



7th International Meeting on Indigenous Child Health

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ORAL ABSTRACT PRESENTATIONS

#1 CPT1A Arctic Variant: DNA Testing on Alaska's Newborn Bloodspot Screening
Sabra Anckner, Matthew Hirschfeld

Purpose: The Arctic Variant of Carnitine Palmitoyltransferase 1A (CPT1A) is a gene that impairs fatty acid oxidation, and is common in Alaska Native infants from coastal regions of Alaska, as well as indigenous populations throughout the Arctic, in Canada, Greenland and Siberia. Approximately 24% of all Alaska Native infants are homozygous for the variant. These infants have a decreased ability to convert fats to energy during periods of illness and fasting, and may suffer from profound hypoglycemia leading to increased illness severity, seizures and death. Few children are identified through the standard mass spectrometry method used on state newborn bloodspot screening.

Methods: Due to the high prevalence of the variant and the potential health consequences, researchers from Oregon Health and Sciences University and the Alaska Native Medical Center worked with the State of Alaska Division of Public Health and the Oregon State Public Health Laboratory's Northwest Regional Newborn Screening Program to develop a DNA test for the Arctic Variant to be added to the existing bloodspot screening panel. Joint efforts to increase knowledge of the variant amongst health care providers throughout Alaska, as well as the families of affected infants, were enhanced.

Results: On July 1, 2016, CPT1A Arctic Variant DNA testing was added to the Alaska newborn screening panel. In 4 months, 268 of 962 Alaska Native newborns were homozygous for the variant. Of those infants, fewer than 10% had an abnormal result on mass spectrometry newborn screening. DNA testing identifies 10 times as many affected infants, and nearly all infants are diagnosed earlier than they would have been with old testing methods or waiting for symptoms to develop. Follow up surveys with parents of affected children to assess their preferred method of obtaining information on the Arctic Variant diagnosis are ongoing.

Conclusions: DNA testing for CPT1A Arctic Variant as part of newborn bloodspot screening is an effective way to identify affected infants, allowing prompt provider notification and education of parents on symptoms and treatment protocols. An upcoming National Institutes of Health study will follow a cohort of affected children and mothers to study diet, activity, periods of illness and symptoms associated with the Variant. DNA testing may be beneficial to other Arctic regions with a high prevalence of this variant, and Alaska's experience in development and implementation can inform the expansion of newborn screening for disorders common in other indigenous populations.

#2 Perspectives and Recommendations from American Indian and Alaska Native Adolescent Girls for a Community-Based Gestational Diabetes Prevention and Reproductive Health Counseling and Education Program

Kelly Moore, Sarah Stotz, Kristen Nadeau, Martha Ann Terry, Yesenia Garcia-Reyes, Kelly Gonzales, Denise Charron-Prochownik and the Stopping-GDM Study Group*

Purpose: American Indian and Alaska Native (AI/AN) women are disproportionately affected by adolescent obesity, adolescent pregnancy, and gestational diabetes mellitus (GDM); all with nearly twice the U.S. prevalence. GDM in turn increases the risk of obesity and diabetes in the offspring, creating a vicious cycle. Thus, the need for early interventions to prevent GDM in AI/AN youth is compelling. The purpose of the qualitative phase of this project is to inform the cultural tailoring of an existing diabetes and reproductive health (RH) education program for adolescent AI/AN females using the perspectives and recommendations of AI/AN females at risk of GDM.

Methods: We conducted five semi-structured inter-tribal focus group (FG) interviews with 13 AI/AN adolescent females (age 15.5 +/- 1.8 years) in Colorado and Oregon. Three FGs included only adolescents and two included a mother/daughter dyad. A trained facilitator moderated the FGs and was assisted by a note-taker. The moderator also showed video clips and booklet excerpts from the existing program to elicit feedback. Interviews were recorded and transcribed verbatim. The transcriptions were analyzed by a qualitative methods expert using inductive coding and the constant comparison method to identify prominent themes.

Results: Major themes emerged: 1. Healthy pregnancy: Girls understood health during pregnancy, but knew little about GDM, preconception counseling, or the relationship between pre-pregnancy weight and GDM. Diabetes understanding was based on knowing adults living with diabetes. GDM education from 'relatable' AI/AN women/older teens who understood AI/AN culture was preferred. 2. Need for RH

resources: Girls relied on Internet, mothers, cousins, and aunts for RH information as school-based 'sex ed' primarily focuses on STD prevention. 3. Empowerment and safety: Empowering girls to make healthy choices and building self-esteem are important. Domestic violence and peer pressure were raised as RH safety concerns.

Conclusions: Participants had a broad perspective regarding RH and empowering young women. They lacked awareness of GDM and their risk. They recommended that the curriculum include 'real stories' from 'people I can relate to,' and a 'hook' to understand how GDM prevention is relevant to them. These findings are now being used in conjunction with FGs of: AI/AN mothers/caregivers, AI/AN women with a personal history of GDM or diabetes, clinicians caring for adolescent AI/AN females, and experts on GDM and adolescent women's health to inform the development of a culturally-tailored GDM prevention program for young AI/AN women.

#3 **Qualitative Examination of Health Perceptions and Obesity among Mothers of Young American Indian Children**

Ashley Weedn

Purpose: Obesity disparities may be potentially mediated through culturally-oriented health counseling. American Indian (AI) children are at high risk for obesity, yet few studies have examined culturally-specific health beliefs related to obesity prevention in this high risk population. The purpose of this study is to examine parental perceptions of health in early childhood among mothers of AI preschool-aged children in the Chickasaw Nation.

