 cm; at two months 6.15 kg and 59.8 cm; at four months 8.90 kg and 62.5 cm and at six months 9.8 kg and 69 cm. The female was 2.92 kg at birth and 52 cm long; at one month 3.2 kg and 52.2 cm; at 3months 5.25 kg and 55.5 cm and at 6 months 7.4 kg and 64.5 cm. Sleeper and blanket measurements were entered into the thermal balance spread sheet and the following data were generated (Bolton, 1996, personal communication).

Table 19
Calibration of Baby Articles; Sleeper and Blanket for Aboriginal Infants*

	compressed	not compressed
Sleepers (feet covered)	.05 inchesor 2.6 mm.	0.1 inchesor 5.2 mm.
Blanket(thin)head not covered	0.02 inchesor 0.5 mm.	

*Measured with a Mituloyo Digital Calibrator, Model CD-8"P, Code 500-352

Figure 9:



Note: Celsius temperature may be converted to Farenheit by multiplying the Celsius temperature by 1.8 and adding 32 to the result.

While Figures 10 and 11 show actual infant weights and lengths, the HTAT, LCT and LTAT are theoretical; they do indicate the variance found in thermal balance within the first months of an infant's life and may have value as a model to discuss infant body heat. To avoid having to refer back to Chapter IV for definitions and explanations of this terminology, Bolton's (1996) definitions for these three categories follow: HTAT (highest tolerable ambient temperature) is the highest ambient temperature at which the infant can avoid a progressive rise in body temperature. An infant would be sweating heavily at this

temperature. This is a higher temperature than the Bligh and Johnson (1973) 'upper critical temperature,' which includes actual sweating. The LCT (lower critical temperature) is the lowest ambient temperature at which the standard metabolic rate is sufficient to maintain body temperature. While the LTAT (lowest tolerable ambient temperature) is the ambient temperature that will require a doubling of metabolic rate to maintain body temperature (Bolton, *et al.*, 1996). Metabolic rate has been estimated as being directly related to body weight. However, the authors note that unlike the HTAT, the definition for LCT is an arbitrary definition. It is unknown what the maximum metabolic input would be for a given infant, but it is assumed that a metabolic rate double that of standard metabolic rate (SMR) would be possible and in the short term would not be life threatening (Bolton, *et al.*, 1996: 2234).

As they stand, figures 10 and 11 indicate a lack of over-heating in the swaddled Aboriginal infants (Bolton, *et al.*, 1996). My data identified infants as generally being swaddled in warm homes. One of the indications of the model is a wide range of infant adaptability to thermal balance. Yet, when I consider the awake and sleeping temperature readings for the fifteen infants (*cf.* figure 15, page 132), it is interesting to note that the readings are in the 35 degrees plus Celsius range. It bears repeating that in wrapped infants, the head is an important variable in the infant's heating control mechanism. So much so that, in a baby lying supine with no head covering, "the risk of hyperthermia is minimal however, over-wrapped the trunk may be" (Bolton, *et al.*, 1996).

Figure 10 - Thermal Balance Model for Tightly Wrapped, Supine Sleeping Male Infant

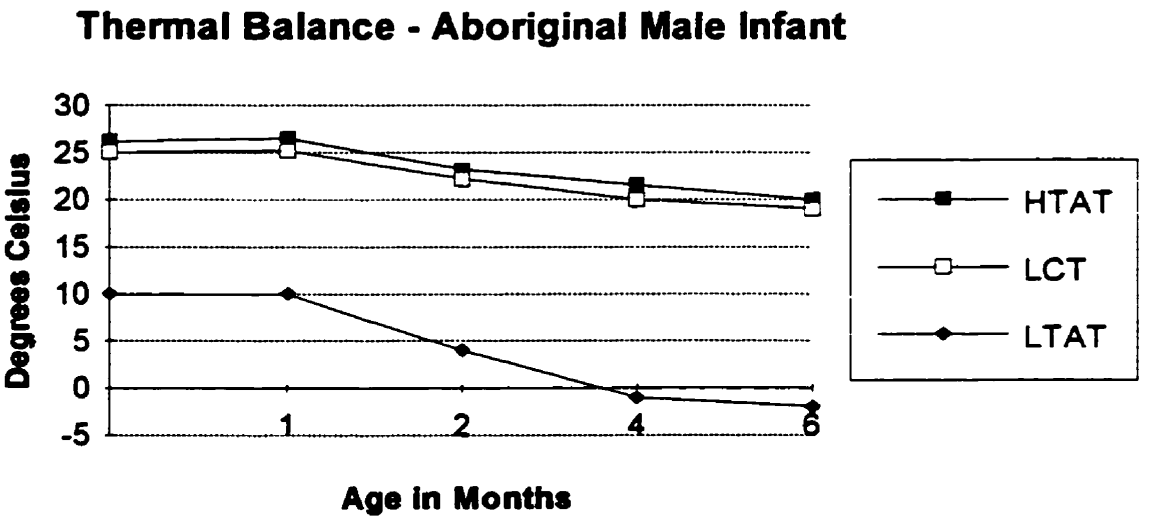
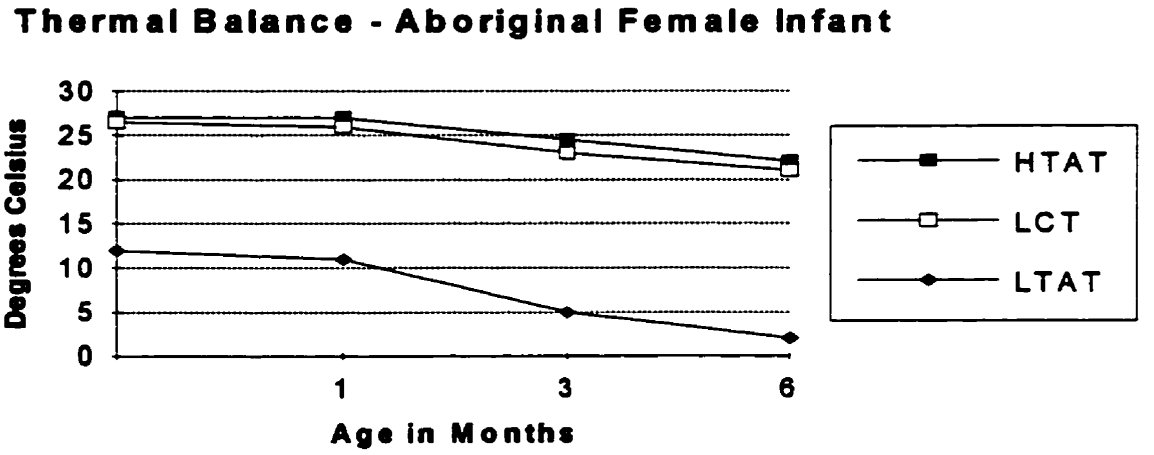


Figure. 11 - Thermal Balance Model for Tightly Wrapped, Supine Sleeping Female Infant



CHAPTER VII

ENVIRONMENTAL CONTAMINANTS

Prior to my leaving for the research site, it had been suggested that I gather other environmental data, such as house temperatures, humidity readings and external temperatures. While arranging for the instruments to take such readings, I was made aware that we could also gather specific data relating to contaminants. Therefore, I received instruction from laboratory personnel in the protocol for collecting these samples. Since I was unable to find any literature on air borne contaminants in Aboriginal reserve housing, this unique opportunity to gather such data was deemed too important to ignore. Also, with 46.5% of mothers identified as smokers, the contaminants in houses could reveal issues previously undetected. For example, a toxin effect may compromise the infant's heart or brain. An infant already threatened by overheating may succumb to perturbations which would not otherwise be obvious on inspection.

7.1 External Temperatures and Contaminants:

One contributing factor to the "warm" residence is the external temperatures. A high proportion of the women at the research site reside in trailers with thin wood surrounds tentatively placed between the trailer base and the ground. Some residents bank snow against the wood to prevent drafts and to avoid exposing the under structure of the trailer to the severe cold. Crawl spaces equipped with grilles to vent moisture escaping to the ground are often closed during the winter to increase floor temperature. The grilles are often left closed during the spring and summer and moisture remains trapped (Lee, 1987).

Bacteria and fungi multiply in this area and flow up into the living area of the residences. Another source of airborne particles is the heating system. Dust particles on furnace filters are recirculated and frequently the filter is missing altogether (see Plate 6).

Residents place plastic over small openings to avoid drafts. Many of these residences are now "air tight", causing the airborne particles to recirculate.

What may be important in this environment is the number of infants in swings during the nocturnal and day hours who are swaddled and constrained. Any air flow around them may be critical to the infant breathing in airborne particles as well as carbon monoxide-dioxide. Suspending the swings close to the ceiling may actually lessen any air movement.

7.1.1 External Temperatures The severe temperatures during the winter discourage venturing outside. Infants experience consistently longer hours inside the residence. Any negative effect found in the residential environment would impact particularly the infants and young children. Parents travel by car to shop and visit and older children travel to school by bus. The buses stop picking up students when the outside temperature drops below -35 C. Young infants are frequently left at home with a sitter and/or grandparent. The short and long-term effects of these residential environments on infants are unknown at this time, but need to be investigated. Table 5 illustrated the sometimes extreme temperatures which keep infants at home for long periods of time.

7.1.2 Contaminants The carbon monoxide (CO) levels in the thirty houses tested were within the normally accepted levels (see Health Canada, Exposure Guidelines for Residential Indoor Air Quality, July 1989). Health Canada states the acceptable short-term exposure ranges for CO is 11 ppm. over an eight hour exposure or 25 ppm. per one-hour exposure. As noted earlier in Chapter IV, the instruments to collect environmental readings were on loan to me on the weekend, a particularly busy time on the reserve. I visited homes with infants and parents still at home and willing to have the readings taken. Recordings were taken at homes which had had many families moving in and out over relatively short periods of time. While it is difficult to establish what is representative of

reserve residences, these did not appear to be markedly different from the many homes I had visited during my interviews.

The CO_2 levels recorder did not function properly and a replacement machine was obtained from Calgary together with an airborne particle counter to establish some spectrum of environmental contamination. Unfortunately, previous instrument rental bookings were honoured by the owner and my time-frame with this equipment was brief since I could not pre-book. I did, however, collect two sets of samples for six houses. While this may be considered a small sample, it nevertheless gives an indication of the Aboriginal infant's environment which has not previously been identified. Table 20 gives the levels recorded in the homes.

Table 20
Results of Carbon Dioxide Readings andAirborne Particle Counter Recordings (N=6)

Residence:	Carbon Dioxide Level[1]	Airborne Particles (in um)			
		0.3	0.5	1.0	5.0
No. 1	750 ppm#	176,070	121,930	23,340	450
No. 2	1,243 ppm	54,160	40,020	10,200	370
No. 3	1,099 ppm	77,130	60,970	15,750	250
No. 4	700 ppm*	999,999	821,760	171,900	2,380
No. 5	1,603 ppm	68,520	47,950	11,690	220
No. 6	900 ppm	75,001	54,769	12,683	310

[1]Levels above 800 ppm are deemed to pose a health hazard (Health Canada, 1989)
The average airborne particles reading is 40,000 (Lee, 1991)
*The front door of this house was open all day
#This house was still under construction and there was a large amount of air leakage

House No. 1 has CO_2 levels (750) approaching a high level (800), the major problem in the infant's environment is the 0.3 (micron size) particles reading of 176,070, which is considered by Dr. T. Lee of the University of Calgary, (told to me in personal

communication) to be a very high reading. House No. 2 again has mixed results with very high CO_2 (1,243) readings and air particles (54,160) slightly above the acceptable range. House No. 3 registered a very high CO_2 recording (1,099) with air particles (77,130) almost double the average range of 40,000. House No. 4 had CO_2 readings of 700 and air particles in the 0.3 range considered extremely high. The high airborne particle range would have serious consequences on the respiratory system of occupants. House No. 5 has recorded CO_2 of 1603 which is considered extremely high. The airborne particles of 68,520 are above the average rate. House No. 6 again registers CO_2 above the acceptable range and airborne particles almost double the 40,000 average range.

According to Dr. Lee (in personal communication, 1998), there are three mechanisms by which inhaled particles may evoke a biological response in the respiratory system. A particle may be inherently toxic due to its physical and/or chemical nature; a particle may be chemically inert, but its presence may restrict the clearance of other toxic particles; and a particle may act as a carrier for gases, vapour or viruses which are toxic or pathological. The danger of particles in the .5 to 5 microns range is that smaller toxic particles, such as moulds, spores and radon, may piggy-back on the larger particles and thereby be inhaled. If the respirable suspended particles are inhaled, they go into the lungs. However, if the particles are 10 microns or larger, the nose hairs filter them out. Since infants are not born with nasal hair, the large particles may present a more serious respiratory problem for infants. Although I was unable to have the lab run microorganism species identification on my samples due to lack of funding, readings of even 500 CFU/m^3 are considered high if there are mixed species. Even 150 CFU/m^3 is considered to be a high reading if there are dominant species along with a few other species (Flannigan, *et al.*, 1991 and Gravesen, *et al.*, 1994). Again, the need for further, more exhaustive research is indicated. Table 22 identifies the levels of bacteria and fungi found in the same homes as recorded in Table 21:

Table 21
Microbial Testing for Airborne
Contamination, Bacterial and Fungi (N=6)

House I.D.	Bacteria (CFU/m^3*)	Fungi (CFU/m^3)
No. 1	6	634
No. 2	1753	31
No. 3	1938	100
No. 4	466	31
No. 5	584	306
No. 6	334	25

* CFU/m^3 = colony forming units per cubic meter of air

The acceptable levels for airborne bacteria and fungi are in the 200 cfu/m^3 range and recordings exceeding this baseline are considered detrimental to the overall health of the occupants (Lee, 1990). After recording airborne bacteria and fungi (Table 21), I used contact strips in the same houses to determine if there was similar surface contamination.

Testing for bacterial and fungal surface contaminants was conducted in places in the residence which would give an accumulation of contaminants. Instructions from the labratory instructor and Dr. Lee were to gather this data from places which were hard to "dust". This would give a reading of contaminants which had sat undisturbed. Collection was taken from high shelves or any lower areas which had not been polished or dusted the previous week. The findings are presented in Table 22.

The sources of contaminants could be various items. For example, once a furnace air filter was dirty, it was routinely thrown out and the furnace would then function, sometimes for years, with no filter at all (see Plate 6). This would perpetuate the circulation of airborne contaminants.

Table 22
Microbial Testing for
Surface Contamination, Bacteria and Fungi

House I.D.	Bacteria (CFU/100 cm)*	Fungi (CFU/100 cm)
No. 1	1304	1026
No. 2	1843	217
No. 3	600	870
No. 4	926	70
No. 4 (Crawl space under House)	2174	330
No. 5	Uncountable[1]	TNTC[2]
No. 6	191	30

* CFU/cm^2 = colony - forming units per 100 square centimeters
[1] Bacterial colonies were uncountable due to converging nature of the colonies formed.
[2] Too numerous to count. Work Order for readings No. 48510.

Residences often had damp and/or water-soaked areas under the house in crawl spaces which encouraged the growth of bacteria and fungi, as seen in Plate 7. In a snowy, cold environment where there is a constant tracking in of mud and snow, women are constantly washing linoleum floors. Wet mops freeze if placed outside after use, so are usually put into a pail still wet until the next use. This standing wet mop represents a source of contamination, ironically the result of an attempt to keep the floors clean (See Plate 8). Another common source of dampness and contamination is broken or damaged flush toilets which add to the dampness and increase the breeding ground for mould (See Plate 9). Mould is another common contaminant and spores from this mould are often seen growing on bedroom walls, or in closets, or on the closet floor. Since this is the room in which all of the family usually sleeps, this mould constitutes another immediate source of air pollution (See Plate 10).

Residence No. 1 is a new home less than one year old. It has three bedrooms, fireplace, central gas furnace and a propane cooking stove in the kitchen. The half

basement has a cement floor. Weeping tiles were not placed on the outside of the basement walls due to advice from construction foreman that the clay in the area would prevent water seepage into the half basement. The area has experienced considerable rain and melting snow conditions over the last year with the result that the basement is very wet and articles on the cement floor (mats and throw rugs) are not drying out. In the spring, the number of mosquitos in the home was high and mosquito coils and sprays were constantly in use within the house.

Residence 2, 3, 5 and 6 are trailers transported into the north after construction elsewhere. Three of the trailers had been occupied earlier by at least ten other families. Maintenance and improvements of the infrastructure was not regular and toilet and taps were broken or dripped constantly. Water stains with obvious mould growth were visible in ceilings, closets and floors.

Residence 4 also was a new three bedroom home less than a year old. The exterior surrounding ground was clay and not graded or levelled, with the result that small ponds of water were sitting around the house. The ditch between the house and the basement wall was full of standing water which flooded the 'crawl space' under this new home. At the time of data collection, we were shown the crawl place and noticed scraps of wood, insulation and paper floating in and at the top of three feet of standing water. This standing water gave off a foul odor which penetrated the new home.

