

# Sioux Lookout Medical Research Findings and Implications 2001-2022

Sioux Lookout-NOSM Local Education Group (SLLEG)

Sioux Lookout First Nations Health Authority (SLFNHA)

Sioux Lookout Meno Ya Win Health Centre (SLMHC)

Northern Ontario Academic Medicine Association (NOAMA)

Northern Ontario School of Medicine University- Sioux Lookout (NOSM)



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## **Introduction**

Sioux Lookout medical research is focused on population health. Respectful research and practical improvements to medical care are priorities of the Sioux Lookout- NOSM Local Education Group (LEG). Collaboration with the Sioux Lookout Meno Ya Win Health Centre (SLMHC), the Sioux Lookout First Nations Health Authority (SLFNHA) and First Nations communities provide important direction, and relationship with NOSM University and the Northern Ontario Academic Medicine Association (NOAMA) allow research development.

Over the past 20 years, local researchers have produced over 150 articles published in a dozen peer-reviewed medical journals. This has led to National coverage on CBC National news (Acute Rheumatic Fever, 2015) and two Canadian Research Awards (CFP Research Award 2015, 2017). Sioux Lookout is internationally known as an important research centre for rural and Indigenous issues and our research findings are often referenced in other rural and Indigenous research papers. Much of the research undertaken over the past 20 years has been led by physician-researchers associated with the Sioux Lookout-NOSM Local Education Group (LEG). These physicians donate their time, seeing research as a critical way to improve care delivery.

A task of research is to describe and document important issues so that they can be brought to the attention of care-provider organizations and the public. Publication in peer-reviewed journals highlights the research findings, facilitating their use in public awareness, negotiations with funding agencies for service improvement, and program development. Once published in a respected journal, national and regional press can bring public attention and give organizations a platform for their health carer needs. Essential, accurate data is critical to drawing attention to challenges or deficits in services. Otherwise “no data, no problem” becomes the default position. Research can identify important service needs, can inform program development and should ideally be included in service planning.

Sioux Lookout Meno Ya Win Health Centre developed a Research Review and Ethics Committee which represents the unique population of the Sioux Lookout region and the complex community/provincial /federal health care system. The committee ensures research is appropriate, meets ethical standards and facilitates meaningful projects.

Below, we will highlight the findings of the last 2 decades of research and improvements that have resulted. We identify ongoing issues in maternal-child care, infectious disease, diabetes, surgery, and palliative care. Some identified needs lie outside present organizational funding models and will require novel resources.

## **Maternal-child Research**

Several dozen studies have focused on living conditions, infectious diseases, pregnancy-related challenges for mothers and their children and addiction management. Current maternal-child research continues with a focus on gestational diabetes and anemia in pregnancy.

### **Respiratory infections and housing conditions**

A recent study, awarded the 2020 Health Canada Assistant Deputy Minister Award for Excellence in Sciences, documented the adverse living conditions which exist in the regional remote First Nations northern communities. (Kovesi 2020) This SLFNHA sponsored study showed that overcrowding and houses in poor repair have contributed to a high rate of pediatric respiratory infections for children under two years. Previous local studies of the same communities found higher rates of respiratory infections requiring hospitalization, and low levels of immunization against pneumococcal disease (40% in adults). (McCuskee 2014, Poling 2014)

#### **Findings:**

- **21% of children under 2 had a hospital admission for respiratory infection**
- **Average house occupancy was 6.6 persons (vs 2.5 Canadian average)**
- **44% of homes had water penetration in exterior walls**
- **Immunization against pneumococcal disease: 25% in children, 40% in adults**

#### **Implications:**

- **Broad initiative to address housing inadequacy and poor living conditions**
- **Improve immunization rates for pneumococcal vaccines**

### Acute rheumatic fever

Another infectious disease story unfolded in 2015 when the region suffered the death of 2 four-year-olds in 2 northern First Nations communities from acute rheumatic fever (ARF). (Gordon 2015a) Local researchers described these and other non-fatal cases in a case series. These preventable complications of ‘strep throat’ garnered national attention, including an interview with 2 infectious disease specialists on the CBC national news, and the study received a Canadian research award. (<https://www.cbc.ca/news/canada/thunder-bay/rheumatic-fever-rates-in-some-ontario-first-nations-75-times-higher-than-rest-of-canada-1.3282074>)