Methods: Focus groups were conducted with mothers of AI children ages 2-5 years enrolled in the Chickasaw Nation WIC program. Initial focus groups (n=3 groups) explored cultural attitudes regarding health and perceptions of weight using a semi-structured interview guide by a Native moderator. Follow-up focus groups (n=3), consisting of the same participants, discussed results to verify themes and explored educational approaches on healthy behaviors. Transcripts were analyzed by three independent reviewers, including a Native assistant, using a modified grounded theory approach to examine patterns in participants' responses and identify recurring themes. Questionnaires were also collected to obtain participant socio-demographic information.

Results: 20 mothers participated in the focus groups sessions. A key theme of health defined as a measure of emotional and physical functioning and not related to weight emerged across all groups. Participants had mixed views on timing of obesity onset, with the majority indicating obesity begins in later childhood. Most participants believed healthy behaviors should begin in early childhood. Participants identified cost, time, desire to please child, and extended family as barriers to healthy meals. They reported incongruent nutritional recommendations from WIC and physicians and identified a need for consistent messaging between providers to guide health decisions.

Conclusions: Reframing health education efforts from addressing weight to focusing on strategies to implement healthy behaviors in early childhood is needed. Consistent messaging between WIC and primary care providers may help AI families establish and maintain healthy behaviors in early childhood.

#4 **Characteristics of Children with Chronic Suppurative Lung Disease: A Prospective 10-year Study**

Gabrielle McCallum, Anne Chang, Greg Redding, Keith Grimwood, Rosalyn Singleton*

Purpose: Regarded as an orphan disease in high-income countries, chronic suppurative lung disease (CSLD), including bronchiectasis, remains high among disadvantaged Indigenous populations in these settings. While largely preventable, CSLD is known to cause premature death in the 3rd-4th decade of life among Indigenous Australians and Alaskans. Data from adult studies with CSLD have shown that predictors, such as persistent airway infection and inflammation, and longer duration of chronic productive cough result in poorer clinical outcomes. However, there are no prospective studies in children with CSLD in the last 50-years to help guide long-term clinical care and management in children.

Methods: We evaluated the long-term clinical outcomes of Indigenous children with CSLD from Australia (n=97) and Alaska (n=41) who participated in our previous study, 'Bronchiectasis Observation Study' (BOS) (2004-2012). During 2015-16, we clinically reviewed as many children as possible living in the larger remote communities where respiratory clinics or health centres were available. Research staff administered standardised questionnaires with caregivers and performed a clinical examination, including spirometry (where able). Additional medical history was extracted from the BOS dataset and from the medical records. Children were classified by physicians into 4 overall categories (well, better, stable, worse) based on their clinical impression.

Results: 80/138 (58%) children (median age 11-years (IQR 7.1-18.6); 48% males) were reviewed. From birth until their current age, children had a median 20 (IQR 14-30) community-treated ALRIs and 4 (IQR 3-6) respiratory hospitalisations. ALRIs decreased with age. Wheeze was present in 10% of children at examination. The clinical status of CSLD was: well (23%); improved (34%); stable (42%) or worse (0%). Clubbing was seen in 4% and current wet cough in 45%. Airway obstruction on spirometry was present in 39% and restrictive disease in 20%, with only 41% having normal spirometry values within population norms.

Conclusions: In a 10-year follow-up of children with CSLD, we found that with on-going clinical care they are generally improved by the time they reach adolescence. Nevertheless, many still experience respiratory symptoms and demonstrate impaired lung function. It thus remains important to follow these children and young people closely and to continue to strive to optimise their clinical management.

#5 **Early Findings from ENVISION: Evaluating Home Visiting Programs for Manitoba First Nations Families on and off Reserve**

Marni Brownell, Wanda Phillips-Beck, Rhonda Campbell, Dan Wiebe, Nathan Nickel, Mariette Chartier, Jennifer Enns, Alan Katz, Dan Chateau, Elaine Burland, Rob Santos*

Purpose: Many First Nations families face challenges in creating nurturing environments for children. Home visiting programs can support children's developmental health trajectories by building on the strengths that families bring to parenting their children. The purpose of this research is to evaluate the impact of two home visiting programs for First Nations families in Manitoba, Canada. The Strengthening Families Maternal Child Health program operates in 16 First Nations communities, while Families First is a provincially funded program available to families off reserve in Manitoba.

Methods: In collaboration with First Nations knowledge users, we are using de-identified data in the Population Health Research Data Repository at the Manitoba Centre for Healthy Policy to evaluate both programs. The Repository captures individual-level information collected through ongoing delivery of health, education and social services in Manitoba. Our study examines the relationship between participation in home visiting programs and: 1) maltreatment-related outcomes; 2) child developmental health at kindergarten; and 3) connection to health and social services. We will also seek input from First Nations communities to develop and measure meaningful health equity outcomes associated with participation in home visiting programs.

Results: We used four different sources of administrative data to identify off-reserve First Nations recipients of the Families First home visiting program (n=5,743). Preliminary descriptive analyses demonstrated that recipients were distributed throughout Manitoba with 40% in the urban centre of Winnipeg, 26% in the remote Northern Health Region, and the remaining participants in the southern/central regions of Manitoba. Further analyses to explore the relationship between Families First participation and child health and development outcomes are underway. Analyses of the Strengthening Families data for First Nations families living on reserve will commence once data transfer and quality assessment protocols are completed.