Women are constantly mopping the linoleum living-room and kitchen floors with a 'rag' type mop and metal bucket of water. Unfortunately in the harsh climate mops cannot be put outside to dry and air out. Consequently, they are placed back into the pail of water or in the unoccupied bath tub, thereby acting as a source of contamination which is continuously recylced within the residence.

Furnaces without filters are another source of recirculation of particles and air contamination. Most residents had thrown away the filter when it appeared full of dust.

Unfortunately, a new clean filter was not put in place, thus adding to interior pollution. Automatic washers and dryers are seldom filtered to exterior vents. Some are directed through the floor into the half basement or to the ground under the trailer. Disposable diapers are added to the existing garbage or trash bag and not contained in separate pails. Hands are not washed after changing diapers and wiping infants' bottoms. Lack of clothes dressers and space presents problems in three bedroom homes with many children. Large piles of dirty laundry are consequently found in bedrooms, halls and kitchens. The high $C0_2$ levels in five of the six homes represents a danger to all the occupants of the residence. We should be mindful of the fact that fungus and bacteria thrive in damp wood and other damp, unrepaired areas. The designation, "major repairs" used by Statistics Canada suggests the breeding conditions favorable to these pollutants.

Table 23 assimilates the readings of airborne particles with those of the contact strips:

Table 23
Carbon Dioxide Airborne Particles, Bacteria and Fungi (Air and Surface Contaminations)

Residence	CO_2 ppm.[1]	Airborne Particles mm		Airborne			
Contact							
		0.3[2]	5.0	B[4]	F[5]	B[4]	F[5]
No. 1	750	176,070	450	6	634	1304	1026
No. 2	1,243	54,160	370	1,753	31	1843	217
No. 3	1,099	77,130	250	1,938	100	600	870
No. 4	700	999,999	2,380	466	31	926	70
No. 5	1,603	68,520	220	584	306	TNTC[3]	TNTC[3]
No. 6	900	75,001	310	334	25	191	30

[1] high is 800 ppm
[2] 40,000 m.m. is acceptable level
[3] TNTC - too numerous to count
[4] bacteria
[5] fungi

According to *Health Canada Guidelines*, 1989, carbon dioxide readings in our samples are very high. Such high levels are injurious to the health of the residents of these homes. Airborne particles exceeding 40,000 can also represent a source of respiratory problems. Bacteria and fungi levels over 200 are deemed detrimental to the health of residence occupants. Fifteen children under the age of ten were living in the six test homes. Eight were under one year of age. Given the data in Tables 23 and 24, their respiratory health may well be compromised.

7.2 Use of Nebulizers and Bronchodilator Inhalers:

One of the advantages of participant observation research is the amount of information gathered which was not known prior to on-site investigation. At the research site, I observed what appeared to me to be an unusual number of nebulizers and bronchodilator inhalers. In one home, a two year old and a three year old were sitting side by side on a couch each using their own separate mask and nebulizer. In order to establish how many infants and pre-schoolers were using such breathing aids, I called the president of the Alberta College of Respiratory Therapy, (the regulatory body in the province), Mr. P. Litwin, R.R.T, who, in response to my inquiry, conducted a computer search of use of such devices by Aboriginal patients based on treaty number, date of birth, home location and medication. With a few exceptions, most children were started on nebulizer therapy before twenty-four months of age. The computer search conducted by Litwin confirmed my casual observations.

From 1990 to 1997, a total of ninety-five young Aboriginal children on the reserve were placed on nebulizers which used salbutamol as the bronchodilator. During my stay on the reserve (1995-1996), thirty-four children were diagnosed with acute viral bronchitis or displayed acute respiratory distress. All ninety-five cases were categorized as "still active." Attempts to verifty how many children used aerosol bronchodilator inhalers were unsuccessful. However, an estimate by the local reserve pharmacist was that

90% of the young children on the reserve were on some type of breathing-assistance device.

Of course, regarding the ninety-five nebulizer users, we cannot draw any statistical conclusions due to the mobile nature of the population. Infants move with their parents on and off the reserve with a fair degree of frequency. However, my observations and the remarks of Mr. Litwin suggest that a high proportion of young children on the reserve experience fairly frequent and often acute respiratory problems. Although the SIDS profile describes the infant as "apparently healthy" prior to death, my examination of the information collected on Alberta Aboriginal SIDS victims from 1990 to 1994 revealed that 90% of the infants had sniffles, colds, coughs, had visited a physician recently, were on antibiotics and/or previously had upper respiratory distress. It may be that these infants had not recovered completely prior to death. The same high level of pre-existing illness was not detected among non-Aboriginal SIDS infants--only 30% of the mothers reported sniffles or slight colds.

CHAPTER VIII

DISCUSSION

Since the emphasis in SIDS research largely has been on infant care strategies and, given the reported high SIDS incidence among Aboriginal peoples, my research focused on contemporary infant care practices among the Aboriginal people of northern Alberta. My primary objective was to investigate infant care among contemporary-aged women to determine what actual infant care was utilized by today's Aboriginal mothers. Secondly, I wanted to establish whether or not these contemporary practices differed from traditional Aboriginal infant care. A related objective was to determine whether or not the risk factors associated with SIDS could be identified with these infant care strategies. While engaged in this research, I became aware of problems with the statistics involved in determining Aboriginal SIDS incidence and I also discovered some potential environmental hazards.

8.1 Traditional Practices and Biomedicine

When I decided to investigage current Aboriginal infant care practices, I did so because the available literature did not appear to deal with the issue adequately. Further, the literature review strongly suggested that biomedicine had largely superseded traditional infant care practices. Contrary to such assertions, my investigation suggests that at most a compromise has taken place. Aboriginal women have acquiesced to the concept of hospital birthing in place of home delivery and the use of birthing sticks. However, once mother and infant return to the seclusion of the reserve, they return to the traditional practices of their culture. With the exception of hospital birthing, my investigation suggests that contemporary Cree mothers rely on traditional practices both before and after birth, largely spurning prenatal visits to the health clinic and visiting such clinics post-natally only for emergency care.

Cree women in Northern Alberta have maintained a close alignment with the practices of their grandmothers. Interestingly, when asked to discuss infant care, all senior women's opening responses began by discussing the birthing process and the subsequent infant care practices they utilized. For the senior women interviewed a birth/infant care dichotomy was inappropriate. Conversely they discussed and described a continuum which started with birth contractions and ended with the last stages of breastfeeding at approximately two years of age. For these senior women, infant care started at birth and ended with weaning.

Results demonstrate that while knowledge about infant care is shared by senior Cree women, changes do occur. Cultural knowledge "is not static, but extended and modified in response to specific experiences", therefore, a cultural model "can be thought of as a protypical schema which is intersubjectively shared" (Garro, 1988:108).

Breastfeeding was utilized by two-thirds of contemporary mothers and the majority of breastfeeding mothers intended to continue for twelve to eighteen months. Mothers stated they breastfed because it was better for the infant, cheaper, and promoted "closeness". The preferred sleeping position was "back" or "side" with only eight percent placing their infants in the prone position. Mothers reported that during nocturnal sleeping hours they rotated their infant's position from "back to side" then "back to opposite side" to keep the infant comfortable during the night. They also reported using the supine position to "watch" the infant during sleeping. Side sleeping position was reported to improve breastfeeding access. The supine position was selected because mothers felt it was "safer", "that baby sleeps better". The wrapping style used by mothers was complemented by supine sleeping as the obvious way to place the infant down. Eighty-nine percent of mothers interviewed had their infants sleep in the maternal double bed. Seventy-five percent of the infants sleeping surface was considered "firm" by the mother and after checking, I agreed. Mothers unanimously answered "no" when asked if

they used a cradle board or moss bag. Seventy-six percent of women interviewed stated that someone had influenced their decisions about infant care. In all cases they remarked that a familial female (mother, grandmother, aunt or older sister) had guided their efforts during the first year of their first infant's development. The new mothers followed the advice because the other women "had experience", had "surviving children" and the knowledge of the older women was "tested by time". They trusted their mother's advice. When asked what advice they would give their daughters when they approached the reproductive age, mothers stated they would pass on the knowledge of the grandmothers, in other words, tell their daughters what their mother had told them about infant care. New mothers who were not breastfeeding or co-sleeping remarked they would change this practice for subsequent infants and advise their daughters to breastfeed, co-sleep and wrap their infants.

Sixty-one percent of women interviewed did not change the normal house temperature when their infant was ill. However, there was a marked difference in their routine which was dependent on the type of illness affecting their infant. For example, if the infant was feverish they reported that they would turn down the house thermostat and reduce the number of clothing and blankets on their infant. If the illness did not involve a fever, mothers maintained their normal routine of blankets, clothes and house temperature.

Three medically trained nurses on the reserve visit the homes of new borns and give advice or answer questions the new mothers may have. They plan and co-ordinate regular prenatal classes which tend to be sparsely attended at best. Generally, after the first class, attendance at subsequent classes is virtually non-existent. This suggests that prenatal classes on the reserve constitute a direct contradiction to the cultural tradition of the people, such as solo sleeping, cribs, not to swaddle, shots and regular medical visits. Planning for the birth is considered "bad luck" and attending classes to discuss this would be avoided. It may be relevant that all of the nurses are non-Aboriginals (the one

Aboriginal nurse having resigned), single and have never been pregnant, nor have any of them delivered an infant. Nurses tend to stay on the reserve for only two years before moving on. I suggest that all of these factors interact to strengthen the reliance on mothers and grandmothers for prenatal and postnatal advice.

My data indicate infants as generally being swaddled, yet there is not a high incidence of SIDS among swaddled reserve infants. One of the indications of the model is a wide range of infant adaptability to thermal balance. As plates 4a, 4b and 4c (pages 197-8) display, Aboriginal infants are tightly swaddled up to the neck region. The entire head, face, forehead, back of head and neck are uncovered and act as active agents in maintaining the thermal balance. Coupled with the traditional practice of placing infants in a supine position, the evidence of the Bolton model suggests that overwrapping Aboriginal infants does not lead to hyperthermia. However, the model does not accommodate any additional blankets or duvets.

Contemporary Aboriginal women adopt a bio-cultural approach to infant care. The biological needs of the infant: sleep, food and warmth, are met following cultural traditions. Women are required to deliver their infants in a strange, highly technocratic society, but they have resisted the authoritative knowledge of that society by maintaining traditional infant care practices as a form of independence from external agencies. What is difficult to document is exactly how much their war of resistance to change may have positively influenced infant survival. For example, they have steadfastly continued to sleep their infants on their backs despite the earlier advice of medical authorities. However, if Aboriginals had been induced to place their infants prone and to bottle feed exclusively, the infant mortality incidence may have been even higher, especially given the high fungal and bacteria counts in the environment.

Table 24 allows a cross-check on change or resistance to change by Aboriginal mothers.

Table 24
Traditional Infant Care Practices, Recommended Changes,
Response to Recommendations and Contemporary Aboriginal Practices

Tradition	External Recommended change	Response to Recommendations	Contemporary Aboriginal Care
Home birthing	hospital	change	hospital
Family midwives	nurse/doctor	change	physicians
Co-sleep	crib/separate	no change	co-sleep
Breast feed	bottle*	slight change	most breast feed
Sleep supine	prone	no change	supine
Swaddle	not swaddle	no change	swaddle
No formal prenatal care	complete 7 months of prenatal visits	no change	1 or 2 visits at 6 and 8 months
Reliance on community and family	visiting nurse and/or physician	no change	family advice

* pre-1970. The 1950-60 recommendations to bottle feed did not change the norm of breast feeding.

Thermoregulation or overheating is a perplexing issue. Clearly, the research site mothers maintain warm homes and swaddle their infants. Figure 14 (page 112) presents recorded high asleep ear temperatures illustrating a rise in Aboriginal infant body temperature rather than a slight decrease. Yet in the research site, a detailed search of reserve birth records for the years 1990 to 1995 for SIDS victims revealed one SIDS case in 293 births or 3.4 per 1,000 live births. It would appear that Aboriginal infants are able to cope with or adapt to the higher body heat. While acknowledging that to suggest Aboriginal infants are able to regulate their cooling mechanism while wrapped because of "more actively functioning sweat glands in the face" is purely speculative at this time, it may be worthy of future research.

8.2 Traditional Practices and SIDS Risk Factors

In SIDS research over the last two decades, much emphasis has been focussed on the so-called "SIDS Risk Profile." This profile identifies certain conditions and behaviours which allegedly place infants at greater risk from the syndrome. These conditions and behaviours include smoking, having infants at a young age, being single, being of low socio-economic status and, more recently, sleeping infants in the prone position and allowing the infant to become overheated. Much of the most recent SIDS literature has emphasized the risk of prone versus supine infant sleeping position and/or overheating.

It has been noted that sleeping supine is the norm for Aboriginal infant care and always has been the norm in this population. My research found that a high percentage of mothers continue to use the traditional supine sleeping position, which happens to be the one favoured by current medical opinion. The advice given by physicians in the 1930's (Hiley, 1995) to sleep infants on their stomach was not implemented. A high proportion of infants are breastfed and co-sleep. The debate between McKenna and Mitchell vis-a-vis the evolutionary safety or risk factor of co-sleeping has been tentatively resolved by addressing the smoking of co-sleeping mothers, rather than the co-sleeping act in isolation as unsafe (Mitchell and Scragg, 1991). As we have noted (Table 16), a proportion of Aboriginal women both smoke and co-sleep.

Why are so many young women smoking? In a recent article, Stewart, *et al.* (1996), report research to assess the nature of the smoking problem and to determine how support services could assist in the reduction of smoking or cessation. Disadvantaged women smokers revealed that they used smoking as a mechanism for coping with the stress in their lives. The authors defined 'disadvantaged' in terms of one or more of the following: poverty, unemployment, low occupational status, low level of education, single parent status, geographical isolation and lack of social support. The authors found a high incidence of smoking among this priority group, referring to the fact that this category is

targetted by social and health agencies as a priority group for smoking cessation programs. These conclusions were drawn from interviews with 386 women who smoked.

They concluded that the disadvantaged find it difficult to move beyond their daily struggle for survival and to visualize the long term benefits of non-smoking. The pervasive stresses in the lives of disadvantaged women suggests that non-smoking programs should focus on their cultural, social and economic environment, rather than solely on health risks. The description of this priority group is remarkably similar to what could be described as the situation of many Aboriginal women and may help us to understand the high level of female tobacco users in this community.

While smoking among Aboriginal families still persists, my observations indicated that many families isolate their infants from second-hand smoke by not smoking in the house. In fact, I saw only one ashtray in all the houses I visited on the reserve and I should note that my visits were not announced in advance. Also, while many mothers classified themselves as single, virtually all had partners or had had partners and none lived alone. All of the mothers had adult brothers and/or sisters present and many had grandparents living with them. A summary of just how closely Aboriginal women adhere to positive factors follows. The total number of contemporary women interviewed was 70.

A high degree of homogeneity in infant care was observed among senior Aboriginal women. The advent of hospital birthing does not appear to have altered their reliance upon traditional infant care practices, such as breastfeeding up to twenty-four months, using moss bags for wrapping babies, muskeg for diapering, co-sleeping, supine sleeping position and the use of swings. It may be that the influence of senior women on infant care practices exceeds that of external influences in many sectors. However, the two variables with 100% agreement among senior women (breastfeeding and the swing) were not reported by contemporary mothers. Breastfeeding was less utilized by younger

women for various reasons, while the use of the swing was so ingrained among contemporary women that they did not consciously include it as part of infant care practices until asked a direct question.

In Aboriginal societies, women represent the transmission of culture. They learn from mothers and grandmothers and pass the tradition along in their own teaching. Today, in the research site no midwife can be located for advice or to teach others. A significant form of power, control and continuity has been lost forever. Although denied the traditional birthing that senior women regard as part of the infant care process, Aboriginal women have maintained several key aspects of traditional infant care. In the privacy of their residence, distant from physicians and government agencies, they have maintained continuity and order by invoking the predictability of known infant care traditions in an otherwise confused and altered environment. Contemporary women tightly swaddle their infants, breastfeed, co-sleep, use traditional swings, save navel cords and some continue to navel bind. These variables are a direct continuity with traditional infant care practices used almost seventy years ago by their grandmothers.

Females aged fifteen to eighteen at first birth tended not to breastfeed nor co-sleep at the same levels as older mothers, although co-sleeping of the infant with his/her grandmother was quite common. This lack of continuity with traditional ways was accounted for by their desire to finish school. Younger females with first or second infants remained in the familial residence to complete school or upgrade for future employment.