The reported cases led to the development of a Sioux Lookout Acute Rheumatic Working Group which included health care providers, researchers, community members and Indigenous Services Canada (ISC); each case was reviewed and follow up put in place. ISC pharmacy simplified antibiotic prescribing by eliminating the requirement of a special prescribing form for the use of Penicillin G (the injectable penicillin required for lifelong antibiotic prophylaxis). The federal pharmacy program (Non-Insured Health Benefits) developed an alert system for ensuring that patients received their monthly antibiotic prescription and follow up was instituted with a local infectious disease specialist in Sioux Lookout. To date no new cases of ARF have been reported.

#### **Accomplishment/Findings:**

- **Research publication led directly to National attention drawn to health care inequalities in remote FN communities and the preventable death of 2 children**
- **Developed a local inter agency working group enabled follow up of antibiotic prophylaxis for ARF patients**
- **Increased awareness of the potential complications of a ‘simple’ strep throat.**
- **Educational material was developed for community members and nurses around the importance of treatment of strep throat.**
- **The attention brought to this disease through research has helped it to remain front of mind for regional clinicians.**
- **Penicillin G prescribing was simplified by the ISC elimination of its special form for the injectable antibiotic required for ARF management.**

#### **Implications**

- **There is a need for continued follow up of the identified ARF patients by family physicians, and pediatricians or infectious disease specialists**
- **There is a need for continued nursing and medical attention to strep throat treatment, awareness of its ARF sequelae, and ongoing surveillance for ARF.**

### Post streptococcal glomerulonephritis (PSGN)

This rare autoimmune reaction to a ‘strep’ throat or skin infection can cause kidney failure (PSGN). A 2016 publication documented a high regional rate (Loewen 2016); in 2019 there was an outbreak in one northern community, into what appears to have been Canada’s first PSGN outbreak. (Jacob 2021) Our research documented the clinical response and the development and implementation of a novel community-wide protocol. The initiative involved Indigenous Services Canada (ISC), SLFNHA public health program (Approaches to Community Wellness), community nurses and physicians, SLLEG and an SLMHC infectious disease specialist. With strong community support, 247 children in the community and 36 adult household contacts were screened. There were 7 pediatric cases in total (no adult cases). All patients were successfully treated and referred to a pediatric service for long term follow up and close contacts received antibiotic prophylaxis. Community leadership ensured robust participation in screening of all children in the community and all adult contacts of cases.

#### **Accomplishment/findings:**

- **A novel protocol was developed for a PSGN outbreak; the research enabled a Canada wide awareness of the protocol, ensuring a more rapid management of future outbreaks in Canada should they occur.**
- **The research documented the effectiveness of a robust community-led awareness which led to successful screening of all children in the community.**
- **Community participated in the development of educational material, available through SLFNHA or ISC.**

#### **Implications:**

- **The research documented the importance of robust community leadership participation in population screening initiatives and serves as a model moving forward.**

### Opioid use and neonatal care

In 2009 the NAN chiefs identified a regional epidemic of opioid use. The use of opioids in pregnancy became an important focus of the SLMHC obstetrical program, delivering ~400 pregnancies/yr. In response, it created the Integrated Pregnancy Program (IPP), which combined prenatal and addiction care in one setting. It was the first 'generalist' medical centre in Canada to adopt holistic family-centered addiction care for mother, partner and infant.

The use of buprenorphine/naloxone (Suboxone) for management of opioid use was adopted in Sioux Lookout. Research provided evidence of its safety and efficacy in pregnancy and moved the science forward; it is now the leading treatment approach to opioid use in pregnancy, replacing methadone. (Jumah 2016) The experience of IPP clinicians and Sioux Lookout research allowed for the use of skin-to-skin bonding and shared rooming to replace the use of medication for many narcotic-exposed neonates. (Ryan 2017) Numerous publications documented the need and subsequent evaluation of these integrated services. (Dooley 2014,16)

