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ORAL ABSTRACT PROGRAM

PROGRAMME DES RÉSUMÉS ORAUX

ORAL PRESENTATIONS – SESSION 1		
Tuesday 25 April	**11:15 – 12:45**	**Room 202**

Investigating the measles susceptibility gap in Ontario infants

Wright J, Bolotin S, McLachlan E, Severini A, Hachette T, Deeks S, Halperin S, Osman S, Brown K, Science M

Introduction/background: Most infants in Canada receive their first measles vaccination at 12 months of age or shortly after. However, there is evidence that transplacental antibody wanes before this period, leaving infants susceptible to measles infection before their first vaccination.

Methods: We enrolled infants <12 months of age admitted to The Hospital for Sick Children in Toronto and their mothers. Measles immunity was measured by a Plaque Reduction Neutralization Test (PRNT). We used logistic regression to evaluate the probability of measles susceptibility in infants by month of age, and adjusting for any variables with $p<0.2$ from univariate regressions. We used multivariate Poisson regression to predict kinetics of antibody titre waning in infants over time.

Results and analysis: We recruited 257 infant-mother pairs. 52.9% of infants were male, 25.6% had underlying conditions, and 97.0% of mothers who recalled their vaccination status had received their MMR vaccines. Only 23.5% of infants had measles antibodies above the PRNT threshold of protection (192 mIU/mL) at two months of age, and all were susceptible by four months of age. The odds of infant susceptibility more than doubled with each one-month increase in infant age (aOR: 2.65; 95% CI: 1.95, 3.60; $p<0.0001$). By two months of age, predicted mean antibody titres decreased to 135 mIU/mL (95% CI: 102, 167), significantly below the threshold of protection.

Conclusions and implications for policy, practice or additional research: Given the timing of routine measles vaccination programs in Canada, our results suggest that Ontario infants are susceptible to measles for the majority of their first year of life. Therefore, measles-exposed infants should be presumed susceptible, regardless of age. High population-level measles vaccine coverage is therefore essential to protect this susceptible population.

Systematic review and meta-analysis of SARS-CoV-2 vaccine acceptance in parents of children aged 5-11

Hui C, Piche-Renaud P, Peresin J, Shahrbabak K, O'Kelly C, Macikunas A, Yan T, Di Chiara C, Tailor L, Farrar D, Morris S

Introduction/Bakground: Despite the well-studied benefits and safety of SARS-CoV-2 vaccines, many caregivers of children aged 5 to 11 years old remain hesitant to have their child vaccinated. Reasons for vaccine non-acceptance and barriers specific to children aged 5-11 and caregivers are poorly understood. Our study aims to: 1) Assess proportion of parents who are acceptant of vaccines in different populations/settings; 2) Identify parent and children characteristics associated with vaccine acceptance; and 3) Identify reasons for vaccine non-acceptance.

Methods: Medline, Embase, Cochrane and CINAHL were searched using predefined search terms to identify relevant studies published between October 29, 2021 and September 12, 2022. Studies were assessed for inclusion/exclusion by two authors, and discrepancies were resolved by discussion with a senior author. Random-effects meta-analysis was performed to estimate the pooled proportion of parents who are acceptant of SARS-CoV-2 vaccines.

ResutIts and Analysis: A total of 1571 articles were identified for full text review, of which 30 were included. Twenty-four studies were conducted in high income countries, three in upper middle-income countries and three in low- to middle-income countries. The pooled effects size for vaccine acceptance in caregivers of children aged 5-11 years was calculated as 54% (95% confidence interval 47–60%), with considerable between-study heterogeneity (I^2 of 99.04%). Characteristics associated with vaccine acceptance included caregivers being

vaccinated against SARS-CoV-2 themselves, and higher parental education. Common reasons for vaccine non-acceptance consisted of vaccine safety/efficacy concerns and perception children being less susceptible to SARS-CoV-2 infection compared to adults.

Conclusions and Implications: The overall proportion of caregivers being acceptant of SARS-CoV-2 vaccine for their child aged 5-11 was found to be low, with the main barriers relating to vaccine safety concerns and health education. Further studies exploring these barriers and potential solutions to increase vaccine confidence and uptake in this age group are needed.

Factors associated with school-based human papillomavirus (HPV) immunization in Alberta: A population-based cohort study

Malkin J, Jessiman-Perreault G, Law J, Teare G, Snider J, Ali Tirmizi S, Allen Scott L

Introduction/background: Human papillomavirus (HPV) infection causes nearly all cervical cancer cases and is a cause of anogenital and oropharyngeal cancers. HPV-associated cancers are inequitable, with an increased burden in marginalized groups in high-income countries. Understanding how immunization status varies by social determinants of health, health system and geospatial factors is valuable for prioritizing and planning HPV immunization interventions.