In interviews, young mothers mentioned that instructions on breast feeding techniques given in the hospital were confusing. Those who were attempting to initiate breast feeding stated that nurses would tell them that they were "not doing it right." Those involved with these first-time mothers appeared to assume that there was a scientific or correct way to breast feed (Zeitlyn and Rowshan, 1997). By the time these mothers have their second or third infant, they have matured both physically and culturally

and out of that cultural security are able to ignore the so-called professional knowledge. The level of breast feeding is high when compared to the socio-economic factors noted. Williams (1996) notes the overall proportion of breast feeding varied significantly with mother's marital status, education and family income. Single mothers with no secondary or post-secondary education and with family income of less than $30,000 per year were less likely to breast feed. As noted earlier, Alberta Aboriginal women are clustered in lower socio-economic categories and therefore would be expected to show a low level of breast feeding. However, traditional infant care practices incorporate breast feeding and my sample community appears to honor the traditions of their elders.

Females who gave birth to their first child at age sixteen, seventeen and eighteen years old, represented less homogeneity than younger or slightly older females. This may represent a withdrawal from traditional ways during this tempestuous period of their life. Frequently when the first time mother is young, her mother and her grandmother are responsible for a large portion of the infant's day-to-day care. After the birth of the second or third infant women set up their own and separate place of residence. It is at this point in the evolution of their infant care practices that women resurrect traditional ways.

All mothers in the contemporary group gave birth in hospitals located geographically and/or culturally a great distance away, some in a small community hospital, others at one of two large hospitals in the provincial capital. The advice from health nurses, maternity/nursery staff and physicians differs at each health institution. However, outside sources do not seem to have much impact on the style of infant care chosen by Aboriginal mothers. The dominant influence is advice from familial females. What is remarkable is the lack of penetration by what Jordan (1993) calls authoritative knowledge.

Young Mother's Age at First Birth: 78.1.% (of my sample group of seventy contemporary mothers). The senior women appear to have started their family at a young

age (under 20 years of age), and many of the contemporary women are following this practice. It therefore has to be formulated as a traditional practice. And while SIDS is more prevalent among younger mothers, the birth percentage is highest in the 20 to 29 year age group (MSB, 1998).

Learn about Infant Care from Female Family Members: 81.4%. What became evident from the interviews about who helped contemporary women make decisions about infant care, is that the young women trusted the experience of their elder female kin. They told me that "(Mother, Grandmother) had more experience, she raised a large family and knew more than I did", or "She's my mom, I trust her", or "It was my first baby, I did not know what to do so I listened to my mother" or "I lived with her (mother or grandmother) when I had my first child, I took her advice".

Breast feeding: 68.1%. Women who did not breastfeed for certain reasons (returning to upgrade education, working, etc.,) also told me that they intend to breast feed any future infants they give birth to. They certainly understood the value of breast feeding on the developmental outcome of the infant and the bonding process of mother/infant during breast feeding.

Co-Sleeping: 61.4% Interestingly, the women not currently co-sleeping have done so (with earlier born infants) in the past. However, when the third infant arrives, the bed is rather crowded with mom and two other young infants or children. The women confided that they can't get the older children out of the double bed (mother's) and hoped that placing the new infant (frequently the third or fourth baby) in a crib might teach the new infant to sleep solo. The limitation to this question is how women define co-sleeping and solo sleeping. Women who had a crib for their infants stipulated "solo" sleeping. This perception does not include breastfeeding in mother's bed or remaining next to mother for subsequent feedings. By this definition a crib does not make for solo sleeping. Further, "fussy" infants go from breastfeeding to "swing" and back again during nocturnal hours.

Smoking: Yes (during pregnancy and after): 45.6%; No (not at all): 54.4%. The mothers who smoked during pregnancy mentioned that they had cut down dramatically during the pregnancy. The women who smoked after delivery, reported that they smoked about 5 cigarettes a day. If their partner smoked, the mothers requested that they smoke outside of the house. One of the assumptions about smoking in Aboriginal communities is that it is high. I think the ceremonies which use pipes and the burning of tobacco may have influenced this thinking. The reported facts, however, point out that while under 50% of contemporary aged females are smokers, fewer young females are smoking. The Canadian smoking incidence is below 20%.

Sleeping Position - on Back or Side: 92.9%. Mothers indicated that they frequently rotate the infant from side to side and onto its back in an effort to ensure that the infant remains comfortable during its sleep. They transfer the infant from back to side when breast feeding. The instructions from outside sources over the last decades have recommended sleeping infants on their tummy - the percentage of women continuing to sleep infants on their back indicates the strong traditional influence the senior women have had in the area of infant care. Given that current research has strongly suggested sleeping infants on their back to reduce the vulnerability of SIDS, the traditional method (time tested by senior women) is now vindicated.

Wrapping (or swaddling): 91.4%. SIDS research at the present time considers swaddling or wrapping as a possible cause of overheating which may cause thermoregulation problems during the night while the infant is sleeping. The adaptability of body adjustment among Aboriginal populations has been documented elsewhere regarding hand temperature (Young, 1994). In that research study, hands of Aboriginals were thrust into ice water and recovered their normal heat temperature at a rate considerably faster than non-Aboriginals. It would seem feasible that this could apply in reverse with infants being able (through adaptation) to adjust their body heat. This factor

is still being explored and there is no firm evidence, but what exists is highly suggestive. Infants seem to actually enjoy being wrapped.

Use of Traditional "Swing" for sleeping: 30.0%. The use of the Cree Swing to assist the infant in sleeping (either in the day or during the night) is one of the variables that stems from the interviews with senior women. For the interviews with contemporary women this variable was problematic. First, the questionnaire was constructed to look at SIDS variables and the importance of the Cree swing was not known at that time and had to be added. Second, the women who mention the swing did so casually, as follows "They sleep in the bed or crib and during the day in the swing". It should be mentioned that when grandmothers or aunts watch the infant, they used the swing. When I asked to see the sleeping room of the infant, I would observe a swing, suggesting it can still be considered an overlapping cultural tradition.

Given that our contemporary sample women have all given birth to their infants in hospitals in locations away from their home community, the power of tradition regarding infant care, seems to have a greater influence on the young women than the exposure to other sources of knowledge observed during the hospital stay.

8.3 SIDS Incidence and Epidemiology

While the literature review indicates a high Aboriginal SIDS incidence compared to that of non-Aboriginals, my analysis of Alberta SIDS cases identified several problems in the way the incidence is identified and reported. The key factor is the ascription of ethnic identity in the Chief Medical Examiner's files, from which much of the Alberta statistics are derived. This ascription is largely left to the discretion of Police officers, RCMP and ambulance crews, who identify the victims as "Native", "Caucasian" or "Other", based from their on-location observations. This ad-hoc ethnic identification is fraught with difficulty. Of sixty-four cases labelled "Native" in the SIDS case file, less than half were confirmed as treaty Aboriginals by Medical Services Branch analysts in

Edmonton when I submitted the information from the records. One case identified as "Caucasian" was in fact a treaty Aboriginal. Infants from other provinces are not deleted from the Alberta numbers. Since the Chief Medical Examiner only records deaths and does not scrutinize birth location, an out-of-province SIDS death may be included in the Alberta statistics.

While it is beyond the ability of police and ambulance crews to verify this information before filling out the forms on which the Medical Examiner's staff base their numbers, the mere fact that such lack of verification is accepted as routine practice suggests that the resultant statistics are suspect. Based on my experience alone, one could suggest that reported Aboriginal SIDS incidence may be higher than they actually are. Despite the amount of cross-checking needed to verify ethnic identity, it is clear that trustworthy statistics will only result if a much more rigorous identification system is in place.

A final problem with the CMO's SIDS case files is the appropriateness of the diagnosis of SIDS in some cases. Several cases that I examined were diagnosed as SIDS, despite clear evidence that the infant had been seriously ill prior to death or had been suffering from a diagnosed disease. Other infants were discovered in highly suspicious circumstances which were never totally explained. In fact, in the sole reported SIDS case on my research site, the partner was later charged with causing 'accidental death.' The innaccurate and inflated reporting of Aboriginal SIDS cases may be partially responsible for the accusatory treatment which Aboriginal parents receive during investigations of infant deaths, particularly when contrasted with the solicitous treatment accorded in most non-Aboriginal cases. With strict methods of data gathering, ethnic and birth location verification, my data for Aboriginals in Alberta suggests that the SIDS incidence may not be as high as previously reported. It could be suggested that the nature of the difference in the reported incidence is that a best guess lies between the reported high of 8.26 and the

low of 2.97 for the years 1990 to 1994. In either case, both indicate greater risk of vulnerability to SIDS among Aboriginals.

The majority of contemporary Aboriginal mothers give birth to full gestation infants of average or above average weight. Infants sleep in the supine position in the mother's bed or in the same room and are tightly wrapped. Fewer mothers smoke than had been assumed prior to the administration of the questionnaire. Of the 46.5 % that continued to smoke during pregnancy, most decreased the number of cigarettes to less than five a day. Smoking after the birth of the infant was confined to outdoors or in the car during inclement weather. As the results of this project indicate, infant care practices such as swaddling, in conjunction with smoking, represent a source of risk for SIDS.

8.4 SIDS and Environmental Factors

My data have indicated that the Aboriginal SIDS incidence in Alberta should be revised to 2.97 per 1,000 live births, compared to 1.14 for non-Aboriginals (see table 10). While investigating bacteria and fungal microorganisms may seem to some to be innappropriate, such an analysis would be in keeping with the research of Sayers, *et al.* (1996) which suggested that certain bacterial substances do not become lethal on their own, but a deadly toxic cocktail exists when they are combined with nicotine. Given the research into environmental pollutants and their impacts on respiratory functions (Morris, *et al.*, 1987, Drucker, *et al.*, 1992, and Mach and Lindsay, 1994), such an examination seems reasonable. Blackwell, Weir and Busuttil (1997), argue the possibility of a synergy between developmental and environmental factors that could enhance colonization by toxigenic bacteria or augment the effects of their toxins on inflammatory responses. The synergy appears to decline with age. In diverse socioeconomic settings, the authors found differences in nose and throat bacteria of healthy infants with higher counts amongst the less affluent. They hypothesize that some cases of SIDS are due to pathophysiological responses "elicited by combinations of infectious agents and/or cigarette somke that occur

during a developmental period when the infant is less likely able to control the effects of inflammatory mediators...." For a complete description of this process see Blackwell, *et al.* (1997). A brief example is given by Mouricourt, *et al.* (1990):

> An excellent example of developmental stage being associated with susceptibility to toxigenic bacteria is the expression among newborn calves of the receptor for enterotoxigenic strains of *Escherichia coli* expressing the K99 adhesin. As this receptor disappears with age, so does suceptibility to disease caused by these bacteria.

According to Blackwell, *et al.* (1997), "Several species of toxigenic bacteria or their toxins have been identified in SIDS infants." Since higher SIDS incidence are recorded in winter, when houses are shut tight against the harshness of winter, and since SIDS appears to impact lower socio-economic families more, it is reasonable to look into factors which would explain this coincidence. As Blackwell, *et al.* (1997) note, "...several groups have suggested that interactions between different infectious agents or infectious agents and environmental factors might be involved in SIDS."

Aboriginal women constantly express their concern that their houses cause health problems, although they were puzzled as to how this happened. The results of our investigation clearly substantiate their concern and open the door for a further scientific investigation to validate that excessive fungus and bacterial counts are indeed causing illness.

While air sampling was confined to a small number of residences and may appear to be small statistically, what is significant is the high levels of contamination from bacteria and fungi in the homes. At the time of testing, the overall cell count, rather than specific tests for type of fungus, were requested due to the excessive cost ($1,000 per house for laboratory testing) and time required for the more specific tests. This remains a prime area for further research to determine the specific bacteria.

In a report from England, the authors of the Black Report (1990) state:

> ...areas having high unemployment rates, *or* bad housing, *or* a high proportion of unskilled workers, or worse, all three, are likely to have high rates of child mortality especially in the first five years of life (Townsend and Davidson, 1990;140).

Implicit within the housing of poverty is overall lack of maintenance, water leaks and poor ventilation. As noted in Chapter IV, this is the ideal environment for the reproduction of bacteria and fungi and atmospheric transmittal. Coupled with smoking, Sayer's (1996) cocktail may represent a future research thrust.

This air pollutant study remains preliminary, but may point to the need for further testing in the homes of infants. In many of the residences at the research site, women privately expressed their concerns that the trailer/house was making them "sick". House repairs, such as, fixing leaks and damp areas, were not carried out. Many of the residents currently living in a home represent the tenth or fifteenth family to occupy the home. As each family relocates to a new dwelling with seemingly fewer problems, another family moves into the problem residence.

SIDS may be an epiphenomenon to existing residential contaminants. Generally speaking, SIDS is a greater risk to infants from lower socio-economic status. These infants may be exposed to bacteria and fungi similar to their Aboriginal counterparts, as well as smoking. How does this apply to SIDS victims removed from the identified economic status? How does this research apply to non-Aboriginal SIDS deaths which occurred after parents employed supine sleeping position, cooler rooms and breastfeeding? Many families of middle and high economic levels are buying older homes which they renovate and update. In such renovations, repairs to damp and musty basements are often left to a later date or are never completed. Air pollutants from these basements may place infants at risk even though other protective practices have been implemented. In addition,

attempts to reduce heating costs by creating virtually air-tight houses result in pollutants being trapped inside the residence and being constantly recirculated.

In this community, awareness of the SIDS risk factors has not promoted changes in infant care strategies. Rather, women have retained vestiges of their traditional infant care practices which coincide with the latest recommendations in SIDS protection, such as breast feeding, and sleeping position of infant (back or side sleeping considered safer than sleeping on stomach). My data suggest that smoking, combined with the practice of swaddling infants, plus residential contaminants, such as bacteria and fungi, places the infant at risk.

Limitations within the project, such as lack of control over whether infants are awake or asleep during the visit and the impact this had on temperature collection, small sample size for the collection of bacteria and fungi, and difficulties establishing accurate Aboriginal birth and SIDS deaths records, of necessity have made the arrival at absolute conclusions questionable, to say the least. As well, the results are not to be generalized because they are limited to a small reserve in northern Alberta. No comparisons to Aboriginal communities in southern Alberta nor to non-Aboriginal communities has been made. However, the overall thrust of the data and the suggestiveness of many of the findings indicates that this is an area which should be followed up on in a further project.

8.5 Conclusion

The objectives of this project were to establish documentation of traditional Aboriginal infant care practices prior to biomedical intervention, to document contemporary Aboriginal infant care practices, to compare both traditional and contemporary practices to illuminate any continuity or displacement, to assess the relationship of contemparary infant care to the SIDS risk factors and/or preventive strategies, and to record and analyze other relevant factors found in the Aboriginal infant environmental.

The results reveal a continuation of several traditional infant care practices which have been regarded as protective of infants with regards to SIDS vulnerability. For example, recent research has suggested that supine sleeping reduces the risk of SIDS. I found that Aboriginal women have traditionally used the supine sleeping position and have breastfed. Although utilization of the supine sleeping position has had positive effects in the reduction of SIDS in other communities (Fleming, *et al.*, 1990 and Dwyer, *et al.*, 1991), intervention to duplicate a similar decrease in Aboriginal communities would not appear to be indicated since this practice is already common. In fact, given the general non-compliance of Aboriginal women to external modes of infant related care strategies (using the prone sleeping position and solo sleeping in a crib--all propounded in the 1930's), attempts to exert external influence on Aboriginal mothers appear not only futile, but even ill-advised. What does appear to influence Aboriginal infant care are the time tested practices of senior female familial relatives. This may also explain why Aboriginal SIDS incidence is high in Edmonton where mothers are separated for long periods of time from familial female interaction.

While the sampling of environmental contaminants was limited due to the high cost of conducting this research, the results of the limited sampling done revealed alarmingly high rates of bacterial and fungal contamination in the homes. As well, the air particulate samples registered higher readings than considered acceptable by Health Canada. Further research into the possible correlation between SIDS and air borne contaminants seems essential, since my investigation indicates that environmental factors may play as strong a role as infant care practices in infant vulnerability to SIDS

Despite the fact that we have demonstrated that Aboriginal SIDS incidence may be overstated elsewhere, it is still clear that bacteria and fungi are insidious perturbations which may be affecting the health of Aboriginal infants manifesting themselves in endotoxin shock syndrome. Thermal regulation may be an issue, given the practice of

wrapping and co-sleeping. Application of the Bolton model to my findings suggested no correlation between swaddling and over-heating. However, this model does not take into consideration the additional heat generated by bedsharing and the fact that swaddled infants are placed under the bed coverings in the parents' bed. Further compounding the situation is that this scenario takes places in well-heated homes.

Thirty-two of the contemporary mothers interviewed were smokers. Of this number, thirteen both bedshared and breastfed, thereby increasing the infants exposure to cigarette smoke. While the number of smokers was less than I had expected, it is still higher than non-Aboriginal mothers. Clearly, more resources need to be directed to the community to lower the percentage of Aboriginal mothers who smoke.

The biocultural model allowed an interactive approach to data gathering. By having access to the actual homes of the mothers and infants, features such as swaddling, the swing, bedsharing, that all members of the family tend to share one bedroom, the actual indoor temperatures and the contrasting external temperatures were noted and recorded. It is unlikely that many of these features would have been discovered if the research had been conducted by questioning the population in a centralized location, for example, the medical unit office, or by simply sending out questionnaires. Certainly, without visiting the actual homes of the people involved, I would not have recognized that there might be a relationship between the incidence of SIDS and such simple factors as inadequate housing in a harsh climate and the significance of unprotected crawl spaces as a source of dangerous household contaminants.