Conclusions: The findings from ENVISION will shed light on the impact of Manitoba's home visiting programs in helping First Nations families flourish.

#6 **Intergenerational Trauma, Cultural Connectedness, and Mental Health among Anishinabe Youth**

Wesley Cote, Andrew Gray

Purpose: Indian residential schools (IRS) operated in Canada throughout most of the 20th century, with the explicit intent to annihilate Aboriginal cultures and identities. Negative mental health impacts on both survivors and their descendants have been well documented. Aboriginal people have promoted cultural revitalization as a key strategy for collective recovery from this historical trauma. Cultural connectedness has been found to be a general protective factor for Aboriginal youth. Our study aimed to evaluate whether this effect is specific: that is, are the mental health benefits of cultural connectedness greater among intergenerational IRS survivors than among other Aboriginal youth?

Methods: A random sample of 250 youth aged 18-39 from a large Anishinabe community were invited to participate in a brief survey. 147 individuals participated. Participants were asked about mental health, cultural connectedness, factors that support cultural connectedness, and history of IRS attendance among parents and grandparents. We used linear regression to calculate differences in proportions of youth with thriving mental health (very good or excellent) according to degree of cultural connectedness and family history of IRS attendance. Factors reported as supporting cultural connectedness were summarized by simple thematic analysis. Community members guided the study design and participated in data collection.

Results: Among youth who did not feel highly connected to their culture, a family history of IRS attendance was significantly associated with a 26% lower probability of thriving mental health. However, among youth who did feel highly connected to their culture, a family history of IRS attendance did not have a significant impact on mental health. Participants reported that cultural connectedness was most supported by relationships with family, particularly Elders; traditional activities on the land; dances and ceremonies; learning and using their language; and having access to the community.

Conclusions: As predicted by proponents of “culture as treatment”, cultural connectedness appears to be a specific protective factor against the negative mental health impacts of intergenerational exposure to residential schools among Aboriginal youth. Greater support is needed for cultural and linguistic revitalization efforts in Aboriginal communities in Canada.

#7 Breaking the Cycle: Interventions during Pregnancy for Supporting Parents who have Experienced Complex Childhood Trauma - A Systematic Review

Chamberlain C, Gee G, Proctor K, Arabena K, Brown S*

Purpose: Childhood trauma profoundly impacts parent's capacity to nurture their own children and is a key factor contributing to cycles of intergenerational trauma. Indigenous families may be particularly vulnerable as many communities experience legacies of historical trauma. Pregnancy can be a vulnerable time for parents who have experienced complex childhood trauma, but offers a unique window of opportunity to identify and offer early support for preventing intergenerational trauma and supporting emotional healing for parents. We aimed to systematically review the evidence for interventions during pregnancy to identify and support parents with previous complex childhood trauma, including for Indigenous parents.

Methods: Following development of an a priori protocol, we searched electronic databases in November 2016 using terms synonymous with 'parent', 'trauma' and 'intergenerational' to identify interventions to support parents who have experienced childhood trauma starting during pregnancy or early postpartum period (< six months). Two authors independently screened and extracted data on the: study design, setting and quality, population characteristics, intervention (intervention onset, intensity, delivery mode, staff qualifications, parental gender, risk status) and comparison characteristics, and outcomes. Data were synthesized using meta-analysis and narrative synthesis for measures of effectiveness, and narrative synthesis of evidence on parental views, screening tools and economic evaluations.

Results: We will present the primary and secondary outcomes, including: Measures of parental psychological wellbeing (trauma, stress and depression inventories); Measures of childhood (< 5 years) wellbeing (developmental indicators (cognitive/speech), emotional/behavioural outcomes, trauma); Child protection referrals and substantiations; Intentional childhood injuries; Parental satisfaction; Adverse childhood experiences (including abuse, trauma, neglect); Childhood hospitalisations (<2, 2-5, 6+ yrs) including unintentional childhood injuries; School entry educational measures; Screening/identification tool validation measures; Adverse outcomes; Economic evaluations; parental reports of independent strategies to overcome cycles of childhood trauma; and theories generated. We will assess differential effectiveness in populations (including Indigenous peoples) using a 'Progress-plus' equity framework.

Conclusions: Pregnancy is a critical period of vulnerability for new and expectant parents who have experienced complex childhood trauma. However, this period also offers unique opportunities to prevent intergenerational transmission of childhood trauma and support emotional healing for parents. We discuss the theory and evidence of effectiveness and acceptability for screening, self-management, therapeutic and supportive interventions, emphasising evidence for Indigenous peoples. Interventions to support expectant and new parents who have experienced childhood trauma have potential to help address the legacy of historical trauma for Indigenous peoples and improving the health and wellbeing of young Indigenous parents and the next generation.

#8 The Onus is on Us' - Overcoming Mistrust and Engaging Indigenous Families in a Canadian Early Intervention Program

Alison Gerlach, Annette Browne, Margo Greenwood*

Purpose: The active engagement of primary caregivers is key to the success of Indigenous early childhood intervention programs. However, there is a context of mistrust that has been shaped by government-sanctioned surveillance and intervention, and Indigenous women's experiences of systemic racism and discrimination, such that Indigenous primary caregivers may delay or defer access to early intervention programs for their children.