Methods: Health administrative data for males and females born in 2004 in Alberta, Canada was used to determine HPV immunization status based on age and the number of doses administered in schools during the 2014/2015-2018/2019 school years. Immunization status and its relationship with social determinants of health and health system factors was assessed by a multinomial logistic regression model and independent samples t-tests. Geospatial variation was assessed using Getis-Ord Gi* hot-spot analysis.

Results and analysis: The cohort consisted of 45,207 youth. In the adjusted model, those who did not see their general practitioner (GP) within three years of turning ten years old had higher odds of not being immunized compared with those who did see their GP (OR=2.02, 95% CI=1.90-2.14). Health system non-users in the 2013-2014 fiscal year had higher odds of not being immunized compared to health system users without health conditions (OR=1.87, 95% CI=1.71-2.05). Those who experienced more material and social deprivation were more likely to be not and partially immunized, respectively, compared to those who experienced less deprivation (p-value<0.0001). Significant hot-spot clusters of individuals without full HPV immunization exist in rural locations on the North and East sides of Alberta. Hot-spots had statistically significantly higher mean material deprivation scores (p-value=0.0080) and fewer GP visits (p-value=0.0013) compared to cold-spots.

Conclusions and implications for policy, practice or additional research: Findings suggest that material and social deprivation, health system access, and rural residency impact HPV immunization. Such factors should be considered by public health professionals when tailoring programming to increase HPV vaccine uptake in priority populations.

Evaluating the efficacy of a brief altruism-eliciting video intervention in enhancing COVID-19 vaccination intentions amongst a population-based sample of younger adults: A randomized controlled trial

Tatar O, Zhu P, Griffin-Mathieu G, Haward B, Perez S, Zimet G, Tunis M, Dubé È, Rosberger Z

Introduction/background: Younger adults are a critical population to address in the COVID-19 pandemic as they typically have lower vaccine uptake rates compared to older aged groups. In a national sample of younger adults, the present study evaluated: 1) the within-group efficacy of an altruism-eliciting video in increasing vaccination intentions; and 2) the between-group efficacy of an altruism-eliciting video in increasing vaccination intentions compared to a text-based control on non-vaccine related COVID-19 preventive health behaviours.

Methods: Using a web-based, pre-post randomized controlled trial design, Canadians aged 20-39 who were unvaccinated with COVID-19 vaccine were randomized in a 1:1 ratio to the video intervention or active text-

control. The video intervention was developed based on a literature review showing that eliciting altruism could increase vaccine intentions. Vaccination intentions were measured using the Precaution Adoption Process Model (PAPM) which included four stages: unengaged, undecided, decided not, and decided to. The McNemar Chi-square and exact tests of symmetry were used to evaluate pre-to-post intervention within-group changes. Post-intervention between-group vaccine intentions were analyzed using the Pearson Chi-square test.

Results and analysis: In total, 1373 participants were analyzed (n = 686 in the video-intervention arm, n = 687 in the text-control arm). Amongst the video intervention arm, there was a significant within-group difference in intentions to receive the vaccine, $\chi 2(1) = 20.55$, $P < .001$. The exact test of symmetry showed that in the video-intervention arm, participants who were unengaged or undecided about receiving a COVID-19 vaccine significantly increased vaccine intentions compared to participants who had already decided not to vaccinate. There was no significant between-group difference post-intervention.

Conclusions and implications for policy, practice or additional research: Our study findings suggest that altruistic messaging could increase COVID-19 vaccine uptake, particularly for those who are unengaged or are undecided about receiving the vaccine. These results could inform messaging regarding primary-series and additional dose COVID-19 vaccination and for other vaccine-preventable diseases.

ORAL PRESENTATIONS – SESSION 2		
Tuesday 25 April	**11:15 – 12:45**	**Room 205**

"They weren't really sure what to do": Gaps in the evidence about COVID-19 vaccination in pregnancy

Manca T, Top K, Graham J

Introduction/background: Rapidly emerging evidence about COVID-19 vaccination in pregnancy required Canadian organizations and provincial and territorial (P/Ts) health authorities to update online information more quickly than resources could sustain. We analyzed how online texts containing COVID-19 vaccine information, evidence and recommendations were used in vaccine decision-making.

Methods: We collected and analyzed online texts distributed by Canadian health authorities (national, P/T, local), vaccine manufacturers, professional societies, and expert advisory panels about COVID-19 vaccine use in pregnancy. Interviews were conducted with pregnant women and prenatal care providers about their understandings of vaccination in pregnancy and reactions to the online texts. Feminist discourse analysis attended to how online texts can shape decisions about and responsibility for COVID-19 vaccination in pregnancy.