REFERENCES CITED

Adams M. "The descriptive epidemiology of sudden infant deaths among Natives and whites in Alaska". *American Journal of Epidemiology* 1985;(122):637-43.

Adelson L, Kinney ER. "Sudden and Unexpected Death in Infancy and Childhood". *Pediatrics* 17, 1956; 663-697.

Allen LH, Pelto GH. "Research on Determinants of Breastfeeding Duration: Suggestions for Biolcultural Studies". *Medical Anthropology* Vol 9, 1985; 87-105.

Avard D, Hanvey L. *The Health of Canada's Children: ACIHC profile*. Canadian Institute of Child Health 1989.

Bacon CJ. "Thermal environment and the Sudden Infant Death Syndrome". *Report of the Chief Medical Officer's Expert Group on the Sleeping Position of Infants and Cot Death* 1993;68-76.

Bacon CJ, Bell SA, Clulow EE, Beattie AB. "How mothers keep their babies warm ". *Archives of Disease in Childhood* 1991;66:627-632.

Bailey FL. "Some Sex Beliefs and Practices in a Navajo Community". *Papers of the Peabody Museum of American Archaeology and Ethnology Vol. XL*, Cambridge, MA, Peabody Museum of American Archaeology and Ethnology, Harvard University Press, 1950.

Bailey FL. "Suggested Technique for Inducing Navajo Women to Accept Hospitalization During Childbirth and for Implementing Health Education". *American Journal of Public Health* 1948;38.

Beal SM, Finch CF. "An overview of retrospective case control studies investigating the relationship between prone sleeping positions and SIDS". *J. Paediatr Child Health* 1991;(27):334-339.

Beal SM. "Sudden infant death syndrome related to sleeping position and bedding". *Med J Aust*,1988;155:507.

Beal SM. "Sleeping position and SIDS". *The Lancet* 1988 (ii):512.

Beckwith JB. "A Proposed New Definition of Sudden Infant Death Syndrome". *Second SIDS International Conference, Australia*, Walker A, McMillen C, (eds). Ithaca, New York, Perinatology Press, 1993.

Beckwith JB. "Discussion of terminology and definition of the sudden infant death syndrome". In *Sudden Infant Death in Infants* Bergman, Beckwith, Ray (eds).

Proceedings of the Second International Conference on the Causes of Sudden Infant Death in Infants, University of Washington Press, Seattle, Washington, 1970;14-22.

Begay RW. *Navajo Childbirth*. Doctoral Dissertation, University of California, Berkley, Ann Arbor, University Microfilms International, 1985.

Bergman AB, Ray GC, Pomeroy MA, Wahl PA, Beckwith JB. "Studies of the sudden infant death syndrome in King County, Washington". *Pediatrics* 1972;(49):860-870.

Bettelheim K, Goldwater P, Dwyer B, Bourne A, Smith DL. "Toxigenic *Escherichia coli* Associated with Sudden Infant Death Syndrome". *Scandinavian Journal of Infectious Disease* 1990;22:467-476.

Bettelheim KA, Chang BJ, Elliot SJ, Gunzburg ST, Pearce JL. "Virulence factors associated with strains of *Escherichia coli* from cases of Sudden infant death syndrome (SIDS)". *Comparative Immunology, Microbiology and Infectious Diseases* 1995;18(3):179-188.

Bettiol SS, Radcliff FJ, Hunt ALC, Goldsmid JM. "Bacterial flora of Tasmanian SIDS infants with special reference to pathogenic strains of *Escherichia coli*". *Epidemiology and Infection* 1994;112: 275-284.

Blackwell CC, Weir DM, Busuttil A. "Infectious Agents and SIDS: Analysis of Risk Factors and Preventive Measures". *Journal of Sudden Infant Death Syndrome and Infant Mortality*, Vol. 2, No.2, 1997.

Blair PS, Fleming PJ, Smith IJ, Ward-Platt MP, Hall D, Leach CEA, Berry PJ, Golding J, Tripp J. The CESDI SIDI Study. BMJ; 1996: 313; 7051; 195-198, July 27.

Blight J, Johnson KG. "Glossary of terms for thermal physiology". *J. Appl. Physiol* 1973;35.

Bolton DPG. Personal Communication. "Explanation of SMR from weight and a van't Hoff correction for raised body temperature". 1996;August 20.

Bolton DPG, Nelson EAS, Taylor BJ, Weatherall IL. "Thermal Balance in Infants". *J Appl Physiol* 1996;80(6):2234-2242.

Bolton DPG, Nelson EAS, Taylor BJ, Weatherall IL. "Thermal Balance and Prone Sleep Position: Results of Theoretical Modelling". Sudden Infant Death Syndrome Conference, The Fourth SIDS International Conference, Washington, D.C. June 1996;177.

Browner CH, Press N. "The Production of Authoritative Knowledge in American Prenatal Care". *Med Anth Quarterly* 1996;Vol. 10, No. 2, June.

Bulterys M. "High incidence of sudden infant death syndrome among northern and Alaskan Natives compared with southwestern Indians: possible role of smoking". *J of Comm Health* 1990;15(3):185.

Calgary Health Services. *Evaluation of the Low Birthweight Project, Summary Report #1 - Focus Group Findings*. Gail V. Barrington and Associates Inc. Calgary, 1996.

Cameron MH, Williams AL. "Development and testing of scoring system for predicting infants with high rate of SIDS in Melbourne". *Aust Paediat J* 1986;(suppl. 37):45.

Campbell, RC. "The Political Epidemiology of Infant Mortality: A Health Crisis Among Montana American Indians". *American Indian Culture and Research Journal* 1989;Vol 13:3 and 4.

Canadian Public Health Assocation. *Health Impacts of Social and Economic Conditions: Implications for Public Policy*. Board of Directors Discussion Paper, 1997;March.

Caputa, M. "Selective brain cooling: an important component of thermal physiology". In Szelenyi Z, Szekely M, (eds). *Advances in Physiological Sciences: Contributions to Thermal Physiology* Akademiai Kiado, Budapest, 1980;32.

Carpenter RG, Shaddick CW. "Role of infection, suffocation and bottle feeding in cot death: An analysis of some factors in the histories of 110 cases and their controls". *British Journal of Preventive and Social Medicine* 1965;19:1-7.

Chen IC. "Primary health care in developing countries: Overcoming operational, technical and social barriers". *Lancet* 1986;Nov.

Cohen SM, Kenner CA, Hollingsworth AO. *Maternal, Neonatal, and Women's Health Nursing*. Springhouse Corporation, Springhouse, Pennsylvania; 1991

Crawshaw LI, Nadel ER, Stolwijk JAJ, Stamford BA, "Effects of local cooling on sweating rate and cold sensation". *Pflugers Archives* 1975;354.

Creighton M. "Creating Connected Identitities Among Japanese Company Employees: Learning to be Members of Department Store Work Communities". *Culture* XV 1995:(2):47-52.

Crosby AW. *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*. Cambridge, Cambridge University Press, 1986.

Culhane Speck, Dara. *An Error in Judgement*. Talonbooks, Vancouver,1987.

Davies DP. "Cot Death in Hong Kong: A Rare Problem?". *The Lancet* 1985;(2):1346-1349.

Davin A. "Imperialism and Motherhood". *History Workshop* 1978;5: 9-65.

Davis-Floyd RE. *Birth - An American Rite of Passage*. Berkley, University of California Press, 1992.

Davis-Floyd RE. "The Technocratic Body: American Childbirth as Cultural Expression". *Social Sciences and Medicine* 1994;Vol. 38, No. 8:1125-1140.

Davis-Floyd RE, Sargent C. "Introduction". *Med Anth Quarterly* 1996;Vol. 10, No. 2, June.

Decker J. "Tracing Historical Diffusion Patterns: The Case of the 1780-82 Smallpox Epidemic among the Indians of Western Canada". *Native Studies Review* 4(1-2), 1988:1-24.

de Jonge GA, Engelberts AC, Koomen-Liefting AJM, Kostense PJ. "Cot deaths and prone sleeping position in the Netherlands". *British Medical Journal* 1989;298:722.

Dobyns H, *Their Number Become Thin*. Knoxville, The University of Tennessee Press, 1983.

Dobyns H. "More Methodological Perspectives on Historical Demography". *Ethnohistory* 36(3), 1989;285-98.

Draper S. "Breast feeding as a Sustainable Resource System". *Amer. Anthropologist* 1996;Vol. 98, No. 2:258.

Dreyfus HL, Rabinow Paul, Foucault Michel, *Beyond Structuralism and Hermeneutics* Harvester Wheatsheaf, N.Y. 1982.

Drucker DB, Aluyi HS, Morris JA, Telford DR, Gibbs A. "Lethal synergistic action of toxins of bacteria isolated from sudden infant death syndrome". *Journal of Clinical Pathology* 1992;45:799-801.

Dwyer T, Ponsonby AL, Newman NM, Gibbons LE. "Prospective cohort study of prone sleeping and sudden infant death syndrome". *The Lancet* 1991;(337),1244-1247.

Engleberts AC, de Jonge GA. "Sleeping position and cot death". *The Lancet* ii, 1988.

Fiedler DC. "Authoritative Knowledge and Birth Territories in Contemporary Japan". *Med Anth Quarterly* 1996;Vol. 10, No. 2, June.

Flannigan B, McCabe EM, McGarry F. "Allergenic and toxigenic micor-organisms in house". *J Appl Bacteriol* 1991;70 (Supplement).

Fleming PJ, Gilbert R, Azaz Y. "Interaction between bedding and sleeping position in the sudden infant death syndrome: A population based case-control study". *Br Med J* 1990;301:85-9.

Fleming PJ, Azaz Y, Wigfield R. "Development of thermoregulation in infancy: Possible implications for SIDS". *J Clin Pathol* 1992;45(Supplement), 17-19.

Fleshman JK, Peterson DR. "The sudden infant death syndrome among Alaskan Natives". *Am J Epidemiol* 1977;(105):555-558.

Foucault M. *The History of Sexuality. Volume 1: An Introduction.* Translated by Hurley R. Vintage Random House, N.Y. 1980.

Frazer JG. "Sympathetic Magic". In *Reader in Comparative Religion, Fourth Edition* Lessa, Vogt, (eds). Harper & Row, New York, 1979.

Frogatt P, Lynas MA. "Epidemiology of sudden unexpected death in infants (cot deaths) in Northern Ireland". *British Journal of Preventive and Social Medicine* 1971;49(119-34).

Garro L. "Explaining high blood pressure: variation in knowledge about illness". *American Ethnologist* 1988;Vol. 15,(1).

Geertz C. *Interpretion of Cultures.* Basic Books Inc. New York, 1979 .

Georges E. "Fetal Ultrasound Imaging and the Production of Authoritative Knowledge in Greece". *Med Anth Quarterly* 1996;Vol. 10, No. 2, June.

Giddens A. *The Consequences of Modernity.* Stanford, Stanford University Press, 1990.

Giosta D. "Strachybotrys Chartarum Often Result of Poor Maintenance in Buildings". *Indian Air Review* 1996;June.

Gravesen S, Frisvad JC and Samson RA. *Microfungi.* Munksgaard, Denmark 1994.

Grether JK, Schulman J, Croen LA. "Sudden infant death syndrome among Asians in California". *Journal of Pediatrics* 1990;116:525-528.

Habermas J. "Technology and Society as Ideology". In *Toward a Rational Society,* Shapiro B (translator). Heinemann, London 1969;81-122.

Haglund B, Cnattingius S. "Cigarette smoking as a risk factor for sudden infant death syndrome: a population based study". *American Journal of Public Health* 1990;80:29-32.

Hahn, Robert A. *Sickness and Healing.* Yale University Press, New Haven, 1995.

Harkness S, Wyon JB, Super CM. "The relevance of behavioral sciences to disease prevention and control in developing countries". In *Health and Cross-Cultural Psychology: Toward Applications* Dasin (ed.), Sage, Newbury Park, 1988.

Harkness S, Super C. "The Developmental Niche: A Theoretical Framework for Analyzing the Household Production of Health". *Soc. Sci. Med* 1994;Vol 38, No.2:217-225.

Health and Welfare Canada. *National Database on Breastfeeding among Indian and Inuit Women. Survey of Infant feeding practices from birth to six months*. Canada, 1988.

Health Canada, Medical Services Branch. *Indian Health Transfer Policy*. Ottawa, 1986.

Health Canada, *Exposure Guidelines for Residential Indoor Air Quality: A Report to the Federal-Provincial Advisory Committee on Environmental Health*. Ottawa, Cat No. H46-2/90-156E. 1989;July.

Helm J. "Female Infanticide, European Diseases and Population Levels among Mackenzie Dene". *American Ethnologist* 1980;7:259-285.

Heriot JM. "Fetal Rights versus the Female Body: Contested Domains". *Med Anth Quarterly* 1996;Vol. 10, No. 2, June.

Herring DA. "There Were Young People and Old People and Babies Dying Every Week: The 1918-19 Influenza Pandemic at Norway House". *Ethnohistory* 1993;41(1):73-105.

Herring DA. "The 1918 Influenze Epidemic in the Central Canadian Subarctic". In Herring A, Chan L, (eds). *Strength and Diversity: A Reader in Physical Anthropology* Toronto, Canadian Scholars' Press, 1994;365-84.

Hiley C. "Old Advice on Infants' Sleeping Position". *Sudden Infant Death Research Inc* Red nose day, Australia, 1995;5.

Hobart M. "Teste est un con". In *Context and Levels: Anthropological essays on hierarchy*, ed. RN Barnes, D deCappet and RJ Parker, Oxford: Jaso Occasional Papers 1985;No. 4:33-53.

Hood E. *Fighting Dirt: The World's Greatest Warfare*. London, Harrap, 1916.

Hultkrantz A. *Shamanic Healing and Ritual Drama: Health and Medicine in Native North American Religious Traditions*. New York, Crossroad, 1992.

Hurlich M. "Historical and Recent Demography of the Algonkians of Northern Ontario". In Steegmann AT Jr, (ed). *Boreal Forest Adaptations: The Northern Algonkians* New York, Plenum, 1983;143-200.

Hutchens AR. *Indian Herbalogy of North America: The Definitive Guide to Native Medicinal Plants and Their Uses*. Boston, Shambhala, 1991.

Irwin KL, Mannino S, Daling J. "Sudden infant death sydrome in Washington State: Why are Native Americans at greater risk than white infants?". *J Pediatr* 1992;(121):242-247.

Jenness D. *Indians of Canada*. University of Toronto Press, Toronto, Ontario 1977.

Jordan B. "Cosmopolitical Obstetrics: Some Insights from the Training of Traditional Midwives". *Social Sci Medicine* 1989;28(9):925-944.

Jordan B. "Embodied Knowledge/Authoritative Knowledge". Annual Meeting of the American Anthropology Association, Phoenix, Az. November, 1988.

Jordan B. "External Cephalic Version as an Alternative to Breech Delivery and Caesarean Section". *Social Science and Medicine* 1984;18 (8):637-651.

Jordan B. "The Self-Diagnosis of Early Pregnancy: An Investigation of Lay Competence". *Medical Anthro* 1977;1(2):1-38.

Jordan B, Irwin S. "A close encounter with a Court-Ordered Cesarean Section: A Case of Differing Realities". In *Case Studies in Medical Anthropology: A Teaching and Reference Source* Baer Hans, (ed). Science Publications, Gordon and Breach, 1987.

Jordan B, Irwin S. "The Ultimate Failure: Court-Ordered Cesarean Section". In *New Approaches to Human Reproduction* Whiteford, Poland, (eds). Boulder, CO. Westview Press, 1989.

Jordan B. *Birth in Four Cultures: A Crosscultural Investigation of Childbirth in Yucatan, Holland, Sweden and the United States*. Waveland Press, Inc. Illinois, 1993.

Kaufert, Joseph M. "Sociological and Anthropological Perspectives on the Impact of Interpreters on Clinician/Client Communication". *Sante Culture Health* Vol VII (2-3), 1990.

Kaufert Joseph M, O"Neil John D. "Biomedical Rituals and Informed Consent: Native Canadians and the Negotiation of Clinical Trust". In *Social Science Perspectives on Medical Ethics* Weisz George, (ed). University of Pennsylvania Press, Philadephia, 1990 .

Klonoff-Cohen HS, Edelstein SL, Schneider-Lefkowitz E, Sreveason P, Kaegi D, Chang JC. "The Effect of Passive Smoking and Tobacco Exposure Through Breast Milk on Sudden Infant Death Syndrome". *Journal of American Medical Association* 1995;273(10):795-798.

Kluckhohn C, Leighton D. *The Navaho*. Garden City, N.Y. Doubleday, 1962.