Methods: This paper draws on the findings from a qualitative critical inquiry conducted in partnership with an Indigenous early intervention program in British Columbia (BC) - the Aboriginal Infant Development

Program (AIDP). Semistructured interviews were undertaken in four different regions of BC to obtain the perspectives of: AIDP workers (n=18), women primary caregivers (n=9) and Elders (n=4) involved with AIDPs, and administrative leaders (n=3) in urban-based community organizations that host AIDPs.

Results: The findings in this paper centre on the relational strategies and approaches employed by AIDPs workers in order to overcome caregivers' mistrust and support family engagement in their programs. Discussion of the findings draws on cultural safety as a useful conceptual lens for examining how AIDP workers' engaged families by being responsive to the socio-historical contexts of families' lives and the ongoing power relations that can shape families' access to early years programs.

Conclusions: Addressing caregivers' reticence about engaging in early child development programs is a serious concern, given the increasing evidence of the benefits of quality programs on the life course of children whose families live in conditions of structural social disadvantage. These findings have relevancy for all early childhood/child health professionals who are questioning how to engage with Indigenous families who are hard to reach as a consequence of multifaceted social and structural factors.

#9 **Training the Next Generation of Pediatrician/Advocates: Indigenous Child Health as Global Child Health**

Brian Volck, Stephanie Clark, Charles Schubert, Denise Warrick, Stephen Warrick*

Purpose: Global child health and child health advocacy are growing areas of interest in medical education. Cincinnati Children's Hospital Medical Center (CCHMC) recently developed a combined child advocacy/global health immersion experience at Gallup Indian Medical Center (GIMC). The curriculum included didactic, interactive, group, clinical, cultural, and reflective activities. Advocacy topics and skills addressed included medical, social, cultural, and ethical issues, including cross-cultural communication, community strength and needs assessment, and historical trauma. Teaching examples and learner on-site experiences emphasized indigenous child health as a unique subset of global child health. We report on four years experience with this program.

Methods: In 2010, CCHMC began sending pediatric residents interested in global child health to GIMC for clinical service and cultural immersion. For spring 2013, we designed a month-long group rotation for CCHMC pediatric interns in the global child health residency track. The first two weeks (in Cincinnati) emphasized advocacy training for low income and limited resource populations, irrespective of geographic location. The subsequent two-week immersion at GIMC included clinical care, home visits, meetings with community advocacy organizations and a traditional healer, book readings and discussions, and visits to other Navajo Nation health facilities. Post-immersion feedback was solicited from participants.

Results: Sixteen CCHMC residents have participated in the program – four per year. Participant feedback was solicited to improve curriculum for subsequent years. Residents expressed gratitude for opportunities to serve and learn from the community, surprise at community challenges and strengths, and new appreciation for historical trauma, social determinants of health, and cultural humility. GIMC pediatricians and staff said they appreciated opportunities to work with physicians in training. Community programs and organizations welcomed resident interest and presence. Curriculum improvements have included expanded on-reservation clinical care, site visits to Zuni child health programs, and brief Gallup community service projects.

Conclusions: This partnership among CCHMC, GIMC, and community organizations has been well received. Participating residents expressed increased awareness of and interest in indigenous health issues. No members of the first two cohorts (who have since completed residency) have chosen to work in indigenous communities, but three non-participating residents who learned about Indian Health Service opportunities in part through this program now work at health care sites on the Navajo Nation. A fifth cohort of CCHMC residents will participate in the program in April 2017. We plan to interview resident participants five-years post-graduation to determine how the program influenced their career choices.

#10 **Effects of Climate Change on Indigenous Peoples**

Lori Byron

Purpose: Climate change currently affects all of humanity but morbidity and mortality remains significantly higher for indigenous peoples and "majority" nations. Women, infants, and children are also disproportionately injured. Our health is significantly altered by climate change and air pollution now. New research shows effects such as fetal damage, diabetes, and even autism. Data and situations in which the indigenous peoples of US, Canada, and other countries have been and are being unequally affected will be emphasized, including situations in which I have been involved, and solutions offered by and aiding indigenous peoples.

Methods: Understand how the warming climate has altered allergens, nutrition, mental health, fetal health, and others.

Results: Learn the current mortality rates from climate change and pollution and how indigenous peoples are disproportionately affected

Conclusions: Determine the mitigation efforts that can improve health in the population that we serve

#11 Exploring the Pathways to Contact with Juvenile Justice in Aboriginal and Torres Strait Islander Children
Jocelyn Jones

Purpose: This project is a Western Australian population-level study which uses linked data from a range of discreet government administrative databases (Department of Health-midwives notification, Department for Child Protection and the Department of Corrective Services). This paper will be addressing associations between, birth and maternal characteristics, gender differences, child protection, parental incarceration and contact with Juvenile Justice among a cohort of Aboriginal and Torres Strait Islander children born in WA. The study identified a number of risk factors that contribute to Aboriginal juvenile delinquency and protective factors that prevent a child from coming into contact with the justice system.