Results and analysis: We found discrepancies in online texts (N=52) about COVID-19 vaccination in pregnancy. Most online texts from national organizations and P/T health authorities described gaps in the evidence needed to inform a recommendation and provided recommendations that contradicted information provided by other organizations (e.g., COVID-19 vaccines were recommended, should be offered, may be offered, were available, or were not recommended in pregnancy). Findings from interviews (N=39) suggest that pregnant people and prenatal care providers, challenged by incomplete information, felt responsible for balancing COVID-19 disease and vaccination risks. Care providers interviewed generally supported vaccination, but "weren't really sure what to do with pregnant clients" who asked about COVID-19 vaccination.

Conclusions and implications for policy, practice or additional research: Discrepant information created uncertainty about vaccination in pregnancy among pregnant people and barriers to providing clear recommendations for prenatal care providers. Attempts should be made to harmonize messaging from national and P/T advisory groups and to provide stronger evidence earlier about vaccines in pregnancy.

Intentions and Attitudes Towards COVID-19 Vaccination During Pregnancy and Lactation in Canada

Bondy S, McClymont E, Albert A, Folkes I, Andrade J, Barrett J, Bogler T, Boucoiran I, Castillo E, D'Souza R, El-Chaâr D, Fadel S, Fell D, Kuret V, Ogilvie G, Poliquin V, Sadarangani M, Scott H, Snelgrove J, Tunde-Byass M, Money D

Introduction/background: The COVID-19 pandemic poses a unique set of risks to pregnant/lactating persons. While SARS-CoV-2 infection is known to cause more serious illness in this population and impact pregnancy outcomes, data regarding the use of COVID-19 vaccines in pregnancy is still growing. Though pregnant and lactating individuals are eligible and encouraged to be vaccinated against SARS-CoV-2 in Canada, vaccine attitudes in this target demographic are not widely understood.

Methods: This national prospective cohort study gathered data on vaccine attitudes in pregnant or lactating persons across Canada between July 2021 – July 2022. Web-based surveys were distributed to elicit levels of vaccine uptake and confidence in this important subset of the population. Survey questions were informed by validated tools including the WHO Vaccine Hesitancy Scale (VHS) and the Theory of Planned Behaviour (TPB).

Results and analysis: Of 3418 respondents, 90.1% intended to receive a COVID-19 vaccine. TPB variables such as attitudes towards COVID-19 vaccines ($p<0.0001$), direct social norms, and indirect social norms ($p<0.0001$) were significantly associated with intention to vaccinate. Perceived vaccine risks, as assessed by the WHO VHS, were greater in those not intending to vaccinate but considerable in both groups (<0.0001).

Conclusions and implications for policy, practice or additional research: While the high rate of COVID-19 vaccination in this cohort limited our ability to discern factors associated with vaccine hesitancy, our study identified several key characteristics that play a role in vaccine uptake, including value placed in vaccines, trust in healthcare providers, and both direct and indirect social influences. These findings can be used to optimize public health recommendations and inform prenatal care providers on how best to approach COVID-19 vaccine counsellng with patients.

Canadian COVID-19 vaccine policies and guidance for pregnant and lactating persons: An environmental scan of the changing landscape

Lee J, Ntahonkiriye N, Wilson S, Fell D, MacDonald S

Introduction/background: A major issue for COVID-19 vaccine policy makers, was the limited availability of initial vaccine clinical information to inform their decision-making on the use of COVID-19 vaccines for the pregnant and lactating population. Changes in vaccine recommendations and vaccine policy occurred as the pandemic evolved and as new evidence emerged. This study aimed to document the changes in vaccine guidance and policies issued over time to guide vaccine decision-making by the pregnant and lactating population.

Methods: An environmental scan was completed by collecting COVID-19 vaccine policies and guidance documents from websites of provincial/territorial (P/T) government and public health authorities, and professional organizations. Specific organizations were contacted to retrieve archived vaccine recommendations. Collected evidence was collated with key federal vaccine-related documents (vaccine authorization dates from Health Canada and vaccination recommendations from the National Advisory Committee on Immunizations (NACI)) to create a timeline.

Results and analysis: Health Canada authorized three COVID-19 vaccines in late 2020/early 2021 (i.e., Pfizer, Moderna, AstraZeneca). Although vaccination during pregnancy and lactation was not initially recommended by NACI nor by P/T public health authorities, pregnant women were able to become vaccinated if they were part of a priority group (e.g., healthcare worker). Safety data on COVID-19 vaccination during pregnancy became available in Spring 2021, during the Delta wave. In April and May 2021, several P/T prioritized pregnant/breastfeeding women in their vaccination programs and NACI issued a strong recommendation with a preference for mRNA COVID-19 vaccine uptake.