Kraus JF, Borhani NO. "Post-neonatal Sudden Unexplained Death in California: a cohort study". *Am J Epidem* 1972;(95):497-510.

Kraus JF, Bulterys M. "The epidemiology of sudden infant death syndrome". In Kiely M, (ed). *Reproductive and Perinatal Epidemiology*. London: CRC Press, 1991.

Krech S III. "Disease, Starvation and Northern Athapaskan Social Organization". *American Ethnologist* 1983;5:710-32.

Langner N. *National Database on Breastfeeding among Indian and Inuit Women; survey of infant feeding practices from birth to six months, Canada 1988, Final Report.* Medical Services Branch, Health and Welfare Canada, Ottawa 1990.

Lave J, Wenger, E. *Situated Learning: Legitimate Peripheral Participation*. N.Y. Cambridge University Press, 1991.

Lean MEJ, Jennings G. "Brown adipose tissue activity in pyruial cases of cot death". *Journal of Clinical Pathology* 1989;42:1153-1156.

Lee Tang G. *Condensation in Manufactured Housing*. Alberta Municipal Affairs, Edmonton, 1987.

Lee Tang G. "Particle size and airborne contaminants". Personal Communication. 1998

Lee NNY, Chan YF, Davies DP, Lau E, Yip DCP. "Sudden infant death syndrome in Hong Kong: confirmation of low incidence". *Br Med J* 1989;(298):721.

Leiderman PH, Talkin SR, Rosenfeld A, (eds). *Culture and Infancy: Variations in the Human Experience*. Academic Press, Inc. NY, 1977.

Li DK, Daling JR. "Maternal smoking, low birth weight and ethnicity in relation to Sudden Infant Death Syndrome". *Am J. Epidemiol* 1991;(134):958-964.

Little RE, Peterson DR "Sudden Infant Death Syndrome Epidemiology: A Review and update". *Epidemiological Reviews* 1990;12:241-246.

Litwin P. "Use of nebulizers and bronchodilators". Alberta College of Respiratory Therapy, personal communication, 1997

Loudon I. *Death in Childhood: An International Study of Maternal Care and Maternal Mortality, 1800-1950*. Clarendon Press, Oxford, 1992.

Loudon I, (ed). *Western Medicine*. Oxford University Press, 1997.

Mach AM, Lindsay JA. "Activation of *Clostridium perfringens* cytotoxic enterotoxin(s) *in vivo* and *in vitro* role in triggers for sudden infant death". *Current Microbiology* 1994;28:261-267

Mackenzie DAC, James VS, Elton RA, Zorgani A, Blackwell CC, Weir DM, Busuttil A, Gibson A. "Toxigenic Bacteria and SIDS: Nasopharyngeal Flora in the First Year". Sudden Infant Death Syndrome Conference, The Fourth SIDS International Conference, Washington, D.C. June 1996;167.

McElroy A "Biocultural Models in Studies of Human Health and Adaptation". *Medical Anthropology Quarterly* 1990;4:243-265.

McGlashan ND. "Sudden infant deaths in Tasmania, 1980-1986: a seven year prospective study". *Soc Sci Med* 1989;29:1015-26.

McKenna J, Mosko S, Richard C. "Frequency and Duration of Breast Feeding Among Routinely Bedsharing and Routinely Solitary Sleeping Latino Mother-Infant Pairs". Fourth International SIDS Conference Washington, D.C. Conference Handout Materials 1996;101-107.

McKenna J. "An anthropological perspective on the sudden infant death syndrome (SIDS): the role of parental breathing cues and speech breathing adaptation". *Med Anthropol* 1986;Vol. 10.

McKenna JJ, Mosko S, Dungy C, McAninch J. "Sleep and Arousal Patterns of Co-Sleeping Human Mother/Infant Pairs: A Preliminary Physiological Study with Implications for the Study of Sudden Infant Death Syndrome (SIDS)". *American Journal of Physical Anthropology* 1990;(83):331-347.

Millar W, Hill G. "Epidemiology of SIDS in Canada". *Canadian Medical Association Journal* 1993;(149):629-635.

Mitchell EA, Ford RPK, Stewart AW, Taylor BJ, Becroft DMO, Thompson JMD. "Smoking and the Sudden Infant Death". *Pediatrics* 1993;91(5).

Mitchell EA, Stewart AW, Scragg R. "Ethnic differences in mortality from sudden infant death syndrome in New Zealand". *BMJ* 1993;306(13-16).

Mitchell EA, Scragg R, Steward AW. "Results from the first year of the New Zealand cot death study". *NZ Med J* 1991;104:71-76.

Mitchell EA. "Sleeping position of infants and the sudden infant death syndrome". *Acta Paediatr Suppl* 1993;389:26-30.

Moffatt, Michael E. "Sudden Infant Death Syndrome in Aboriginal Infants". *The Proceedings of the Workshop on Reducing the Risks of SIDS in Canada* Hodges S, (ed). Vancouver, Canada, 1993;50.

Moffatt MEK, Gray D, Postl BD. "Sudden Infant Death Syndrome in Manitoba, Confirmation of High Rates for Indians". *Arctic Medical Research* 1988;47(Supp 1): 528.

Molotch H, Lester, M. "News as Purposive Behavior: On the Strategic Use of Routine Events, Accidents and Scandals". *Am Sociological Review* 1974;Vol. 39(1):101-12.

Moore SF. "Explaining the Present: Theoretical Dilemmas in Processual Ethnography". *American Ethnologist* 1987;14:727-36.

Moran E.F. "Human adaptation to Arctic zones". *Annual Review of Anthropology* 1981;Vol. 10.

Morria P. *Loss and Change*. Anchor Books, Doubleday and Company, Garden City, N.Y. 1975.

Morris JA, Haran D, Smith A. "Hypothesis. Common bacterial toxins are a possible cause of sudden infant death syndrome". *Medical Hypotheses* 1987;22:211-222.

Morrison HI, Semenciw RM, Mao Y, Wigle DT. "Infant Mortality on Canadian Indian Reserves, 1976-1983". *Canadian Journal of Public Health* 1986;77(July/Aug).

Mouricourt M, Petit JM, Carlas JR, Julien R. "Glycoprotein glycans that inhibit adhesion of *Escherichia coli* mediated K99 fimbriae: Treatment of experimental colibacillosis". *Infection and Immunity*, 1990, 58:98-106

Muir B. *Health Status of Canadian Indians and Inuit - 1990*. Ottawa: Indian and Norther Health Services, Health and Welfare Canada, 1991:Cat H34-48.

Naeye RL, Landis B, Drage JS. "Sudden infant death syndrome: A prospective study". *American Journal of Diseases of Childhood* 1976;130:1207-1210.

Nelson T. *Sudden Infant Death Syndrome and Child Care Practices*. Pub. Dept. of Paediatrics, Hong Kong, 1996.

Nelson EAS, Taylor BJ, Weatherall IL. "Sleeping position and infant bedding may predispose to hyperthermia and sudden infant death syndrome". *The Lancet* 1989;(i):199-201.

Nicholl JP, O'Cathian A. "Sleeping position and SIDS". *The Lancet* 1986;(ii):106.

O'Conner S, Monture P, O'Connor N. "Grandmothers, Mothers and Daughters". *Canadian Women Studies 10* 1989;Vol 2 and 3:39-40.

Oliver-Smith Anthony. *The Martyred City: Death and Rebirth in the Andes*. Waveland press, Inc. Illinois, 1992.

Ponsonby AL, Dwyer T, and Jones ME. "Sudden infant death syndrome: seasonality and a biphasic model of pathogenesis". *Journal of Epidemiology and Community Health* 1992;46:33-37.

Ponsonby AL, Dwyer T, Gibbsons LE, Cochrane JA, Wang YG. "Factors Potentiating the Risk of Sudden Infant Death Syndrome Associated with the Prone Position". *New England Journal of Medicine* 1993;329(6):377.

Postl B Irvine J MacDonald S and Moffatt M. "Background paper on health of Canada's Aboriginal People". In *Bridging the Gap* The Canadian Medical Association, 1993.

Rabinow P, (ed). *The Foucault Reader*. Pantheon Books, N.Y. 1984.

Radcliffe-Brown AR, Forde D, (eds). *African Systems of Kinship and Marriage*. Oxford, Oxford University Press, 1958.

Ramenofsky AF. *Vectors of Death: The Archaeology of European Contact*. Albuquerque, University of New Mexico Press, 1987.

Rasmusen D. "Fungus May be Linked to Infant Deaths". *Indoor Air Review* 1996;Vol. 6, No. 4.

Ray AJ. "Diffusion of Diseases in the Western Interior of Canada, 1830-1950". *Geographical Review* 1976;66(2):13-26.

Reynolds PC, *Stealing Fire: The Mythology of the Technocracy*. Iconic Anthropology Press, Palo Alto, CA, 1991.

Rintakaka PJ, Hiravonen J. "The epidemiology of sudden infant death syndrome in Finland in 1969-80". *Forensic Sci In* 1986;30:219-33.

Ritenbaugh C "Body Size and Shape: A Dialogue of Culture and biology". *Medical Anthropology* Vol 13, 1991: 175.

Robinson H, Cumming M. "Sudden Infant Death Syndrome and Canadian Aboriginal Infants". *The Proceedings of the Workshop on Reducing the Risks of SIDS in Canada* Hodges S, (ed). Vancouver, 1993.

Saadi AT, Blackwell CC, Essery SD, Weir DM, Busuttil A. "Comparison of Human Milk and Infant Formula on Inhibition of Bacterial Binding and Neutralisation of

Toxins". Sudden Infant Death Syndrome Conference, The Fourth SIDS International Conference, Washington, D.C. June 1996;166.

Sahlins M. "Other Times, Other Customs: The Anthropology of History". *American Anthropologist* 1983;83(3):517-44.

Sargent C, Bascope G. "Ways of Knowing About Birth in Three Cultures". *Med Anth Quarterly* 1996;Vol. 10, No. 2.

Sayers NM, Drucker DB, Telford DR, Morris JA. "Synergistic Interaction of Bacterial Toxins and Nicotine in Sudden Infant Death Syndrome (SIDS)". Sudden Infant Death Syndrome Conference, The Fourth SIDS International Conference, Washington, D.C. June 1996;87.

Scheper-Hughes N, (ed). *Child Survival*. D. Reidel Publishing Co. Holland, 1987.

Schwarz, MT. "Unravelling the Anchoring Cord". *American Anthropologist* 1997;99(1).

Scragg R, Stewart AW, Mitchell EA, Ford RPK, Thompson JMD. "Public health policy on bed sharing and smoking in the sudden infant death syndrome". *New Zealand Medical Journal* 1995;108.

Sesia PM. "Women Come Here on Their Own When They Need To". Prenatal Care, Authoritative Knowledge, and Maternal Health in Oxaca". *Med Anth Quarterly* 1996;Vol. 10, No. 2.

Shah CP. "The health of children of low income families". *Canadian Medical Association Journal* 1987;137:485-490.

Shannon DC, Kelly DN. "SIDS and Near-SIDS: First of Two Parts". *New England Journal of Medicine* 1982;Vol. 306.

Smith FB. *The People's Health, 1830-1910*. London, Croom Helm, 1979.

Snow D, Lanphear K. "European Contact and Indian Depopulation in the Northeast: The Timing of the First Epidemics". *Ethnohistory* 1987;35:15-35.

So, J.K. "Human biological adaptation to Arctic and Subsrctic zones". *Annual Review of Anthropology* 1982;Vol. 9.

Stanton AN. "Overheating and cot deaths". *The Lancet* 1984;(ii):1199-1201.

Statistics Canada. "Income Distribution by Size in Canada, 1994". Ottawa Catalogue 13-207.

Statistics Canada. *Profile of census tracts in Edmonton Part B*. Ottawa: Industry, Science and Technology Canada, 1992. 1991 Census of Canada. Catalogue 95-378.

Steele R, Langworth JT. "The Relationship of Ante-natal and Post-natal Factors to Sudden Unexpected Death in Infancy". *Canadian Medical Association Journal* 1966;94:1165.

Stewart MJ, Brosky G, Gillis A, Jackson S, Johnston G, Kirkland S, Leigh G, Pawliw-Fry BA, Persaud V, and Rootman I. "Disadvantaged Women and Smoking". *Canadian Journal of Public Health* 1996;July-August.

Strathern M. "Artifacts of History: Events and the Interpretations of Images". In *Culture and History in the Pacific* Siikala J, (ed). Helsinki, Finnish Anthropological Society, 1990;25-44.

Suchman L, Jordan B. "Validity and the Collaborative Construction of Meaning". In *Questions about Questions: Inquiries into the Cognitive Bases of Surveys* Tanur J, (ed). New York, Russel Sage, 1991.

Tansey EM "From the Germ Theory to 1945". In *Western Medicine* Loudon I, (ed). Oxford University Press, 1997.

Thornton R, Miller T, Warren J. "American Indian Population Recovery Following Smallpox Epidemics". *American Anthropologist* 1991;93(1):28-45.

Townsend P, Davidson N, (eds). *Inequalities in Health: The Black Report and the Health Divide.* Whitehead M. (ed.) Penguin Books, London, 1990.

Turner Victor W. "Betwixt and Between: The Liminal Period in Rites de Passage". In *Reader in Comparative Religion: An Anthropological Approach* Lessa WA, Vogt EZ, (eds). Harper and Row, London, 1979.

Ubelaker DH "North American Indian Population Size: Changing Perspectives". In Verano JW, Ubelaker DH, (eds). *Disease and Demography in the Americas* Washington, DC, Smithsonian Institution Press, 1992;169-76.

Valdes-Dapena M. "Sudden Infant Death Syndrome: A Review of the Medical Literature 1974-79". *Pediatrics* 1980;66:597-614.

Valdes-Dapena M. *Sudden Unexplained Infant Deaths: An Evolution in Understanding.* Department of Health Education and Welfare, 1978.

Vanlandingham MJ, Buehler JW, Hogue CJR, Strauss LT. "Birthweight-specific infant mortality for Native Americans compared with whites, six states". *Am J of Public Health* 1980;(78):499-503.

Wailoo MP, Petersen SA, Whittaker H, Goodenough:"The thermal environment in which 3-4 month old infants sleep at home". *Arch Dis Child* 1989;(64):600-604.

Waldram JB, Herring D, Young TK. *Aboriginal Health in Canada: Historical, Cultural and Epidemiological Perspectives.* Toronto, University of Toronto Press, 1995.

Waxman AC. "Navajo Childbirth in Transition". *Medical Anthropology* 1991;Vol. 12.

Wenger E. *Toward a Theory of Cultural Transparency: Elements of a Social Discourse of the Visible and Invisible.* PhD Dissertation, Department of Information and Computer Sciencee, U of California at Irvine, 1990.

Wigfield RE, Fleming PJ, Berry PJ, Rudd PT, Golding J. "Can the fall in Avon's sudden infant death rate be explained by changes in sleep position?". *Br Med J* 1992;(304):282-283.

Wikan U, *Managing Turbulent Hearts, A Balinese Formula for Living.* The University of Chicago Press, Chicago, 1990.

Wilcox A, Skjaerven R, Buekens P, Kiely J. "Birthweight and Prenatal Mortality: A comparison of the United States and Norway". *Journal of the American Medical Association* 1995;273(9).

Williams G, (ed). *Andrew Graham's Observations on Hudson's Bay,* 1769-91, London, Hudson Bay Historical Society, 1969.

Williams PL, Innis SM, Vogel AMP. "Breastfeeding and Weaning Practices in Vancouver". *Canadian Journal of Public Health* 1996;July-August:231-236.

Willinger M, James LS, Catz C. "Defining the sudden infant death syndrome (SIDS): Deliberations of an Expert Panel Convened by the National Institute of Child Health and Human Development". *Pediatric Pathology* 1991;11, 677-684.

Wilson E. "Sudden Infant Death Syndrome in China". *The Lancet* 1990;336(8724):1199-1200.

Wilson E. *Sudden Infant Death Syndrome in Cross-Cultural Context and Cultural Perturbations.* Unpublished M.A. Thesis, University of Calgary, 1990.

Wolf E. *Europe and the People Without History.* University of California Press, Berkeley, 1982.

Wright Peter WG. "Babyhood: The Social Construction of Infant Care as a Medical Problem in England in the Years Around 1900". In *Biomedicine Examined* Lock Margaret, Gordon Deborah, (eds). Kluwer Academic Press, Dordrecht, The Netherlands, 1988;299-329.

Wright Peter, Treacher J, (eds). *The Problem of Medical Knowledge: Examining the Social Construction of Medicine.* Edinburgh University Press, 1982;1-19.

Young TK. "Mortality patterns of isolated Indians in Northwestern Ontario: a 10-year review". *Public Health Report* 1983;(98):467-475.

Young TK. *Health Care and Cultural Change: The Indian Experience in the Central Subarctic*. Toronto, University of Toronto Press, 1988.

Young TK. *The Health of Native Americans*. Oxford: Oxford University Press, 1994.