#### **Accomplishments/Findings:**

- **Documented high rates of regional pregnancies (30%) affected by opioid use disorder (OUD)**
- **The introduction of Suboxone therapy in pregnancy resulted in a marked decrease of neonatal opioid withdrawal, down to 4% from 18% among of all narcotic-exposed neonates at SLMHC.**
- **Suboxone became the primary treatment for OUD in pregnancy in Canada several years after it was instituted in Sioux Lookout.**
- **SLMHC initiated 'skin to skin' and 'in-room care' for all infants**
- **SLMHC initiated outpatient addiction care during pregnancy and introduced outpatient opioid therapy for follow up of post partum mothers and newborns.**
- **Normalized concurrent treatment of addiction and obstetrical needs for both fathers and mothers at IPP, which is now recognized as best practice in Canada.**

#### **Implications:**

- **Ongoing need for community-based education and support of pregnant women for healthy pregnancies.**
- **Need for expanded community-based addiction care.**
- **Need for increased resources at the IPP program at SLMHC.**

## Gestational Diabetes

Diabetes in pregnancy has been a focus of research from 2015-2022 at the SLMHC IPP. (Hummelen 2020) Studies have documented a high regional prevalence of both gestational diabetes and pre-existing T2DM in pregnancy. (Poirier 2020) We have shown an association of maternal weight and diabetes and increased morbidity (e.g., C-sections rates are 40% higher). (Kattini 2020) The participation of one of the clinical researcher team members on an Indigenous Services Canada (ISC) working group has led to an updating of ISC protocols for diabetes screening in pregnancy.

### **Accomplishments/Findings:**

- **Gestational diabetes is two times more common than the provincial average (12% vs 6%) and pre-existing T2DM is eight times more common (3.7% vs 0.4%).**
- **Women with diabetes in pregnancy are on average 4-5 years older and weigh 10-19 kg more than women without diabetes.**
- **Diabetic pregnancies are affected by more maternal hypertension, a higher Caesarean section rate, higher infant birthweight and hyperbilirubinemia.**
- **Improve prenatal screening: new ISC nursing station prenatal screening protocols will include diabetes screening in the 1<sup>st</sup> trimester and an early A1c.**

### **Implications:**

- **The high rate of diabetes in pregnancy is unique in the province and requires effective resources for optimizing diabetes care at the community and hospital level.**
- **Consider developing community-based pregnancy and obesity related research with a focus on mother's pre-pregnancy weight and weight gain in pregnancy.**
- **Digitizing prenatal forms to improve prenatal data collection and information transfer; presently these forms are written by hand at the nursing station.**

## **Diabetes-related research**

### *Diabetes prevalence*

Despite high rates of diabetes being “common knowledge”, the contemporary regional prevalence was undocumented until several research initiatives by SLFNHA and SLLEG researchers. A 2020 publication documented a regional diabetes prevalence double that of the Canadian population (15% vs 8%). (Matsumoto 2020) A further study identified a diabetes complication (i.e. kidney disease, lower limb amputations, vision problems) rate of 5.4%. (Chan 2021)

### *Chronic kidney disease*

Regional diabetes-related kidney disease is an important complication; advanced chronic renal failure (7%) was found to be double the Canadian rate. (Kelly 2019) Earlier research identified the physical and psychological burden experienced by regional dialysis patients. (Salvalaggio 2003) Aside from the uprooting from community and moving to Sioux Lookout or Thunder Bay, patients with end stage kidney disease also suffered pain and mobility issues.

#### **Accomplishments/findings:**

- **We now have accurate numbers documenting the high prevalence of diabetes in our region.**
- **Complications such as kidney diseases, dialysis and lower limb amputations (see below) are common.**
- **Dialysis carries painful physical and emotional burdens for patients, who need to leave their home communities.**

#### **Implications:**

- **Document and understand population rates of obesity and overweight.**
- **Document the state of food access and security.**
- **Develop funding for reconnection of dialysis patients with their home community; most dialysis patients cannot afford trips back home.**
- **Dialysis patients would benefit from routine rehab services for pain and mobility issues.**
- **Communities should continue to lobby for home dialysis capacity where feasible.**
- **The “familiarity” with diabetes as part of daily family life can breed complacency. Ongoing interventions are needed to explore ways to improve glucose control.**