Conclusions and implications for policy, practice or additional research: During the first year of COVID-19 vaccine availability, there was considerable variation in the timing by which federal, P/T policy makers, and professional organizations issued COVID-19 vaccine policies and guidance to pregnant/breastfeeding individuals within their respective jurisdictions. Such differences may have posed challenges to COVID-19 vaccine confidence and decision-making among pregnant and breastfeeding persons.

Exploring the psychological antecedents on vaccination decisions in pregnant or lactating individuals.

Bruce M, Surti M, Castillo E, Giesbrecht G, Lee K, Patel S, Park J

Introduction/background: The National Advisory Committee on Immunization (NACI) recommends pregnant individuals receive the COVID-19 vaccine following evidence that associated COVID-19 infection in pregnancy with increased morbidity and mortality. The 5Cs scale (Confidence, Constraints, Calculation, Complacency and Collective Responsibility) is a validated tool exploring vaccination decisions. Understanding vaccination decisions is necessary to design and evaluate interventions designed to influence behaviour change.

Methods: We conducted a provincial, internet survey-based, study Nov. 2021 to Mar. 2022. Pregnant or lactating individuals, or those planning a pregnancy regardless of vaccine status were recruited (N = 229). Likert-scale type quantitative questions were adapted from the 5C tool to focus on COVID-19 and pregnancy. Collected data was statistically analyzed by SPSS software.

Results and analysis: Self-reported COVID-19 vaccine uptake was significantly associated with all 5C factors. Vaccine uptake was higher among individuals who: had previous vaccines (non-COVID) during pregnancy ($\chi2=67.63$, $p<.001$) or outside of pregnancy ($\chi2=21.55$, $p<.001$). Vaccine uptake was also associated with Confidence in vaccine safety and effectiveness ($t=27.34$, $p<.001$, $d=3.53$), with increased Collective Responsibility ($t=16.97$, $p<.001$, $d=2.44$), with higher level of education ($\chi2=28.44$, $p<.001$), and with previous vaccination of other children ($\chi2=5.53$, $p=.02$). Conversely, vaccine uptake was lower for individuals who had high levels of Calculation or extensive information searching ($t=3.89$, $p<.001$, $d=0.53$), experienced Constraints or barriers to access vaccinations ($t=5.94$, $p<.001$, $d=0.90$), or had a higher level of Complacency ($t=13.79$, $p<.001$, $d=1.99$). Trust in medical professionals was strongly associated with vaccine uptake ($t=15.22$, $p<.001$, $d=2.53$). Trust in government was also explored: compared to the provincial government, trust in the federal ($t=8.00$, $p<.001$, $d=0.54$) and municipal governments ($t=9.08$, $p<.001$, $d=0.61$) was significantly higher.

Conclusions and implications for policy, practice or additional research: There are meaningful associations between psychological antecedents and perinatal vaccine uptake. Trust in government and in medical professionals was also strongly associated with vaccination uptake decision making. These are important considerations for future vaccination rollouts.

Determinants of non-vaccination for pertussis despite recommendation from maternity care provider in pregnant women in Canada

Baysac D, Guay M, Lévesque I, Kokaua J, Castillo E, Poliquin V, Gilbert N

Introduction/background: Immunization with the Tetanus, diphtheria and acellular pertussis (Tdap) vaccine during pregnancy is safe and effective in protecting newborns during the first months when morbidity and mortality from pertussis infection are the highest. However, in 2018-2019, most pregnant women were not vaccinated, largely because they had not been advised to do so. This analysis aims to identify determinants of the non-vaccination for pertussis vaccination in those women who had been advised to get vaccinated.

Methods: The Survey on Vaccination during Pregnancy was conducted for the first time in 2019, in conjunction with the Childhood National Immunization Coverage Survey. It included mothers who gave birth between September 2018 and March 2019. This analysis was restricted to 2,775 mothers who had been advised by their maternity care provider to get vaccinated against pertussis during pregnancy.

Results and analysis: Of those women who had been advised to get vaccinated, 21% were not. This rate varied across provinces and territories, ranging from 8.6% in Prince Edward Island to 31.9% in Newfoundland and Labrador. The risk of non-vaccination was higher in those who had already given birth (aOR=1.9), had lower income (aOR=2.1), and had received prenatal care from an obstetrician-gynaecologist (aOR=1.7) or midwife (aOR=5.2) compared to a family doctor.