Zeitlyn S, Rowshan R. "Privileged Knowledge and Mothers' 'Perceptions': The Case of Breast feeding and Insufficient Milk in Bangladesh". *Medical Anthropology Quarterly* 1997;11:56-68.

APPENDICES

APPENDIX A

QUESTIONNAIRE ON INFANT CARE PATTERNS

by Elizabeth Wilson

Department of Anthropology

University of Manitoba

Funded by

Northern Scientific Training Program

and

Social Sciences and Humanities Research Council of Canada

Thank you very much for your cooperation and help. Your responses to these questions will be used to determine the type of infant care used by today's Aboriginal mothers in Northern Alberta. We will have a meeting after I have completed my questionnaires to tell you what the written report will show.

HISTORY:

Band Name: _____

Member of Band: Yes _____ No _____

If "No", Are you a member of another Band: Yes _____ No_____

If "Yes", which Band: _____

_____ _____

Case Identification Number Assigned Date Conducted

_____ _____

Location of Residence Infant's Birth Date

Mother's Age _____ Infant's Birth Weight _____

Other Births: Yes _____ No _____

If **YES**, year(s) of previous birth(s): 1)_____

2)_____

3)_____

4)_____

I. GENERAL QUESTIONS:

1) What kind of heating do you have in your home?

a) gas b) electric c) fire place d) central

e) wood stove f) none g) other _____

2) What makes you decide to turn the heat on?

a) when you begin to feel cold
b) when you think that the baby is cold
c) when others complain about it being cold
d) other reason

_____

3) Do you use one of these?

a) portable heater b) electric heater

c) heating pad d) heated water bed

3a) How many rooms are there in your house? _____

3b) What type of ventilation is there? _____

3c) How many windows are there in your house?_____

3d) Instrument readings of C02_____

3e) Instrument readings of C0_____

(3d and 3e readings to be taken by researcher)

4a) How do you tell if the baby is too hot?

_____

4b) How do you tell if the baby is too cold ?

_____

4c) How do you keep the baby's temperature just right?

_____

4d) What makes you think the baby's body temperature is not all right?

_____

5) If the baby gets sick do you:

a) warm the house Yes____ No____
b) cool the house Yes____ No____
c) add blankets to baby's bed Yes____ No____
d) take away blankets Yes____ No____
e) keep to the same routine Yes____ No____

6) Do you have running water? Yes____ No____

7a) Do you have a flush toilet? Yes____ No____

7b) Do you have an outhouse? Yes____ No____

7c) Or do you use a pail or bucket? Yes____ No____

8) What type of diapers do you use? Cloth_____ Disposable_____

9) How many people in the house smoke? _____

9a) Who are they?_____

9b) Where do they smoke?_____

9c) How often do they smoke?_____

10) About how many cigarettes are smoked in the house per day? _____

11) Do you smoke? Yes___ No____ Sometimes_____ A few a day_____

12) If **YES**, how many cigarettes did you smoke during your pregnancy?

_____

13) What kind of milk does baby drink? Breastmilk _____ Formula _____

14) Why? _____

15) If breastfeeding, do you
a) only give baby breastmilk
b) give baby breastmilk and some formula
c) give baby breastmilk, formula and some other liquids
d) give baby breastmilk during the night and formula during the day

Yes____ No____

16) If only breastmilk, how long will you (did you) do this? _____

16a) Why for this length of time? _____

II. SLEEP PATTERNS:

17) Where does the baby normally sleep?

_____

17a) Please show me where the baby normally sleeps

_____

17b) Does your baby sleep:

A) Alone in its bed?

B) With others?

If A) go to Question 27

If B) go to Question 18a

QUESTIONS IF CO-SLEEPING PATTERN:

18a) Who else sleeps in the bed?

_____

18b) Why do you/ or they sleep here?

_____

18c) Who sleeps next to whom in the bed?

_____

18d) When you lie the baby down on the surface do you think about which way you want the baby to face Yes_____ No_____

18e) If **YES**, what is your reason for facing the baby one way or the other?

_____

18f) How often do you have the baby face in that direction?

a)always b)sometimes c) I don't care which way d) it changes

18g) When you are in bed with the baby, which direction do you face?

_____

18h) Why?_____

_____

18i) What makes you turn your face? _____

18j) How close do you like your face to be to the baby's?

a)very close b)touching c)not too close d)I don't know

18k) Why? (to any of the responses above) _____

19) How many blankets are placed on the infant?

a)one b)two c)more _____ d)same as I have in bed _____

19a) Do you place a blanket under the baby? Yes____ No____

19b) What does your baby wear when he or she is asleep?

_____

19c) Does anyone else sleep in the same room as you and the infant but on a separate surface? Yes____ No____

19d) If **YES**, who and where?

_____

20) How many nights a week does the baby sleep here?

a) every night b)every other night c)only on weekends d) other numbers___

20a) On a usual night , how many **hours** a night is the baby on this surface?

_____

20b) How many hours a night does the baby sleep without waking?

_____

21) When you sleep with the baby, what position is the baby in?

a) on its stomach b) on its back c) on its side

21a) Why do you choose this position?

_____

_____

21b) Do you ever place the baby in another position to sleep?

Yes____ No____

21c) If **YES,** why? And under what circumstances?

_____

_____

22) How do you feel about sharing a bed with your infant?

a) fine b) never thought about it c) it worries me d) not worried

22a) If you worry about sharing a bed with your infant, what makes you worry?

a) its unsafe b) its uncomfortable c) want baby to have own bed

d) other reasons

_____

_____

23) How does the baby's father feel about you sleeping with the baby?

a) he is against it
b) he tolerates it, but would prefer a different arrangement
c) he doesn't care
d) he supports it
e) he insists upon it

24) Do you put the baby's head on a pillow? Yes____ No____

24a) If **YES**, how many pillows and what kind of filling? _____

_____

24b) If **NO**, why not? _____

25) What else is usually in the bed

_____

26) The surface of the bed you share with the baby is: (show me, please)

a) extremely soft (baby's body compresses it a great deal)

b) firm (baby's body hardly compresses it)

c) very firm (baby's body does not compress it)

III. SOLITARY SLEEPERS:

27) Please show me where the baby sleeps?

_____

28) Why did you choose this place for the baby?

_____

29) Are there times when the baby does not sleep here? Yes____ No____

30) If **YES**, are there times when the baby sleeps with you or someone else?

Yes____ No____

31) How many nights a week does the baby sleep somewhere else?

a) none b) one c) two d) three e) more

32) Does the baby sleep in its own bed for the entire night?

Yes____ No____

33) If NO, how many hours a night does the baby sleep alone?

a) eight hours b) seven hours c) six hours

d) five hours e) less than five hours

34) If NO, why do you change where the baby sleeps?

_____

35) Does someone else sleep in the same room as the baby, but in another bed ?

Yes____ No____

36) If **YES**, who is that person

---

37) If **YES**, how far away do they sleep from the baby?

a) ten feet b) five feet c) beds touching d) lets measure it

---

38) Who else sleeps in the house?

---

39) How many blankets do you put on your baby at night? _____

40) The surface of the bed you share with the baby is: (show me, please)

a) extremely soft (baby's body compresses it a great deal)
b) firm (baby's body hardly compresses it)
c) very firm (baby's body does not compress it)

41) Does the baby have a pillow in its own bed? Yes____ No____

42) If **YES**, how many pillows and what kind of filling does the pillow have:

42a) Are there stuffed toy animals in or near the bed when infant is sleeping?

For all Mothers:

43) At night, do you wrap the blankets around the baby? Yes____ No____

44) Please show me how you put the blankets around the baby for night sleeping?

---

45) When you sleep separately from the baby what position do you put the baby in?

a) it's stomach b) it's back c) it's side

46) Why do you use this sleeping position for the baby?

---

47) Do you ever change the sleeping position of the baby? Yes____ No____

48) If **YES**, why ?

_____

49) How do you feel about your baby sleeping in a separate bed or room?

_____

50) Why?

_____

51) Did some other person help you make decisions about how you to look after your baby? Yes_____ No_____

51a) If **Yes**, who? _____

51b) Why do you follow the advice of this person?

_____

52) If you have older children did you look after them the same way as you do this infant?

Yes____ No____

52a) If no, what have you changed

_____

52b) Why? _____

52c) If you have more babies will you continue to look after them the way you are looking after this infant? Yes____ No____

52d) If No, what would you change?

_____

52e) Why? _____

52f) What advice have you given or will you give to your daughters about infant care?

_____

_____

53a) Did you use a navel binder? Yes____ No____

53b) Did you save the baby's cord? Yes____ No____

53c) Did you put the baby's cord in a special place? Yes____ No____

53d) Where did you put it? _____

APPENDIX B1

CONSENT FORM FOR SENIOR WOMEN

Elizabeth Wilson
Department of Anthropology
University of Manitoba
Winnipeg, Manitoba

SUDDEN INFANT DEATH RESEARCH PROJECT

Chief and Council Approval - Motion #108-94-95, Dated Oct. 1994

I understand that Ms. Wilson, together with ....., an interpreter, wishes to talk to me about the traditional way we Aboriginal women looked after our babies.

All information will be addressed and recorded in such a manner as to protect my name, reserve, and location. Questions will be about sleeping environment, sleeping position, swaddling and general infant care practices.

....

Mother Witness

Date:.....

APPENDIX B2

CONSENT FORM FOR WOMEN WITH INFANTS

Elizabeth Wilson
Department of Anthropology
University of Manitoba
Winnipeg, Manitoba

SUDDEN INFANT DEATH RESEARCH PROJECT

Chief and Council Approval - Motion #108-94-95, Dated Oct. 1994

I have been told about the research project Ms. Wilson wishes to complete on SIDS by the interpreter .....

I understand that I have the right not to participate in the project and that I can withdraw at any time from the project if I do agree to participate. During all interviews, Ms. Wilson will be accompanied by ....., who will act as interpreter.

All information gathered will be recorded in such a way that I will remain anonymous. Complete confidentiality will be maintained about this information.

I understand that my infant's ear temperature will be taken as it sleeps during the time of the interview, and that the room temperature will also be recorded. I have the right to agree to be involved in the research while choosing to decline the recording of temperature readings.

Ms. Wilson, through the interpreter, will ask me where my baby sleeps, in what position (on the tummy or on the back or side), and who sleeps with the baby. These questioned can be answered or not as I choose.

I am also aware that Ms. Wilson has Chief and Council approval for this research, as well as the approval of the University of Manitoba and its Ethics Committe to conduct this project.

The data collected will be used to help understand SIDS and may be used to identify factors which may assist in altering the frequency of SIDS. Identification of sleeping practices now used may help to isolate a variable which could be changed or to eliminate that variable as a factor under consideration as contributing to the frequency of SIDS among Aboriginal peoples.

Mother agrees to participate in the project by signing at line (A).

Mother also agrees to temperature recording by signing at line (B).

(A) ....

.....

Mother Witness Date

(B) ....

.....

Mother Witness Date

APPENDIX C

ASSISTANT RESEARCHER

CONFIDENTIALITY AGREEMENT

I, ..., acting as interpreter for Elizabeth Wilson on the Sudden Infant Death Research Project approved by the Bigstone Chief and Council (Motion #108-94-95) agree that all information made known to me by those being interviewed, as well as by Ms. Wilson in conversation concerning the project, will be kept entirely confidential by me and will not be revealed by me to any persons not authorized by Ms. Wilson.

Signed:..... Witness:.....

Date:.....

APPENDIX D

The Bolton Model Spreadsheet

(on following pages)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	This is a spreadsheet-based computer model of the heat losses from a baby in known conditions.													
2	It requires Microsoft Excel v 2.2 or later to run. Computation set to: "Manual", "Iterate" maximu													
3	Fill in the data in the cells designated by solid borders. If the model crashes exit WITHOUT SAVI													
4	ambient PH2O	Ar	upper/lo	% B	%"e	%BS	area of	L in	Tskl	PH2	Cond.	Rad.	Evap.	heatlos
5	1	1	Scalp	9.5	0.7	6.65	0.021	6.6	33	21	116.1	31.3	17.2	3.37
6	ambient temp	2	Forehe	6	0.9	5.4	0.017	0	26	14	376.8	110.0	37.3	9.03
7	5	3	Lower f	5.5	0.7	3.85	0.012	22	35	23	44.4	11.7	7.3	0.79
8	Posture(1-4)	4	Trunk	26	0.7	18.2	0.059	30	35	24	34.0	9.0	5.7	2.85
9	2	5	Bottom	6	0.7	4.2	0.014	38	34	23	26.2	6.9	0.0	0.45
10	lateral =1	6	Upper a	8	0.9	7.2	0.023	26	34	22	38.2	10.1	6.2	1.26
11	supine =2	7	Forear	6	0.6	3.6	0.012	26	33	21	36.5	9.6	5.8	0.60
12	prone =3	8	Hands	5	0.5	2.5	0.008	19	34	23	49.9	13.2	8.1	0.57
13	Prone/facedown	9	Thighs	11	0.7	7.7	0.025	22	35	23	43.9	11.6	7.2	1.55
14		10	Lower l	10	0.7	7	0.023	22	34	23	43.7	11.5	7.1	1.40
15	Body length	11	Feet	7	0.8	5.6	0.018	24	33	21	38.8	10.2	6.2	0.99
16	61	##	Scalp	9.5	0.3	2.85	0.009	97	36	24	11.1	2.9	1.9	0.15
17	Body weight	##	orehead	6	0.1	0.6	0.002	90	36	24	11.9	3.1	2.1	0.03
18	6	##	er face	5.5	0.3	1.65	0.005	112	36	24	9.7	2.5	1.7	0.07
19	Body Surface ar	##	Trunk	26	0.3	7.8	0.025	120	36	25	9.1	2.4	1.6	0.33
20	0.322	##	Bottom	6	0.3	1.8	0.006	128	36	24	6.4	2.2	0.0	0.06
21	Fr. humidity at s	##	er arms	8	0.1	0.8	0.003	115	36	24	9.3	2.4	1.6	0.03
22	0.55	##	rearms	6	0.4	2.4	0.008	115	35	24	9.2	2.4	1.6	0.10
23	Core temperat	##	Hands	5	0.5	2.5	0.008	109	36	24	9.9	2.6	1.7	0.11
24	36.1	##	Thighs	11	0.3	3.3	0.011	112	36	24	9.6	2.5	1.7	0.15
25		##	er legs	10	0.3	3	0.010	112	36	24	9.6	2.5	1.7	0.13
26	Respiratory	##	Feet	7	0.2	1.4	0.005	114	36	24	9.5	2.5	1.6	0.06
27	Evaporative wat	=	1.6953			100	0.322		35			0.0		24.112
28	40.65	IPH20											Metab	13.29
29	0.043	ICH20						N	waterproof nappyliner					
30	1.05	Ve	onductivity, core to skin											
31	0.045	IH2O				or	Low							
32	13.29	Metabolic input												
33														
34														
35														
36			g H2O/	watts/m2										
37	Scalp	16	10.1											
38	Forehead	53	33											
39	Lower face	16	10.1											
40	Trunk	17	10.5											
41	Bottom	11	7.1											
42	Upper arms	13	7.8											
43	Forearms	15	9.6											
44	Hands	15	9.2											
45	Thighs	12	7.4											
46	Lower legs	12	7.4											
47	Feet	13	8.3											

	O	P	Q	R	S	T	U	X	Y	AA	AB	A	AE	AF	AG	AH	AI	AJ
1																		
2	10 times.																	
3	G CHANGES.							Maximum										FACE
4	core/	Actual ev		hi con		surface		g H2O/m		Q/Q			L/S	P/F	LATERA	SUPINE	PRONE	DOWN
5	50	10		69		11.5		10.1		1.4	50		0.7	0.9	0.7	0.7	0.8	0.9
6	52	33		71		26.1		33		1.4	52		0.9	0.2	0.7	0.9	0.65	0.15
7	49	7.3		99		7.485		10.1		2	49		0.7	0.5	0.7	0.7	0.5	0.5
8	60	5.7		156		6.905		10.5		2.6	60		0.7	0.7	0.7	0.7	0.7	0.7
9	19	0		50		6.468		7.1		2.6	19		0.7	0.9	0.7	0.7	0.9	0.9
10	30	6.2		68		7.138		7.8		2.3	30		0.9	0.9	0.9	0.9	0.9	0.9
11	17	5.8		68		7.045		9.6		4	17		0.6	0.6	0.6	0.6	0.6	0.6
12	40	8.1		240		7.793		9.2		6	40		0.5	0.5	0.5	0.5	0.5	0.5
13	40	7.2		80		7.461		7.4		2	40		0.7	0.7	0.7	0.7	0.7	0.7
14	36	7.1		180		7.447		7.4		5	36		0.7	0.7	0.7	0.7	0.7	0.7
15	20	6.2		238		7.172		8.3		12	20		0.8	0.8	0.8	0.8	0.8	0.8
16	50	1.9		69		5.624		10.1		1.4	50							
17	52	2.1		71		5.669		33		1.4	52							
18	49	1.7		99		5.541		10.1		2	49							
19	60	1.6		156		5.507		10.5		2.6	60							
20	19	0		50		5.47		7.1		2.6	19							
21	30	1.6		68		5.522		7.8		2.3	30							
22	17	1.6		68		5.516		9.6		4	17							
23	40	1.7		240		5.554		9.2		6	40							
24	40	1.7		80		5.54		7.4		2	40							
25	36	1.7		180		5.539		7.4		5	36							
26	20	1.6		238		5.529		8.3		12	20							
27	25.8	watts																
28	total	loss																
29																		
30																		
31																		
32																		
33																		
34																		
35																		
36																		
37																		
38																		
39																		
40																		
41																		
42																		
43																		
44																		
45																		
46																		
47																		