Methods: This study used mixed methods, the qualitative component of this project used data seven Aboriginal young people. Data was gathered from individual lifelines, Photovoice and semi-structured interviews to describe their life experiences. Key risk and protective factors were identified and used to inform the data analysis of the quantitative. The quantitative component described maternal and birth characteristics, child protection, intellectual disability and contact with juvenile justice for a cohort of Aboriginal children born from 1986-1990 in WA (n=7756). Data was linked from a range of government administrative datasets through the WA data linkage branch. Univariate and multivariate analysis was conducted.

Results: This research identified a range of significant risk factors for contact with juvenile justice. Males were found to be the most vulnerable in the cohort. They were three times the risk of contact with juvenile justice and if they had an intellectual disability 1.8 times. Interestingly, low birth weight was protective against contact with juvenile justice. Children of teenage mothers with a parity of 3+ were 3 times the risk of contact with justice. Child maltreatment was identified as a significant public health issue with those children with a substantiation at 2.5 times the risk of contact with juvenile justice.

Conclusions: This research supports the importance of longitudinal studies and highlighted the value of data linkage in an improved understanding of risk factors. This study is unique and the first of its kind it was able to identify risk factors for a cohort of Aboriginal children and contact with juvenile justice. It was able to map a child's developmental pathway from birth and document a range of risk factors associated with contact with juvenile justice. These results provide evidence where to target appropriate interventions along the life-course and to support policy development and programs

#12 He waka eke noa. Working with Whānau (Extended Families) to Improve Outcomes in Māori Traumatic Brain Injury.
Hinemoa Elder

Purpose: The role of whānau is recognised as an essential aspect of hauora (wellbeing) for Māori, who are over represented in traumatic brain injury populations. Whānau knowledge systems are a potent resource for enhancing recovery outcomes as used in Te Waka Oranga, a novel tool. This approach takes the view, in contrast to the current paradigm which trains whānau to be rehabilitationists, that by locating the whānau within their own culturally determined knowledge systems and optimising their intergal role in delivery of culturally required interventions the experience will be enhanced, they will feel a greater sense of ease and they will bring their own unique cultural knowledge forward to address the culturally defined aspects of the traumatic brain injury. Aim The aim of this aspect of a wider research project was to test validated cultural assessment tool, Te Waka Kuaka and a Māori cultural approach, Te Waka Oranga with five whānau.

Methods: Te Waka Oranga, describes a process of bringing together whānau knowledge, skills and feelings, with health workers knowledge, skills, and feelings in the context of identifying recovery destinations they collectively want to bring forward in order to improve the experience of recovery and to improve outcomes for whānau. It is also hypothesised that this approach will improve the experience of the health workers. Te Waka Kuaka is a Māori cultural needs assessment tool that has been developed to identify and guide this work. The four subscales on the Te Waka Kuaka help identify and navigate whānau needs any given time on the journey.

Results: This paper describes the impact and experiences of using these tools with whānau at the centre.

Conclusions: Māori theory and praxis brings forward whānau resources to promote whānau healing and self-determination. It is likely that this way of working may have wider application in the areas of insult to the brain such as mental health and addictions and neurodegenerative disorders.

#13 Epidemiology of Haemophilus Influenzae Serotype A from 2000-2015, an Emerging Pathogen in Alaska

Michael Bruce, Tammy Zulz, I. Plumb, D. Hurlburt, K. Rudolph, D. Bruden, R. Singleton, C. DeByle, J Klejka, T. Hennessy*

Purpose: Prior to introduction of the Haemophilus influenzae type b (Hib) conjugate vaccines, rates of Hib disease among Alaska Native (AN) people were among the highest reported in the world. Routine vaccination has reduced these rates to very low levels; however, serotype replacement with non-type b strains, particularly serotype a, is of concern.

Methods: We identified cases of invasive Hi disease in Alaska from 2000–2015 through statewide invasive bacterial disease surveillance. Medical charts were reviewed on laboratory-confirmed cases using standard forms to verify clinical presentation. Estimated population in Alaska as of 2014 was 737,354; Alaska Native (AN) people comprised 19% of the population.

Results: During the study period, a total of 264 cases of invasive Hi disease were reported; 134 (51%) were typeable Hi. Of those, 48 (34%) were serotype a, 38 (28%) were serotype b, 32 (24%) were serotype f. Among 48 Hia isolates, 44 (92%) occurred in AN people; median age was 0.7 years; 67% were male. 8% of Hia cases (4 children) were fatal. Common clinical presentations included: meningitis (39%), pneumonia (20%), and septic arthritis (18%). Overall annual Hia incidence was 0.4 cases/100,000 population. Annual incidence rates among children < 2 were 13.2 cases/100,000 persons; annual incidence rates for AN children < 2 were 44 cases/100,000 persons.

Conclusions: Serotype a is now the most common Hi serotype seen in Alaska, with the highest rates among AN children. Further research is needed to determine sequelae, risk factors, and prevention strategies.

#14 Tuberculosis in the Indigenous Child in Canada: Results from Nationwide Surveillance

Ryan Giroux, Aaryn Montgomery-Song, Ian Kitai, Raquel Consunji-Araneta, Amber Miners, Shaun Morris*

Purpose: Indigenous children in Canada, particularly those who are Inuit and First Nations, have historically had higher rates of tuberculosis (TB) than other groups. However, there is little detailed epidemiologic and clinical data about TB disease in children in Canada. This study characterizes the epidemiologic, clinical, and treatment data for all cases of TB in children under age 15 in Canada identified through the Canadian Pediatric Surveillance Program's (CPSP) Childhood Tuberculosis Study. In particular, we specifically highlight data for children with physician-reported Indigenous backgrounds (First Nations, Métis, or Inuit).