### Lower limb amputations

A 2017 publication documented extremely high rates of regional lower limb amputations in people with diabetes. Between 2010-2013, all diabetes-related amputations of the lower limb in the Sioux Lookout region occurred at 7 times the provincial rate. (Loewen 2017) Another publication described the management and triaging of diabetic foot ulcers. (Kivi, 2016)

#### **Accomplishment/findings**

- **Research documented extremely high rates of lower limb amputations**

#### **Implications:**

- **Need for an interagency, interdisciplinary approach to this complication of diabetes. Include effective screening at the community level and seamless referral to hospital-based services, including infectious disease and surgical consultations, diabetic foot ulcer wound management, podiatry and rehab services.**
- **Involve community-based diabetes workers in the assessment of diabetic feet and early identification of diabetic ulcers.**
- **Community-based diabetes workers could support patients requiring wound care and an assessment of appropriate footwear.**
- **Expand SLMHC programming to include foot care for all inpatients with diabetes.**

## **Palliative Care**

Program development in palliative care is an important example of how research can enhance clinical services. Researchers had conducted several important palliative care studies before the design of the new SLMHC hospital and these helped inform hospital design decisions. When the new SLMHC hospital was being developed, these findings were incorporated in the design.

A literature review of palliative care issues for Aboriginal patients documented the need for respectful care, the involvement of family and community and the use of interpreters. (Minty 2007) That same year a collaborative study with SLMHC and the Centre for Education and Research on Aging and Health at Lakehead University developed a pain management educational program for nurses involved in palliative care provision. (Linkewich 2007)

In 2009, a qualitative study of bereaved First Nations family members highlighted the need for adequate physical and spiritual patient and family support. (Kelly 2009) This study documents the importance of the physical environment, both for privacy and to allow large numbers of family members and community members to be in attendance. These research findings were taken to the hospital design team, resulting in a state-of-the-art palliative care suite at SLMHC. (Walker 2009, St Pierre-Hansen 2010) There is a private entrance for later night visitors, a large room to accommodate family gatherings and private kitchen facilities.

### **Accomplishment/findings:**

- **Palliative care for First Nations patients includes family and community considerations**
- **The palliative care suite at SLMHC was designed to provide the privacy and comfort for extended family and community member visitation.**
- **These facilities have received widespread positive family feedback.**
- **Our research supported the Nishnawbe Aski Nation contribution to provincial and federal palliative care working groups.**
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### **Implication:**

- **Research can identify important service needs and can inform program development and evaluation and should be included in service planning.**

## **Emergency Services**

Pre-hospital community emergency care was the subject of a collaboration of several Sioux Lookout physicians and the community of Sachigo Lake. (Vanderburgh 2014) The project documented the development of a community-specific emergency response network and protocols; capacity development for this program is ongoing. (Born 2012, Orkin 2014, 2016)

In several studies of the SLMHC emergency department (ED), local research demonstrated the large burden of mental health and addiction issues managed in the ED. (Matsumoto 2016, 2018) Mental health diagnoses are now the leading reason for a visit to the Sioux Lookout ED. Patients who require a Form 1 for mandatory psychiatric assessment wait an average of 55 hours in the ED before transfer. The SLMHC ED manages mental health and addictions presentations at 4x the rate of comparable hospitals, including 8x more cases of self-harm. (Hummelen 2021)

### **Accomplishments/findings:**

- **SLMHC manages a large number of mental health and addictions emergencies in the ED.**
- **This research has led to a significant increase in provincial funding for more MD hours and additional mental health observation facilities in the ED**
- **Remote First Nations communities have limited access to pre-hospital services and community and hospital resources are required to optimize care for mental health emergencies.**

### **Implications:**

- **This research has also led to novel government planning around regional psychiatric services, with planned dedicated psychiatric beds at SLMHC, and a more efficient regional psychiatric transfer process.**
- **Our research provides accurate data for hospital and community program development.**

## **Surgery**

In 2011, local researchers collaborated with the SLMHC department of surgery to do a feasibility study of developing an endoscopic retrograde cholangiopancreatography (ERCP) service. (Touzin 2011) We documented a high prevalence of gallbladder disease including 17% of patients with an ‘impacted stone’ requiring immediate intervention with an ERCP. At the time, this required an urgent transfer to an urban centre and is now done here in Sioux Lookout with the new ERCP program.