Mothers who did not believe that their newborn was at risk of pertussis were more likely to be unvaccinated (OR=12.0). Beliefs that vaccines in general for children are ineffective (OR=4.1), dangerous (OR=6.0) and do not protect their health (OR=7.4) were also associated with non-vaccination.

Conclusion and implications for policy, practice or additional research: These findings highlight the socioeconomic inequalities and inaccurate perceptions about pertussis vaccination. A better understanding of the factors underlying the refusal of maternal vaccination is needed to guide maternal vaccination programs and to improve acceptance of the Tdap vaccine.

ORAL PRESENTATIONS – SESSION 3		
Tuesday 25 April	**15:00 – 16:30**	**Room 202**

Evaluating a COVID-19 Vaccination Module for Health Sciences Students: Learners' Perspectives

Allan K, Taddio A, Cho A, Cameron K, Fadel S, Gudzak V, Bucci L, Thomson H, **Bjelajac Mejia A**

Introduction/background: Healthcare providers are trustworthy sources of information about vaccination and key actors in building confidence and promoting uptake of vaccines. This study explored learner outcomes following completion of a COVID-19 vaccination module offered to first year health sciences students at the University of Toronto. We evaluated whether the completion of the module (required for first year pharmacy students) prepared students for clinical practice.

Methods: First year pharmacy students from the University of Toronto participated in this mixed-methods study. A purposive sample of students (n=215) completed a closed-ended survey and a subset (n=9) participated in focus groups. Quantitative survey data was analyzed using descriptive statistics and triangulated with qualitative data. Data analysis was guided by the Kirkpatrick Framework which evaluates learner perception at four levels: satisfaction, knowledge, behaviour, and results.

Results and analysis: Learner Satisfaction: Over two-thirds of students reported the module addressed their questions about COVID-19 vaccination. The variety of learning modalities (infographics, short-answer, multiple-choice questions, case studies) enhanced learner experience, though most did not continue to use the module as a resource after completion. Learner knowledge: Students reported the acquisition of knowledge related to vaccine science, patient eligibility, vaccine hesitancy, and vaccine distribution. Learner behaviour: Students reported feeling more confident in recommending COVID-19 vaccines to patients, family, and friends. Learners noted that the module developed their clinical skills related to addressing hesitancy, improving patient experience, and administering injections, though they felt further 'hands-on' training was needed. Learner results: A minority of students felt that their advice led friends and family (37%) or patients (21%) to receive the vaccine.

Conclusions and implications for policy, practice or additional research: The COVID-19 vaccination module was effective at enhancing knowledge and confidence among pharmacy students. Further inquiry is needed to explore whether the addition of interactive components could effectively develop clinical skills critical to vaccination and if the module should be integrated within core pharmacy curricula.

Vaccine promotion strategies in community pharmacy addressing vulnerable populations: a scoping review

Chadi A, David P, Thirion D

Introduction/background: Vulnerable populations are under vaccinated and display higher risks of complications from infectious diseases. In many countries, pharmacists have gained the rights to prescribe and administer vaccines, which contributes to improving vaccination rates. However, little is known on how pharmacists define and reach vulnerable communities. The purpose of this study is to describe how vulnerable communities are targeted in community pharmacies.

Methods: We performed a systematic search of the Embase and Medline database in August 2021 according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses protocols (PRISMA ScR). Articles in English, French or Spanish addressing any vaccine in a community pharmacy context and that target a population defined as vulnerable were screened for inclusion.

Results and analysis: A total of 1039 articles were identified through the initial search and 63 articles met the inclusion criteria. The vast majority of the literature originated from North America (n=54, 86%) and addressed influenza vaccination (n=29, 46%), pneumonia (n=14, 22%), herpes zoster (n=14, 22%) or human papilloma virus (n=14, 22%). Lifecycle vulnerabilities (n=48, 76%) such as age and pregnancy were most often used to target patients followed by clinical factors (n=18, 29%), socio-economical determinants (n=16, 25%) and geographical vulnerabilities (n=7, 11%). The most frequently listed strategy was giving a strong recommendation for vaccination, promotional posters in pharmacy, distributing leaflet/bag stuffers and providing staff training. A total of 24 barriers and 25 facilitators were identified. The main barriers associated to each vulnerable category were connected to effective promotional strategies to overcome them.

Conclusions and implications for policy, practice or additional research: Pharmacists prioritize lifecycle and clinical vulnerabilities and may overlook the complex relationship between vulnerability and access to care. Through leveraging the wide variety of promotional strategies, pharmacists can play an even greater role in making vaccination more equitable.