Methods: TB cases were identified via active surveillance through a monthly form sent by the CPSP to approximately 2500 active pediatricians, pediatric subspecialists, and select non-pediatricians who manage childhood TB. For cases meeting inclusion criteria, a detailed questionnaire was sent to collect clinical, epidemiological, and treatment data, followed by 6-month follow-up surveys until 6 months after treatment completion. Case identification was active for 36 months beginning in September and data collection from these cases is ongoing. Here, we present data from 142 cases that met inclusion criteria and returned an initial detailed questionnaire, out of 248 unique reported index cases.

Results: 51% (N=72) of cases were in Indigenous children (41 First Nations, 30 Inuit, one unspecified) and median age of 5y11m (0m to 14y11m). 90% of First Nations children lived within Manitoba and 89% lived on-reserve. Inuit children were in Nunavut (n=20) and Québec (n=10). 18% of Indigenous children had previous treatment for LTBI, compared to 3% of non-Indigenous. Hospitalization occurred in 61% (19% ICU) with a median length of stay of 14d (IQR 11.5-29.5) compared to 44% (10% ICU) hospitalization (median LOS=14d, IQR=7-24) in non-Indigenous. 26% (Indigenous) vs 29% (non-Indigenous) visited a healthcare professional at least once before TB diagnosis.

Conclusions: Despite efforts such as vertical TB programs, there remains a high disease burden, hospitalization/ICU admission rate, and reactivation rate in Indigenous children. Our study estimates an incidence of 49 incident cases per 100,000 population of Inuit children, suggesting that an Inuit child may be more likely to contract TB than a child in Ethiopia, a nation with a rate of 41 cases per 100,000 children. Public health strategies focusing on Inuit and on-reserve First Nations people are present, but effective resources need to be reviewed and prioritized to reduce the burden of TB disease in Indigenous children in Canada.

#15 Impact of PCV13 on Invasive Pneumococcal Disease in American Indians Less Than 5 Years of Age Living on the Navajo Reservation

Lindsay Grant, Laura Hammitt, Robert Weatherholtz*

Purpose: American Indians living on the Navajo Reservation experience high rates of invasive pneumococcal disease (IPD) compared with the general US population. IPD rates declined after pneumococcal conjugate vaccine (PCV7) introduction in 2000. In April 2010, PCV13 replaced PCV7.

Methods: Pneumococcal isolates cultured from normally sterile sites in Navajo children <5 years of age were identified through active, laboratory-based surveillance. Isolates were serotyped by slide agglutination and confirmed by Quellung reaction. Indian Health Service User Population denominators were used for rate calculations. We compared rates of IPD in the PCV7 era (2001-2009) to the PCV13 era (2011-2015) using Poisson regression. PCV13-types were 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F.

Results: We identified 210 IPD cases from 2001-2009 and 42 from 2011-2015, a 61% reduction in the rate of IPD in children <5 years ($p<0.0001$). The PCV13-type IPD rate declined from 66 to 4 cases/100,000 ($p<0.0001$). Rates of IPD for serotypes 7F (21 vs. 1 cases/100,000; $p<0.0001$), 1 (16 vs. 0/100,000; $p=0.0004$) and 19A (21 vs. 0 cases/100,000; $P<0.0001$) decreased significantly. Cases of PCV13-type IPD identified after introduction of PCV13 were: type 3 (2 cases); type 7F (1 case); type 4 (1 case) – all cases were at least partially immunized. Serotype 22F was the most common non-vaccine (NVT) type from 2011-2015 (6 cases/100,000). The rate of NVT IPD remained unchanged ($p=0.93$).

Conclusions: PCV13-IPD rates declined significantly following PCV13 introduction. Continued surveillance will monitor for changes in NVT disease and sustained protection from VT disease.

#16 Trends in Otitis Media among American Indian and Alaska Native Children and the U.S. General Population of Children after Introduction of the 13-valent Pneumococcal Conjugate Vaccine

Rosalyn Singleton, Sara Seeman, Lisa Bulkow, Susan Emmett, John Kokesh, Steve Holve, Thomas Hennessy*

Purpose: Indigenous populations have experienced a disproportionate burden of otitis media (OM) infections, one of the most common pediatric illnesses. *Streptococcus pneumoniae* is the most common bacterial cause of OM. After routine vaccination with 7-valent pneumococcal vaccine (PCV7) in 2000, decreases in OM visit rates were observed for the U.S. general population and for American Indian/Alaska Native (AI/AN) children. Data from a large nationwide managed healthcare database shows a decline in OM visits during 2004-2011. We report on the rate of OM visits in AI/AN children after introduction of 13-valent pneumococcal conjugate vaccine (PCV13) in 2010.

Methods: We used the Indian Health Service's National Patient Information Reporting System to identify outpatient visits listing OM as a diagnosis among AI/AN children <5 years of age for 2010-2011 and 2012-2013 and compared with 2003-2005. AI/AN outpatient visits for myringotomy with insertion of tubes (MIT) were analyzed for 2010-2012. Outpatient visits for OM for the general U.S. child population were analyzed using the National Ambulatory Medical Care (NAMCS) and National Hospital Ambulatory Care Surveys (NHAMCS) for 2010-2011 and compared with 2003-2005.