In 2018 SLMHC used this study to justify funding for an ERCP program in Sioux Lookout, an expansion in programming, which was approved by the Local Health Integration Network (LHIN). The program is now well underway and allows for complete gallbladder services to be completed in our setting. Expanding on this, the surgery department has initiated a novel procedure to complete both an ERCP and gallbladder removal during the same surgery (‘rendezvous’ procedure); this further lessens the need for patient to travel to Sioux Lookout for two separate procedures. (Parkinson 2022) Local researchers are currently documenting the efficacy and morbidity of the ERCP program and the rendezvous procedure, combining research and a simultaneous program audit.

Another planned prospective research project will evaluate a recent innovation for breast cancer surgery and lymph node marking, which allows all components of breast surgery to be completed in Sioux Lookout, without the need for travel to Thunder Bay for lymph node identification before surgery. These initiatives are designed to allow the SLMHC surgical program to optimize care for patients who live remotely and have onerous travel challenges.

### **Accomplishment/findings:**

- **A feasibility study in 2011 documented the high rate of gallbladder disease in our region. This study supported the need for an ERCP service in Sioux Lookout and was used to obtain LHIN finding for a program in Sioux Lookout.**
- **Not only was the service developed, but innovations are also underway to reduce patient travel requirements by the initiation of a 1-step ERCP and gallbladder removal surgery (Rendezvous procedure). This program is now being evaluated in a prospective research study, which will act both as an SLMHC audit and a research project. The findings may enable similar programs in other rural communities.**

### **Implications:**

- **Research documents the efficacy and safety of the ERCP program.**
- **These studies demonstrate the scope of care which can be provided in a rural hospital with a full compliment of surgeons; this can inform funding agencies and other hospitals.**

## **Addiction Medicine**

Local research has been instrumental in the development and acceptance of opioid use management in pregnancy. (Jumah 2016, Dooley 2014, 2016) It documented the success of community-based opioid agonist therapy (OAT) programs. In collaboration with SLFNHA community physicians and community leadership, the OAT ('Suboxone program') successes and challenges were documented. (Kanate 2015, Mamakwa 2017) This award-winning research study showed the effectiveness and improvement in community wellness, measured by improved school attendance, higher immunization rates, decreased child apprehension and police charges. The research garnered national attention and contributed to the acceptance of addiction service provision in a remote setting with community-led and family physician-supported treatment.

Recent addiction-related research includes a qualitative study of recovery from opioid use called the 'Healing Journey'. (Madden 2023) One community welcomed the research providing a better understanding of the healing process to optimize of OAT and addiction services. With close community support and participation, the study has documented the value of traditional practices, family support and trauma-informed counselling for recovery in the community setting.

### **Accomplishments/findings:**

- **Documented the success and feasibility of community-based addiction programming and its challenges (2015, 2017).**

### **Implications:**

- **Ongoing research has identified the need for holistic community-based patient support in healing from addiction and trauma.**

## **Qualitative studies and cross-cultural care**

“Interview-style” research played an important role in supporting hospital administrators during the development of the cross-cultural programming in 2008-2009 prior to the opening of the new Sioux Lookout Meno Ya Win Health Centre. (Walker 2009, 2010)

Since then, a series of qualitative studies have increased our understanding of some important cross-cultural components of patient and culture centered care. Research projects have brought an understanding of traditional birthing practices (O’Driscoll 2011), the difficulty in leaving home for childbearing (O’Driscoll 2011) and the experience of menopause by First Nations women (Madden 2010). Other qualitative studies have examined the experiences of physicians providing cross-cultural care (Kelly 2002), the experience of dialysis patients (Salvalaggio 2003), the delivery of effective hospital-based palliative care (Kelly 2009), the role Traditional Medicine can play in the management of diabetes (Johnson 2022) and the challenges of recovery from opioid use (Healing Journey 2023).

This body of work has always been undertaken in a respectful manner and has contributed to a better understanding of First Nations experiences and perspectives for non-Indigenous healthcare providers. These studies have been used in medical education across Canada and are a part of the curriculum in the Northern Ontario School of Medicine. The 2022 Johnson study was the first national publication to include authorship by 3 Traditional Medicine practitioners.