A Shot in the Arm: The Evidence and Gaps Regarding the Role of Pharmacy Technicians in Vaccination Services

Demarco M, Waite N, Houle S, Carter C

Introduction/background: Busy pharmacy workloads and competing clinical priorities limit a pharmacist's ability to meet the needs of vaccine-willing patients and contribute to missed opportunities with vaccine-hesitant individuals. The past few years have seen an increased interest in pharmacy technicians supporting increasing vaccination services needs. No systematic literature review has been done to identify the evidence and gaps regarding pharmacy technician roles in vaccination services.

Methods: In compliance with PRISMA protocols, systematic searches were performed in PubMed, Embase, International Pharmaceutical Abstracts, Scopus, and CINAHL. A summary of evidence and gaps regarding pharmacy technician traditional and emerging roles, pharmacist and pharmacy technician perspectives, and impact on workflow and patient outcomes was created.

Results and analysis: Full-text screening of 145 relevant records identified 14 articles for inclusion. Most articles evaluated emerging pharmacy technician roles in patient screening (n = 8, 53%) and vaccine administration (n = 5, 36%). Pharmacy technician vaccine screening roles included identifying eligible patients using electronic medical records, vaccine registries, or paper-based systems. Screening activities were considered complex and had the potential to increase overall time required for vaccination services. Vaccine administration roles included vaccine handling and storage, choosing the correct needle and syringe, drawing up vaccine, vaccine administration, responding to emergency situations, and completing required documentation. Pharmacists and technicians advocated for accredited vaccine administration training owing to consistent benefits in pharmacy workflow efficiency, pharmacist clinical time, and pharmacy technician job satisfaction. Implementation of emerging roles demonstrated positive patient outcomes (n = 10, 72%). Research gaps included no or limited

research on the impact of pharmacy technicians' involvement on vaccination workflow, pharmacy efficiency, adverse events, and cost-effectiveness.

Conclusions and implications for policy, practice or additional research: This review supports deployment of pharmacy technicians in delivering vaccination services with demonstrated evidence of their emerging role in vaccination services. Future research will be important for advocacy work with policy makers, pharmacy owners/managers and pharmacy staff.

A prospective, controlled community pharmacy-embedded study to evaluate pharmacists as immunizers: Pharmacy reported results from the two-year intervention

Isenor J, Kervin M, Halperin D, Bowles S, Bettinger J, Langley J, Slayter K, Waite N, Lalji F, Kaczorowski J, McNeil S, Halperin S

Introduction/background: The addition of pharmacists as immunizers has been shown to improve influenza vaccination rates. Pharmacists have also been pivotal in the success of the COVID-19 vaccine rollout across Canada. However, few studies have evaluated the impact on the uptake of other vaccines for healthy adults. We aimed to assess the effectiveness of enhanced pharmacist-delivered strategies on adult vaccine uptake for pertussis (Tdap), high-dose influenza, meningococcal, travel health, and herpes zoster vaccines.

Methods: A two-year prospective, nonrandomized community pharmacy-based study compared an enhanced pharmacist-delivered immunization strategy to the standard pharmacist immunization approach. New Brunswick and Nova Scotia pharmacies participated. Various strategies designed for each target vaccine were used by the intervention pharmacies: combining vaccinations with other services, targeted client outreach, immunization weeks, and simulated public funding to provide pertussis (Tdap) vaccine at no cost. Vaccine uptake was compared using pharmacy-generated reports of the number of vaccine doses administered before and after the intervention and between non-intervention and intervention pharmacies.

Results and analysis: A total of 23 intervention and 21 non-intervention pharmacies participated in the study, with 6,134 vaccines administered in the intervention pharmacies versus 5,922 vaccines in the non-intervention pharmacies. The simulated public funding of pertussis (Tdap) vaccine resulted in the highest increase in vaccine administration. Comparing the difference between pre- and during-study pertussis (Tdap) vaccine uptake within the pharmacies found a large increase in doses being administered in the intervention pharmacies (79 pre-study doses versus 1,151 during-study doses) and a slight increase in the non-intervention pharmacies (77 doses versus 132 doses, respectively).

Conclusions and implications for policy, practice or additional research: This study demonstrated that pharmacist-delivered immunization programs enhanced by various outreach strategies and in particular simulated public funding, increased the number of vaccines provided in pharmacies, specifically for pertussis (Tdap) vaccine.

Building a Future Forward Model of Care for Pharmacy Influenza Immunization of High-Risk Patients: A Canadian Consensus

Sihota A, Bonell C, Buffone B, Houle S, Kim J, Kani M, MacLean E, Nseir A, Ravinatarajan P, Richard F, Tilli T, Whiskin C, Wong V, Roumeliotis P

Introduction: Recently, there has been low uptake of influenza vaccinations; as such, a variety of immunization strategies have been utilized throughout the country with many jurisdictions focusing on vaccinating high-risk populations. However, there is a lack of knowledge, awareness, and comfort when it comes to assessing high-risk patients that present in community pharmacies. We investigated this unmet need for pharmacies to understand how to collaboratively identify and screen patients from a multidisciplinary lens, defining a practical model of care implementation.