Results: The 2010-2011 OM-associated outpatient visit rate for AI/AN children <5 years of age (63.5 per 100/year) was less than for 2003-2005 (91.4) and similar to the U.S. general population (62.8 [95% CI: 53.0-72.6]). The 2010-2011 AI/AN infant OM visit rate (130.5) was 1.6 fold higher than for the U.S. infant population. The AI/AN OM visit rate declined to 57.6 in 2012-2013. For AI/AN children, the highest 2010-2011 OM visit rate was in Alaska (135.0). The MIT rate for 2010-2012 was low for AI/AN children (0.33) except for Alaska (2.43), compared with the 2010-2011 U.S. rate (0.97 [95% CI 0.5, 1.4]).

Conclusions: OM outpatient visits for AI/AN children declined by one-third from 2003-2005 to 2010-2011 with an additional decline to 2012-13. Unlike the AI/AN population and published managed healthcare rates, the OM rate for the U.S. population, based on the NAMCS/NHAMC, did not decline during this period, possibly because of slower PCV13 uptake. In contrast to historical rates, the 2010-2011 OM visit rate for AI/AN children <5 years was similar to the U.S. general population; however, the AI/AN infant OM rate remained higher than the U.S. general population. Among IHS regions, the highest AI/AN OM visit and MIT rates were in Alaska.

#17 Improving Indigenous Child Health Service Delivery through Continuous Quality Improvement

Natalie Strobel

Purpose: The Audit and Best Practice for Chronic Disease (ABCD) program is a continuous quality improvement (CQI) program for the prevention and management of chronic disease in Indigenous people in

Australia. The program broadened its scope in 2005 to include maternal and child health. By the end of 2014 over 270 primary care centres across Australia had participated in the ABCD CQI program. There are now 8 years of data available from standardised audits of almost 15,000 clinical records for Indigenous children who attended primary care centres across Australia.

Methods: This study used 6 years of child health audit data from 59 Australian primary health care centres to determine if the quality of child health care had improved during this period. Analysis variables were related to important age-relevant health issues and prevention and early intervention items implemented in the 12 months prior to the audit. These were collated into four categories: administrative, health check, anticipatory guidance and specific health issues. Crude and adjusted logistic GEE models were used to examine the effect of audit year on the delivery of care. Odds ratios and 95% confidence intervals were calculated.

Results: 2360 individual file audits were conducted in 59 centres. During the study period the percentage of children included in recall systems significantly improved (84% to 95%). The majority of child health check components showed significant improvements. Provision of nutrition advice and oral health advice significantly increased over time. The recording of an ear infection decreased (25% to 7%) and the recording of treatment and follow up both significantly increased over time.

Conclusions: We documented significant improvements in quality of care of Indigenous children over a six year period from 2008 to 2013 in primary care centres participating in a CQI program in Australia. CQI is accepted as a necessary component of high quality health service delivery. Uptake and resourcing of CQI initiatives within Indigenous PHC is increasing with the ABCD program being the predominant initiative in Australia. We believe this to be the first examination of data that relates CQI activity (ABCD involvement) to changes in the quality of early child health care over time.

#18 Sacred Babies: An Evaluation of the Infant Survival Curriculum for Community-based Early Childhood Workers in Manitoba First Nations Communities.

Grace Kyoona-Achan

Purpose: Background: High rates of unsafe sleep practices have resulted in numerous infants deaths in First Nations (FN) communities. This concerning state gave rise to the need for an intervention. An indigenous curriculum was created for community-based early childhood workers to address knowledge gaps resulting in practices leading to Sudden Infant Death Syndromes (SIDS). Implementation of the curriculum began in January 2015 and is ongoing. To date, four (4) training sessions have been delivered.

Methods: Pre-training needs assessments provided information on known risks and protective factors for SIDS. Eighty one (81) summative evaluation surveys provided feedback on knowledge community based participants gained from the training. The surveys used mixed method and were administered immediately post training.

Results: We discuss the results of the evaluation surveys. Preliminary findings show the role of adequate and culturally relevant training in addressing SIDS in First Nations communities. Evidence-based and culturally informed trainings can effectively support and address long term positive change in the occurrences of SIDs in First Nations communities. Participants were supported to begin exploring alternative safe sleep practices.

Conclusions: In order to address infant mortality rates in FN communities in a culturally safe and appropriate manner, gaps in knowledge on safe sleep practices need to be shared widely with all community based maternal child health home visitors, daycares, and prenatal educators. We share details of training based on a First Nations curriculum and its impact in participating communities. Evaluation results highlight best practices for infant safe sleep in FN communities.

#19 Improving Access to Primary Care for Aboriginal Babies in Western Australia: A Randomised Controlled Trial Pilot Study.

Daniel McAullay

Purpose: Despite a decade of substantial investments in programs to improve access to primary care for Aboriginal mothers and infants, more than 50% of Western Australian Aboriginal babies are still not receiving primary and preventative care in the early months of life. There have been difficulties in ensuring that the appropriate primary care providers receive information about the baby's birth by the time the baby is discharged from hospital. There is no consistent process for ensuring that choices about primary care are discussed with Aboriginal families.