Several commentaries have directly addressed social and health inequities: Prejudice in Medicine (Guilfoyle 2008), Out of Sight, out of mind (Guilfoyle 2015), ARF in First Nations Communities (Gordon 2015b) and The Cultural Erosion of Indigenous People in Health Care (Matthews 2015)

### **Accomplishments/findings:**

- **Provided non-Indigenous healthcare providers with information and perspective on cross-cultural care delivery to First Nation patients.**

### **Implications:**

- **There is an ongoing need for informative qualitative research to facilitate understanding, and to bridge the cultural gap, power differential and systemic inequities experienced by First Nations patients in the healthcare system.**

## AWARDS

### Health Canada Assistant Deputy Minister Award for Excellence in Sciences 2020:

Kovesi T, Mallach G, Schreiber Y, McKay M, Lawlor G, Barrowman N, Tsampalieros A, Kulka R, Root A, Kelly L, Kirlew M, Dabek E, Miller J. (2022) Housing conditions and respiratory morbidity in Indigenous children in remote communities in Northwestern Ontario, Canada. *Canadian Medical Association Journal* 24, 194:E80-8. doi: 10.1503/cmaj.202465.

### Canadian Family Physician Best Original Research Article 2017

Evaluation of 6 remote First Nations community-based buprenorphine programs in northwestern Ontario. Mamakwa S, Kahan M, Kanate D, Kirlew M, Folk D, Cirone S, Rea S, Parsons P, Edwards C, Gordon J, Main F, Kelly L. *CFP*. 2017;63(2):137-145.

### Canadian Family Physician Best Original Research Article 2015

Gordon J, Kirlew M, Bocking N, Farrell T, Kennedy C, Haavaldsrud M, Douglas L, Saginur R, Schreiber Y, Blakelock B, Kelly L. Acute Rheumatic Fever cases in First Nations communities in Northwest Ontario: social determinants of health “bite the heart”. *CFP* 2015;61(10):881-6.

### NOAMA Clinical Innovation Fund (CIOF) Award

2013: Kelly, L. Neonatal Narcotic Exposure in NW Ontario: incidence and treatment

2014: Kirlew, M. Development and implementation of Sioux Lookout Zone Specific Clinical Pathways for the treatment of Sepsis, Pneumonia, Skin Infections and Urinary Tract Infections.

2014: Nguyen A. Evaluating outpatient physiotherapy prioritization methods: does a rating of 'high priority' correlate with lower functional outcomes at baseline?

2015: Kirlew M. Community-wide measures of wellness in a remote first nations community experiencing Opioid dependence: evaluating outpatient buprenorphine/naloxone substitution therapy in a First Nations Healing Program.

2021: Parkinson, M. Evaluation of 1-step and 2-step gallbladder surgery in a rural hospital in NW Ontario.

2022: Hummelen R. Assessing Iron Deficiency Anemia (IDA) in Pregnancy in Northern Ontario, in coordination with Sioux Lookout First Nations Health Authority.

### NOAMA Academic Funding Plan (AFP) Awards:

2010: Kelly, L. Narcotic Neonate - A Literature Review for Prevalence and Outcomes in Northwestern Ontario

2010: Kelly, L. First Nations Women's Health Education Initiatives (menopause and traditional birthing practices)

2011: O'Driscoll, T. Development of a Regional, Multidisciplinary, Cross Cultural Maternal Child Care Plan

2011: O'Driscoll, T. Developing a First Nations Doula Program in Northwest Ontario

2016: Tobe, S. Chronic Kidney Disease in Northwestern Ontario: an epidemiologic assessment.

2020: Hummelen, R. Enhancing care for women with diabetes in pregnancy living in fly-in communities: a quality improvement initiative.

2021: Madden, S. The Healing Journey from Opioid Use.

### Ongoing Research

Anemia in pregnancy

Anemia in childhood

Best practices for community-based opioid treatment programs

Physician handbook for opioid substitution therapy, 2<sup>nd</sup> edition

Travel burden for patients in remote communities with gallbladder disease

Development of an evidence-based hospital protocol for Misoprostol Induction of Labour

Participation in Understanding Regional Mortality Planning Committee

Audit on accuracy of ultrasound formula for estimated birth weight at SLMHC



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