Methods: A modified Delphi process was used to identify and prioritize the gaps between real-world needs and clinical practice. Subject matter experts, including twelve pharmacists, one pediatrician, and one general practitioner physician, determined the unmet needs for real-world screening and management of influenza prevention for high-risk patients and developed questionnaires that explored key areas of interest. Experts voted on over 50 statements and consensus was considered reached at ≥75% agreement.

Results: Our experts determined the unmet needs surrounding influenza immunization for high-risk patients include pharmacy proactivity, patient screening, assisting patients with obtaining vaccinations, and pharmacy workflow. In brief, pharmacies should proactively identify high-risk patients and, if necessary, educate them on the importance of influenza immunization. Identification of high-risk patients should be performed by screening for age, certain medications, pregnancy, type of residence, and high-risk workplace. Pharmacies should aid patients in obtaining a vaccination appointment and should inquire about the need for any other vaccines. Finally, safety considerations and pharmacy resources should dictate the appropriate interval time between appointments.

Conclusions: These findings have produced a novel real-world model of care implementation embedded into a monitoring algorithm that acts as an extension to the assessment process pharmacists already utilize. This algorithm will be an important resource for pharmacists to confidently assess and monitor high-risk patients seeking vaccination against influenza.

ORAL PRESENTATIONS – SESSION 4

Tuesday 25 April	**15:00 – 16:30**	**Room 205**

Vaccine Effectiveness against Omicron hospital admission and severe outcomes: a report from the CIRN Serious Outcomes Surveillance Network

Andrew M, Pott H, Ye L, Xidos T, LeBlanc J, Wilson K, McGeer A, Verschoor C, Hatchette T, ElSherif M, Ambrose A, Boivin G, Valiquette L, Trottier S, Loeb M, Smith S, Katz K, McCarthy A, McNeil S

Introduction/background: The CIRN SOS Network conducts active surveillance for COVID-19 to describe disease burden and vaccine effectiveness (VE). Here we report VE against hospitalization and severe outcomes during the Omicron wave.

Methods: Patients with laboratory-confirmed COVID-19 and test-negative controls admitted to eleven sites in Ontario, Quebec, Alberta, and Nova Scotia between December 1/2021 - March 31/2022, were enrolled. Individuals reporting two or more COVID vaccine doses were considered vaccinated. Measures included age, frailty, demographics, vaccination status, ICU admission, and death. VE against hospital admission was calculated using a test-negative design as 1-Odds of vaccination in cases vs. controls; VE against the most severe outcomes among individuals admitted with COVID-19 was estimated by comparing the rate ratio of events in vaccinated vs. unvaccinated cases. Estimates were age-stratified and adjusted for age, sex, frailty, and comorbidity.

Results and analysis: Of 2,991 cases and 1,313 test-negative controls, mean age was 68.8 ±18.5 years (cases) and 72.8 ±24.9 (controls); 46.8% were women, and 64.1% of cases and 89.3% of controls had received ≥2 COVID-19 vaccine. Among those with known frailty status, 46.4% of cases and 54.6% of controls were frail. ICU admission was experienced by 20.3% of those aged <65 years vs. 10.5% aged 65+ and 5.3% vs. 16.4% died. Adjusted VE against Omicron hospitalization was 79.6% (95%CI 75.1-83.3%) overall and differed slightly according to age: 82.8% (77.6-86.8%) for those with 65+ vs. 74.6% (65.4-81.3%) for age <65 years. Comparing rate ratios among admitted cases, VE against ICU admission was 48% (35-57%) and against death was 24% (3-41%).

Conclusions and implications for policy, practice or additional research: Age and frailty are essential factors when interpreting clinical outcomes and VE. VE against the Omicron variant-related hospitalization was high and

was similar or higher for older vs. younger adults. Notably, VE against severe outcomes was also substantial and was not only due to the prevention of hospitalization in the first instance.