Methods: This is a population-based, stepped wedge, cluster randomised controlled trial of an enhanced model of early infant primary care involving research staff working with birthing hospitals and primary care

providers to understand gaps in infant care coordination to adapt and target the study intervention to meet local needs. This is a behaviour change intervention delivered to hospital staff focusing on two key behaviours. 1. Staff meeting with families soon after birth to ensure health education, care coordination, discharge planning and communication. 2. Staff communicating with the family's primary care provider to ensure they receive birth and hospital details.

Results: During the pilot phase there were 67 Aboriginal babies born. Six per cent of births were low birth weight and 12% premature. We conducted 15 interviews with health staff. From these interviews, staff identified a number of key barriers and enablers to improving early postnatal care and improved early infant primary care. Barriers identified include time and staffing pressures and the lack of induction and professional development opportunities. Enablers identified include the development of continuity of care models, development of standardised guidelines, improving the way hospital health staff communicate and including the mother and families more in discharge planning.

Conclusions: The pilot study allowed us test and adapt all tools to be used in the larger trial. The qualitative tools used during a pilot phase worked particularly well in allowing us to collect very rich information. The results thus far have identified a number of issues to be addressed to improve the delivery of early primary care for Aboriginal babies and their families.

#20 **The Association between Family and Household Structure and Indigenous Children's Health**

Maggie Walter

Purpose: Family life is an important social determinant of health, but to date little or no empirical research has examined links between family and household structure and Indigenous children's health. Different family types and household structures provide different levels of emotional, social, economic and instrumental support to children, which in turn influences their health and wellbeing. We examined the associations between different family and household types and parent/carer reports health of Indigenous children in Australia

Methods: We used the first 7 waves of the Longitudinal Study of Indigenous Children (LSIC) in Australia. Wave 1, comprised 1,671 children and was collected in 2008. Due to the sparse distribution of the Indigenous population a non-random sampling approach was used with children recruited from 11 geographic sites. Children were not selected randomly from within each site. Retention rates for waves 2 – 7 ranged from 82% to 87%. We include all available data in our analysis which comprises 1,671 children in wave 1 to 1,253 children in wave 7. Our measure of family and households comprised 9 categories differentiating between couple and lone parent households and those living with non-parent carers. Our dependent variable was "How would you rate "study child's" health in general?", with response categories 1) Excellent, 2) Good, 3) Fair, and 4) Poor. We undertake a descriptive analysis and examine associations using OLS.

Results: Our descriptive analysis show that while the majority of children live with one or both parents, a significant minority live with a non-parent carer and this increases from 5% to 10% over the 7 waves of LSIC. Most households have more than one child. Having other adults in the household was more prevalent in lone parent households than couple households. Our preliminary OLS results indicated that different family and household structures were associated with parents/carers reports of their children's health. Compared to children in households comprising only "parent & partner & study child", study children with non-parent carers and those in large, diverse family households had significantly poorer health.

Conclusions: A relatively large proportion of Indigenous children lived with non-parent carers and this increased over time. Our results suggest that these children had significantly poorer general health than those living in a couple household. Government policy for Indigenous Australians that is targeted to assisting parents to retain care of their children may improve the health of those children.

#21 **Understanding Aboriginal Children's Perspectives and Expression of Pain: Generating Knowledge to Reduce the Hurt**

Sharon Rudderham, Margot Latimer, John R. Sylliboy*

Purpose: Aboriginal children experience high rates of pain that can interfere with healthy development and wellbeing. This pain experience is believed to be a lingering effect of the historical trauma and colonization efforts that were tragically thrust on Aboriginal people globally. Physical, emotional, mental and spiritual pain continue to exist for young people but there are few resources and mechanisms to assist in addressing the hurt. The Aboriginal Children's Hurt & Healing (ACHH) Initiative is a two-eyed seeing, community-based project lead by an Indigenous and Western team with the aim of better understanding how to mobilize the youth and community voices to reduce the hurt and improve overall wellbeing.

Methods: This mixed method cross-sectional study used 3 types knowledge gathering strategies: conversation sessions, health care utilization for pain issues and youth art workshops. There were 146 children and youth as well as 28 professionals and 17 Elders who participated from four First Nation communities in the Mi'kma'ki & Wolastoqey regions. The pain care utilization data was drawn from communities in the Mi'kma'ki region with a total of 8 communities overall with pain-related information. The three types of knowledge were integrated and themed to have a comprehensive understanding of the pain and hurt experience for Aboriginal children and youth in these regions.

Results: The conversation themes were consistent; stoicism, reluctance to seek care, experiences of racism and poor health care encounters where community members did not feel respected or heard were described. Participants also described positive interactions and relevant recommendations for improved care for both an Indigenous and Western lens. Youth primarily painted emotional pain but physical, mental and spiritual hurt were also present. Youth provided insight into how they cope with persistent pain. The health care utilization data with age and sex -matched group (N=5260) showed Aboriginal children have significantly higher rates of physical pain diagnoses and significantly lower rates of mental health diagnosis; in contrast to the conversation and art results.

Conclusions: This knowledge gathering and synthesis effort shows that Aboriginal children and youth from these regions are indeed suffering high rates of all types of untreated pain and hurt, that if only determined through one data effort (utilization) would not be identified. Participants also provided insight and specific recommendations regarding what can be done to improve health care encounters and the different strategies that are effective. Results have been incorporated into various knowledge translation strategies that include a mobile art exhibit, course curriculum for health clinicians and a story-based app for children and youth to convey the different dimensions of their pain and hurt.