APPENDIX E

Ear Temperatures Registered of Awake and/or Sleeping Infants in Residence at Research Site Awake (Not Wrapped); Sleeping (Wrapped) Centigrade Readings

Baby No.	Awake	Sleeping	House Temperatures
1	36.3	36.4	24.0
2	37.1	n/a	23.7
3	36.4	n/a	26.2
4	36.4	n/a	24.0
5	35.7	37.3	24.7
6	36.3	n/a	22.7
7	36.5	n/a	24.7
8	36.8	n/a	26.4
9	36.7	n/a	21.8
10	37.0	n/a	23.8
11	35.7	37.3	24.4
12	36.8	37.7	20.0
13	37.0	n/a	21.7
14	37.3	n/a	27.5
15	36.4	n/a	26.1
16	37.7	36.8	23.8
17	36.8	n/a	24.0
18	36.3	n/a	20.2
19	36.9	n/a	23.7
20	36.4	n/a	22.7
21	37.3	37.7	23.4
22	36.9	37.5	27.2
23	36.8	n/a	24.4
24	35.2	n/a	21.2
25	n/a	37.7	28.4
26	35.8	n/a	22.6
27	n/a	38.1	19.0
28	n/a	37.8	21.0
29	36.7	n/a	25.0
30	36.7	n/a	25.0
31	36.7	n/a	25.0
32	36.5	37.7	17.0
33	38.1	n/a	23.0
34	37.4	n/a	26.1

35	37.7	37.7	28.2
36	37.6	n/a	23.1
37	37.3	n/a	22.8
38	36.5	37.3	25.4
39	37.3	n/a	21.7
40	37.0	n/a	22.7
41	36.9	n/a	24.0
42	36.7	n/a	21.8
43	37.0	n/a	23.8
44	37.2	n/a	20.1
45	36.3	n/a	24.0
46	36.5	37.3	21.0
47	38.1	n/a	23.0
48	37.7	n/a	28.0
49	37.6	n/a	23.1
50	37.3	n/a	22.8
51	36.7	37.8	25.4
52	37.6	n/a	23.1
53	37.0	n/a	22.7
54	36	37.7	24.0
55	36.3	n/a	20.2
56	36.4	n/a	23.8
57	37.3	n/a	26.1
58	37.1	n/a	23.7
59	36.4	n/a	26.2
60	36.4	n/a	24.0
61	36.8	n/a	26.1
62	36.9	37.5	27.1
63	n/a	37.7	28.1
64	36.7	n/a	23.8
65	36.2	37.3	24.0
66	36.3	n/a	20.3
67	36.9	n/a	23.7
68	36.4	n/a	22.7
69	37.3	37.7.0	23.4
70	36.3	n/a	24.0

APPENDIX F

Common Features of Traditional Birth and Infant Care Practices by Northern Alberta Cree

	Case #1	Case #2	Case #3	Case #4	Case #5
Age	87	86	82	79	76
Age at First Birth	15 yrs.	23 yrs.	19 years	18 yrs.	19 years
# of Babies	13	10	10	9	14
Age at Last Birth	50 yrs.	43	41	40 yrs.	?
Born hospital or home	yes, home	yes, home	yes, home	1 at home, rest at hospital	yes, home
Assisted Birth	mother-in-law grandmother	sister-in-law	her mother & 2 other relatives	?	her mom and dad
Birthing Stick	yes	no	yes	yes	yes
Wrap and Bush	yes	no placenta-yes	yes	yes	yes
Wash Baby	sponge off	yes	sponge bath	yes	yes
Dispose of Cord	her mom in bush	yes	yes, moose & spruce stumps	yes, moose & spruce stumps	high on bush & moose tracks
Naval Binding	yes	yes	yes	yes	yes, not hurt skin
Hip Binding/Breast	yes	yes	yes	yes	yes
Breastfeed	yes	yes	yes	yes	yes
Who taught	her mom & grandmother	sister-in-law	grandmother & mother	mom	her mom
How long breastfed	1 year	1 - 2 years		12 mos.	24 mos.
Confinement (Y/N)	yes	yes	yes	?	yes
How long	2 days	10 days	7 days bed	?	10 days
Who helped	husband	sister-in-law	her mom helped	?	?
Moss Bag	yes	yes	yes	yes	yes
Muskeg	yes	no, cloth diaper	no, diaper	no, cloth diapers	yes, brown, 2 times a day (wet part)
Sleep at Night	bed with mom & dad	bed with mom	bed with mom	with parents	with mom
Position	on back	on side	on side	on side	on side
Sleep at Day	swing	swing	swing	swing	swing
Position	on back	?	back	side	back
Wrap baby	yes	yes, 4 mos.	yes	no	?
Mom Smoke	no	no	no	no	?
Mom Drink	no	no	no	no	?
Circumcise males	no	?	?	no	?

Teething	nothing	?	?	?	back hind of moose teething ring - top of fat on moose hard
Food at labour	tea	?	?	?	
Medicine for labour	?	boiled roots	?	?	boiled black root tree, swampy area -big root

	Case #6	Case #7	Case #8	Case #9	Case #10
Age	75	72 (midwife too)*	71	70	64
Age at First Birth	19	19	19	20	18
# of Babies	12	5	11	5	12
Age at Last Birth	43	36	39	?	40
Born hospital or home	home	2 in teepee 2 in hospital	1 at home	home	hospital
Assisted Birth	her sister	her husband	her mother	mother-in-law	?
Birthing Stick	yes	yes	no	?	?
Wrap and Bush	yes	yes	held on to top of bed	yes	?
Wash Baby	yes	yes	yes	sponge	?
Dispose of Cord	yes	yes	yes, her dad put it on moose tracks	?	no
Naval Binding	yes	yes	yes	yes	yes
Hip Binding/Breast	yes	yes	no	yes	yes
Breastfeed	yes	yes	yes	at birth	?
Who taught	?	mom	mom	mom	mom
How long breastfed	1½-2 yrs.	1 year	6 mos.	24 mos.	1 mo.
Confinement (Y/N)	yes	yes	yes	yes	yes
How long	5 days	7 days	2 days - no heavy work	3 days - no heavy work	?
Who helped	sister & husband	her husband	her mom	?	sister-in-law & husband
Moss Bag	yes	yes	yes	yes	no
Muskeg	no - cloth diapers	cloth diaper	yes	yes	cloth diaper
Sleep at Night	at foot of bed	with mom in bed	with mom	with mom on side	her bed, her side
Position	back	side	side	side	side
Sleep at Day	swing	swing	swing	swing	swing
Position	back	back	back	back	back
Wrap baby	yes	yes	yes	yes	yes
Mom Smoke	?	no	no	?	?
Mom Drink	?	no	no	?	?
Circumcise males	?	no	no	?	?
Teething	no problem	no problem	?	?	?
Food at labour	?	?	?	?	?
Medicine for labour	?	?	?	?	?

* Case 7 acted as a midwife for other family members

	Case #11	Case #12	Case #13	Case #14	Case #15
Age	56	58	60	68	59
Age at First Birth	17	18	18	20	18
# of Babies	8	8	11	9	7
Age at Last Birth	?	?	31	39	?
Born hospital or home	2 at home, 6 in hospital	old hospital	hospital	hospital	hospital
Assisted Birth	midwife/nurse	nurse	nurse	nurse	nurse
Birthing Stick	no bed	no	no	no	no
Wrap and Bush	hung in bush	no	no	?	what hospital does with it
Wash Baby	sponge	?	no	yes	
Dispose of Cord	moose track/ rotten spruce stump	in bush, bury	her mom did this	threw it away	moose tracks, spruce stumps
Naval Binding	yes	?	yes	yes	no
Hip Binding/Breast	?	?	?	no	no
Breastfeed	yes	yes	1st one - others bottle	yes	yes
Who taught	mom	?	mom	mom	mom
How long breastfed	24 mos.	12 mos.	6 mos.	10 mos.	18 mos.
Confinement (Y/N)	?	?	yes	?	?
How long	?	?	hospital, 7-10 days	?	?
Who helped	mom	mom	her mom, sister 15 days	mom	mom
Moss Bag	yes	yes	yes, 1st one	no	no, cloth diaper
Muskeg	yes	for 1st baby	yes, 1st one	no	no
Sleep at Night	swing over her bed	her bed, mom and dad	little basket by mom's bed	crib	crib, then with her after 6 mos.
Position	back	side	side	stomach	side
Sleep at Day	swing		swing	swing	swing
Position	back	on tummy	back	back	back
Wrap baby	yes	yes, but not if sleep on tummy	yes	yes	yes
Mom Smoke		?	yes	?	?
Mom Drink	?	?	no	?	?
Circumcise males	?	?	no	?	?
Teething	?	medicine from nurse	medicine from nurse	from nurse	?
Food at labour	?	no	no	no	?
Medicine for labour	?	no	no	no	?

	Case #16	Case #17	Case #18
Age	55	50	87
Age at First Birth	24	18	16
# of Babies	5	3	16
Age at Last Birth	34	25	45
Born hospital or home	hospital	hospital	home
Assisted Birth	nurse	nurse	mother
Birthing Stick	no	no	yes
Wrap and Bush	no	no	yes
Wash Baby	?	no	yes
Dispose of Cord	?	no	yes, in bush
Naval Binding	yes	yes	yes
Hip Binding/Breast	no	no	yes
Breastfeed	yes	yes	yes
Who taught	?	mom	mother
How long breastfed	?	3 mos.	18 months
Confinement (Y/N)	no	no	yes
How long	?	?	1 week
Who helped	?	?	sisters
Moss Bag	yes	no	yes
Muskeg	yes	no	yes
Sleep at Night	swing in mom's room	crib	bed, w mom
Position	back	side	back
Sleep at Day	swing	swing	swing
Position	back	back	back
Wrap baby	yes	yes	yes
Mom Smoke	yes	?	no
Mom Drink	no	?	no
Circumcise males	no	?	no
Teething	?	?	moose hind
Food at labour	?	?	tea (medicinal)
Medicine for labour	?	?	?

APPENDIX G

Distribution of Main Issues Associated with Infant Care Practices as Reported in Questionnaire on SIDS Risk Factors by Contemporary Aged Women (N=70)

Age[1]	Age2	Case	1	2	3	4	5	6	7	8	9
31	20	01	1	0	1	1	1	1	1	1	1
18	18	02	0	0	1	1	1	0	1	1	1
36	17	03	1	1	0	0	1	1	1	1	0
24	19	04	1	1	1	1	1	1	1	1	1
33	17	05	1	1	0	1	1	1	1	1	1
26	20	06	1	1	1	0	1	1	1	0	0
25	17	07	1	1	1	1	1	1	1	1	0
24	19	08	1	1	0	1	1	1	1	1	1
31	20	09	1	1	1	1	1	1	0	0	1
31	19	10	1	1	1	0	1	1	0	1	1
24	18	11	1	1	0	1	1	1	1	1	1
26	16	12	1	1	1	1	1	1	1	1	0
29	19	13	1	1	0	0	1	1	1	1	1
27	16	14	1	1	1	0	1	1	1	1	1
18	15	15	0	1	0	0	1	1	1	1	1
27	19	16	1	1	1	1	1	1	1	1	1
32	18	17	1	0	0	1	1	1	0	1	1
23	20	18	1	1	1	0	1	1	1	0	1
23	17	19	1	1	0	0	0	1	1	1	1
21	18	20	1	1	0	0	1	1	1	1	0
23	21	21	1	1	1	0	0	0	1	1	1
21	19	22	1	1	1	1	1	1	1	1	1
27	19	23	1	0	1	1	1	1	1	1	1
32	19	24	0	0	0	1	1	1	1	1	1
24	20	25	1	1	1	0	1	1	1	1	0
30	18	26	0	1	1	0	1	1	1	1	1
26	17	27	1	0	1	0	1	1	1	1	1
31	21	28	1	0	0	0	1	1	0	0	1
24	18	29	1	1	1	0	1	1	1	0	1
24	18	30	1	1	1	1	1	1	1	1	1
23	17	31	1	1	1	1	1	1	1	1	1
25	16	32	1	0	1	1	1	1	1	1	1
22	17	33	1	1	1	1	1	1	1	1	1
21	18	34	1	1	1	1	1	1	1	1	1
30	26	35	0	1	1	1	1	1	1	0	0
27	20	36	1	0	1	1	1	1	1	0	1

Age1	Age[2]	Case	1	2	3	4	5	6	7	8	9
22	17	37	1	1	0	0	1	1	1	1	1
23	19	38	1	1	0	0	1	1	1	1	1
29	19	39	1	0	1	0	1	1	1	1	1
24	18	40	1	1	1	1	1	1	1	1	1
25	19	41	1	0	1	1	1	1	1	1	1
26	21	42	1	0	1	1	1	1	1	0	1
21	16	43	0	0	1	1	1	1	1	1	1
24	20	44	0	0	1	0	1	1	1	0	1
26	22	45	1	0	1	0	1	1	1	0	0
28	17	46	1	1	1	1	1	1	1	1	1
23	16	47	0	0	0	1	0	1	1	1	1
17	16	48	0	1	1	1	1	0	0	1	1
23	18	49	0	0	0	1	1	1	0	1	1
19	16	50	0	0	0	1	0	0	1	1	1
19	18	51	0	0	1	1	1	1	1	1	1
27	17	52	1	0	0	1	1	1	0	1	1
24	20	53	0	0	0	1	1	1	0	0	1
26	18	54	1	0	1	1	1	1	0	1	1
31	17	55	1	0	1	0	1	1	0	1	1
26	18	56	1	0	1	1	1	1	0	1	1
26	18	57	1	0	1	1	1	1	0	1	1
30	17	58	0	1	1	1	1	1	1	1	1
26	19	59	0	0	1	1	1	1	1	1	1
30	18	60	0	0	1	1	1	1	1	1	0
32	20	61	0	0	1	1	1	1	1	0	1
19	19	62	0	0	1	1	1	1	1	1	1
36	17	63	1	0	0	0	1	1	0	1	1
23	18	64	0	0	1	1	1	1	0	1	1
36	19	65	1	1	1	1	1	1	0	1	1
34	22	66	1	1	0	0	1	0	1	0	0
29	18	67	0	0	0	0	1	1	0	1	0
28	27	68	0	0	1	0	1	1	0	0	0
22	18	69	0	0	1	0	1	1	0	1	1
24	19	70	1	1	1	0	1	1	1	1	1

Legend:

1. disposal of cord
2. naval binding
3. breastfeeding
4. co-sleeping
5. position, back or side
6. wrap baby for sleeping hours
7. swing sleep in day - on back
8. young age at first birth (young = less than 20 years)
9. who taught female how to look after her infant

Age[1] at time of interview

[2] at birth of first child

APPENDIX H

Plates

Plate 1 - Traditional wrap used by senior women - A moss bag into which infants were placed. Long cord at top of photo is used to lace infant into the bag, until only the infant's head is uncovered.

Plate 2 - Traditional swing used by senior women - A senior woman quickly constructed this swing made of a blanket suspended between two ropes, separated by small pieces of wood.

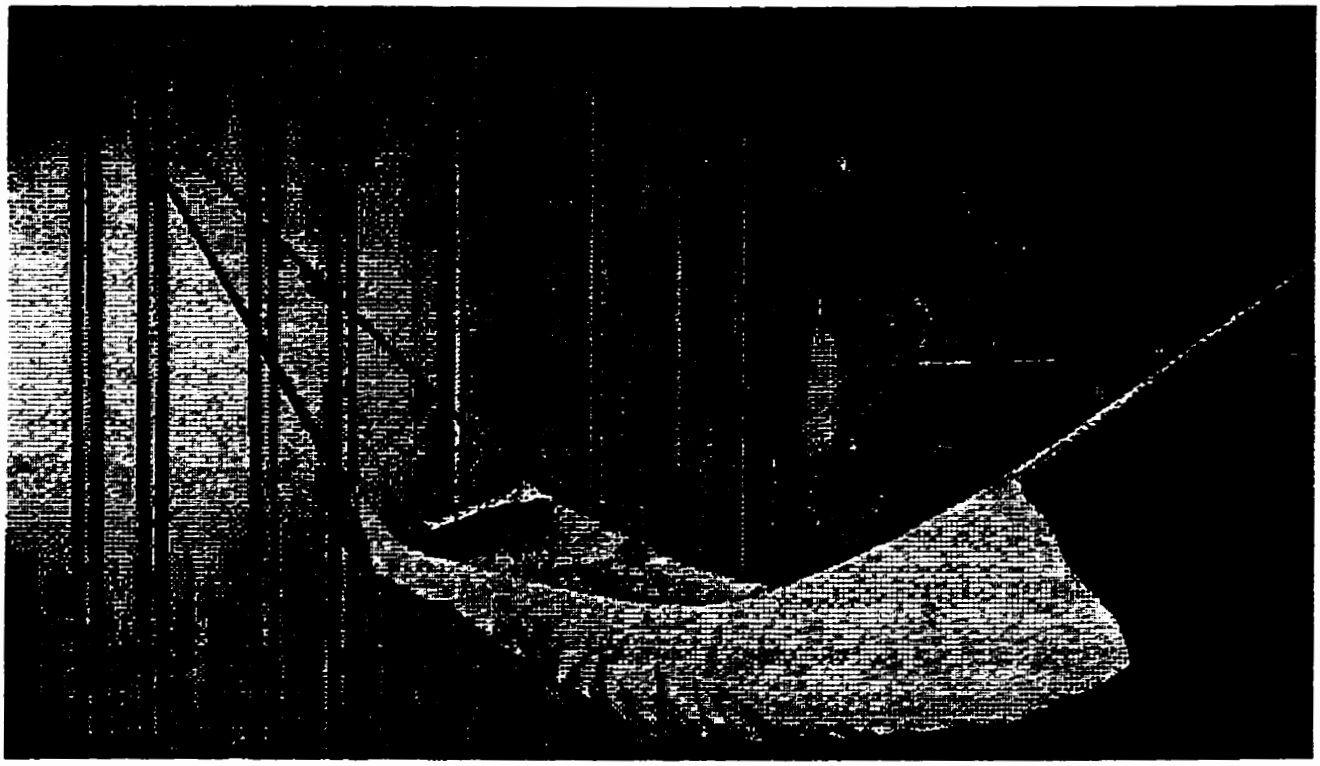


Plate 3 - Co-sleeping: a common practice among Cree mothers - mother nursing infant, and sibling:

Plate 4a: Contemporary infant wrapping - Eight month old infant being wrapped by first-time, nineteen year-old mother. Note two pins along the side to secure the blanket.

Plate 4b: Another view of contemporary infant wrapping - Baby sitting with mother.

Plate 4c: And one more view of contemporary (1996) wrapping - Baby lying on bed.

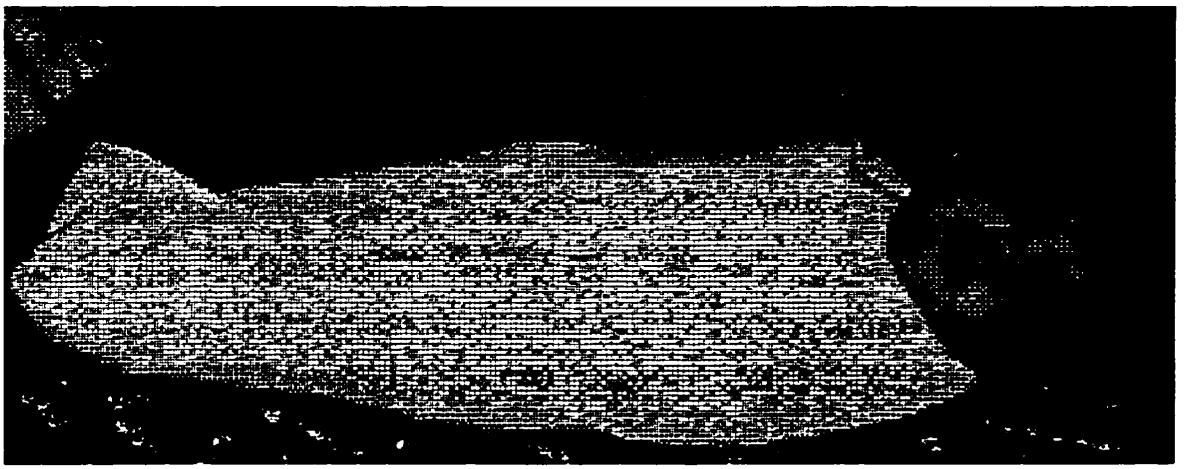


Plate 5: Swing used by contemporary mothers - In the common sleeping room of Aboriginal families can be found disposable diapers, a modern crib and tot bed, together with the traditional swing. Plastic rods are placed at both ends of the swing to prevent the collapse of the swing from the infant's weight.

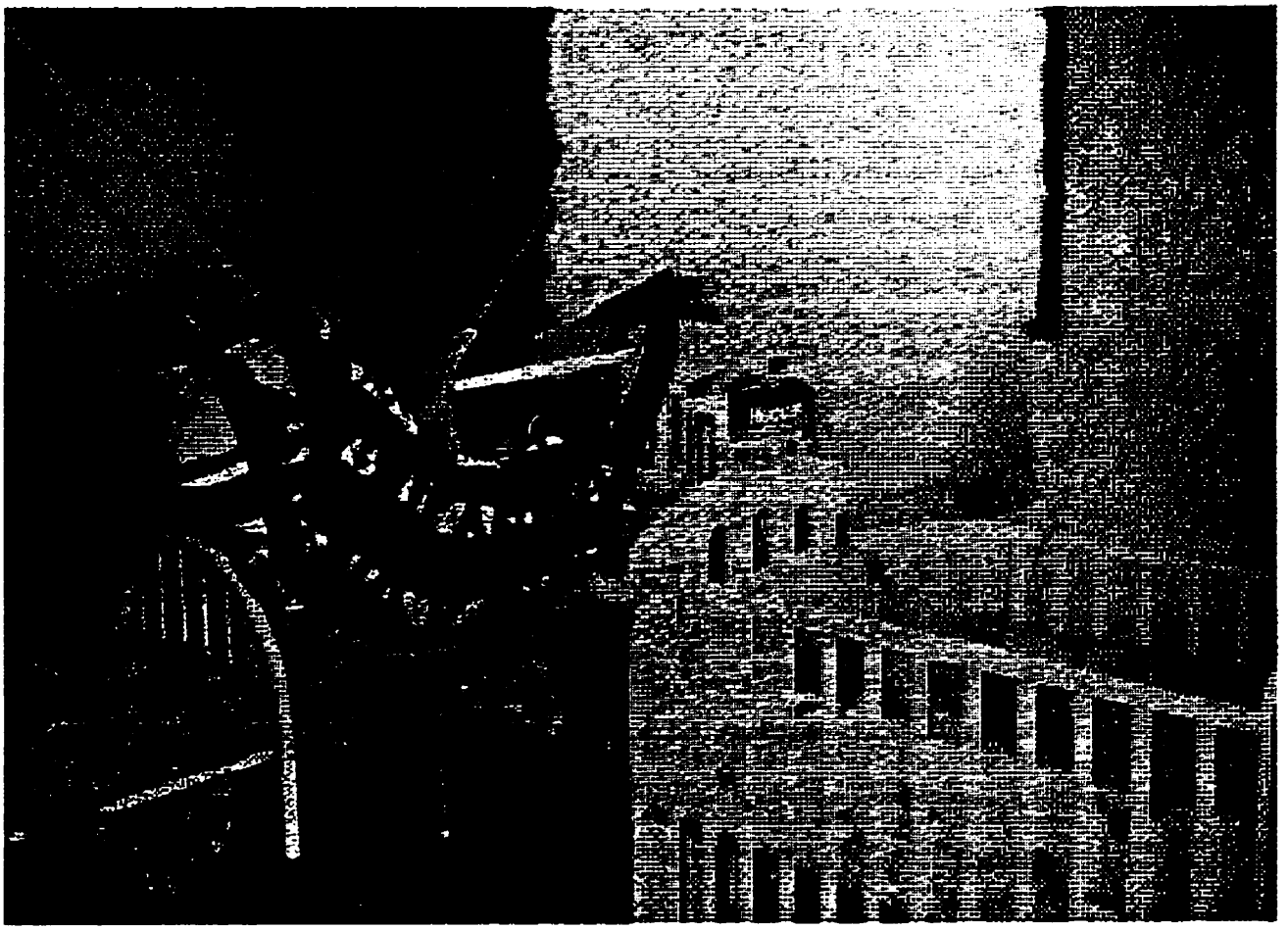


Plate 6 - Sources of contamination - house furnace with no filter:

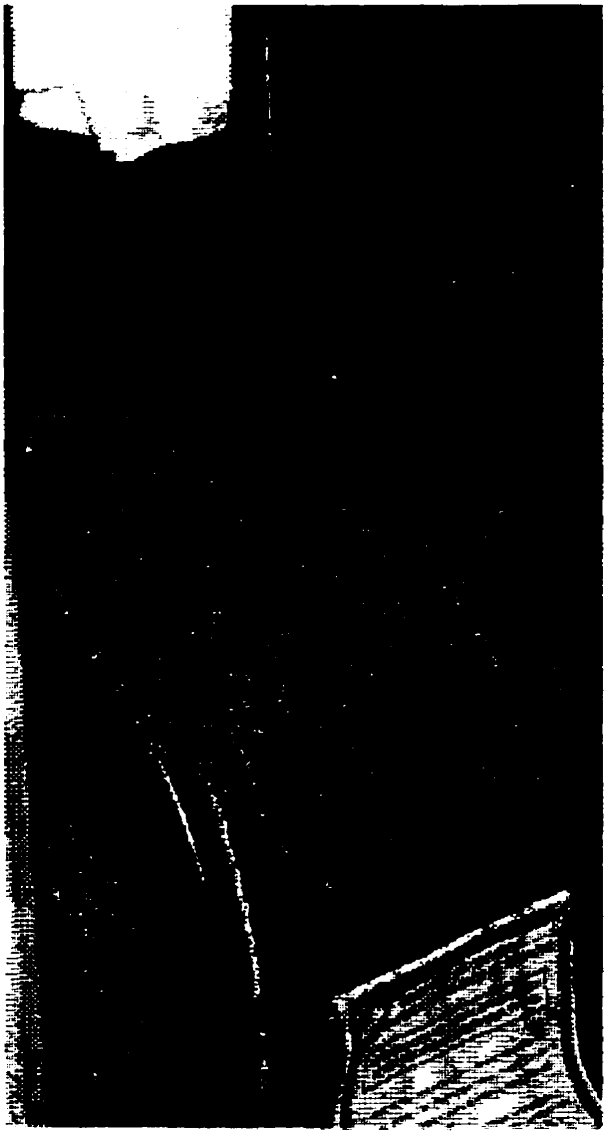


Plate 7 - Dampness in crawl spaces under residences

Plate 8: Possible agent of contamination spread -

Plate 9: A common source of dampness: broken flush toilets

Plate 10: Mould is another common contaminant.

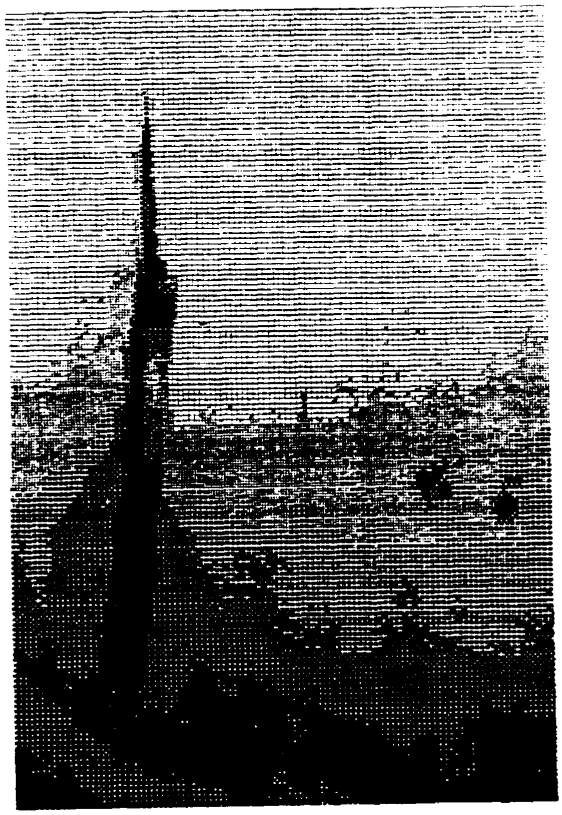
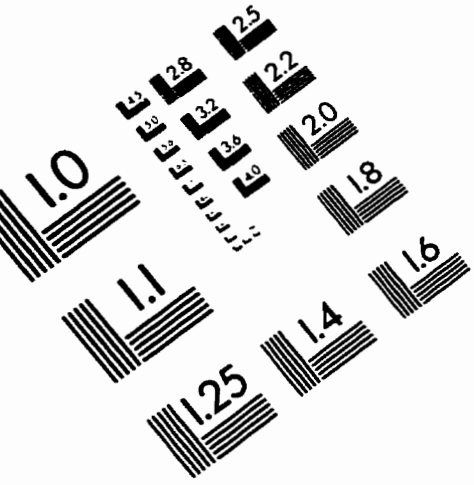
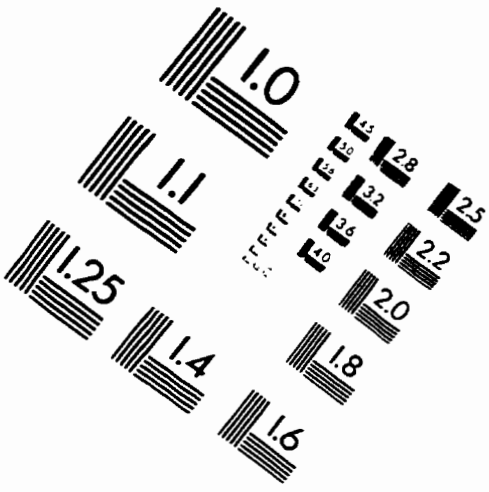
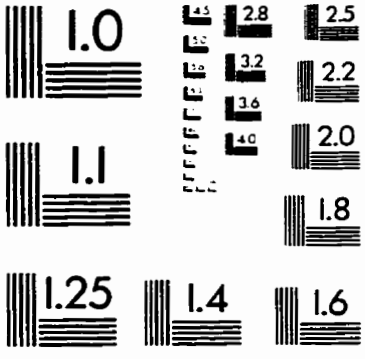
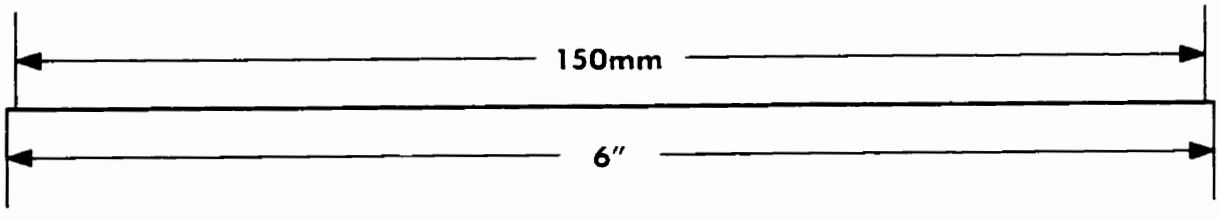


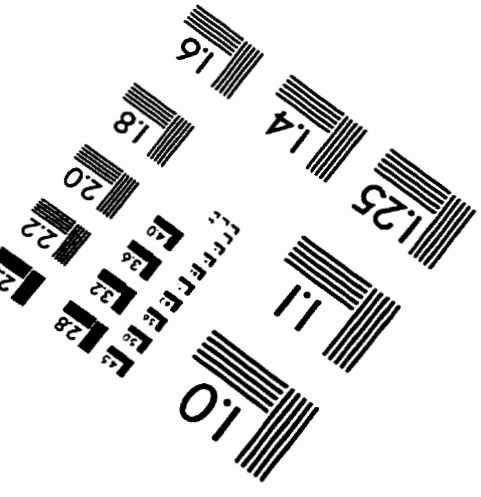
IMAGE EVALUATION
TEST TARGET (QA-3)

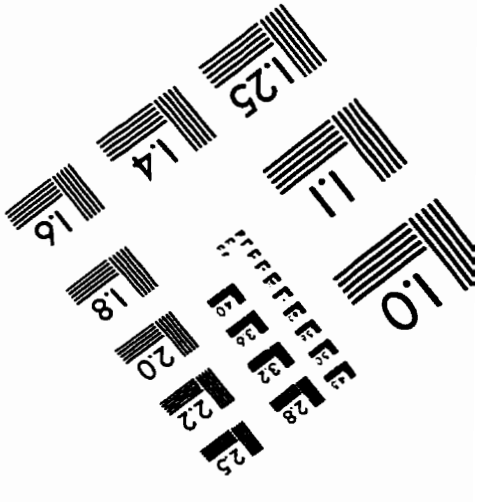












APPLIED IMAGE, Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989