An S1 subunit adjuvanted COVID-19 vaccine is safe and immunogenic in a Phase 1 trial

Racine T, **Hamonic G**, Peacock K, Arora S, Elsherif M, Lingyun L, MacKinnon-Cameron D, Collin N, Dubois P, Falzarano D, Hodgson P, Halperin S, Sanche S, Langley J, Gerdts V

Introduction/background: Since 2019 there have been over 630 million (M) cases and 6.6 M deaths attributed to the SARS-C0V-2 virus. There is a continued need for development of COVID-19 vaccines using different platforms. Subunit-based vaccines have a long history of safety, effectiveness, and can be easily manufactured and stored. The COVAC-2 vaccine (VIDO, Sask.) contains the S1 portion of the SARS-CoV-2 spike protein formulated with the Sepivac SWE™ adjuvant; we report here preliminary results of a Phase I clinical trial conducted in Canada. NCT04702178

Methods: This was a multi-centered, randomized, observer-blinded, placebo-controlled study in COVID-19 vaccine-naïve healthy adults to assess the safety and immunogenicity of three dosing levels (25, 50, and 100 µg protein) administered twice (4 weeks apart) in adults 18 through 54 years of age and 25 and 50 µg protein in adults 55 years of age and older. Within each group, eight participants received the vaccine and four participants received saline placebo. Immune responses were measured from day 0 to 365.

Results and analysis: Among 61 participants, the most common local and systemic reactions were pain at the injection site and headache, respectively. To date, one solicited (drowsiness), and two unsolicited (fatigue and brain fog) adverse events (AE) of Grade 3 severity were reported in the same participant in the 100 µg group after the first vaccine dose which resolved within 48 hrs and did not recur with dose 2.

Analysis of participant serum via ELISA, live virus neutralization, and pseudoneutralization assay demonstrated that antibody levels increased with each dose.

Conclusions and implications for policy, practice or additional research: In its first-in-human trial, the COVAC-2 vaccine was found to be safe and immunogenic, as observed by high IgG and virus neutralization titers. These data led to the initiation of a Phase II clinical trial, as well as a Phase I Booster trial.

Incidence and proportion of invasive pneumococcal disease (IPD) caused by serotypes covered by existing and newly authorized pneumococcal vaccines among adults in Ontario, 2011-2021

Grewal R, Lim G, Hillier K, Buchan S, Coghill C, Harris T, Wilson S

Introduction/background: Invasive pneumococcal disease (IPD) is a significant cause of morbidity and mortality worldwide, particularly among older adults. In Ontario, the adult immunization program covers PPV23 (polysaccharide vaccine) for all adults aged ≥65 years and those ≥18 years with immunocompromising/underlying medical conditions. PCV13 (conjugate vaccine) is publicly-funded for immunocompromised adults aged ≥50 years. Two new conjugate vaccine products, PCV15 and PCV20, were recently authorized by Health Canada. We explored the incidence and proportion of IPD cases by vaccine-specific serotype groupings among Ontario adults.

Methods: In Ontario, all confirmed cases of IPD are reportable. We included all confirmed IPD cases from 2011-2021 and grouped them by vaccine-specific serotypes (PCV13, PCV15/non-PCV13, PCV20/non-PCV15, PPV23/non-PCV20, and non-vaccine preventable [NVP]). We calculated the incidence and proportion of all IPD cases per year by vaccine-specific serotypes among adults, stratified by age group (18-49, 50-64, ≥65 years).

Results and analysis: Incidence of IPD was highest in adults aged ≥65 years. The incidence of IPD attributed to PCV-13 serotypes declined over the study period for all age groups. A significant decline in IPD incidence was seen during the COVID-19 pandemic for all serotypes and age groups. The proportion of IPD cases caused by

PCV13 serotypes declined whereas the proportion of cases caused by unique serotypes covered by other vaccines and NVP serotypes generally increased. Among adults aged ≥65 years, the proportion of IPD cases by vaccine-specific serotypes in 2011 versus 2021, respectively, was 36.7% and 22.1% for PCV13, 8.2% and 5.5% for PCV15/non-PCV13, 7.2% and 14.9% for PCV20/non-PCV15, 2.4% and 9.8% for PPV23/non-PCV20, and 26.5% and 33.6% for NVP.

Conclusions and implications for policy, practice or additional research: The proportion of IPD cases caused by non-PCV13 and NVP serotypes increased from 2011-2021 among Ontario adults. Introducing new conjugate vaccines that cover additional vaccine-preventable serotypes within public programs may help reduce the burden of IPD.

Effectiveness of Recombinant Influenza Vaccine vs. Standard Dose Inactivated Influenza Vaccines Against Laboratory-Confirmed Influenza and Related Hospitalized Outcomes in Adults: A Cluster Randomized Trial

Hsiao A, Yee A, Fireman B, Hansen J, Lewis N, Klein N

Introduction/background: More effective influenza vaccines are needed to prevent influenza and its complications. Recombinant influenza vaccines may offer better protection than traditional egg-based vaccines. Using a modified-cluster randomized design, we estimated relative vaccine effectiveness (rVE) of recombinant quadrivalent influenza vaccine (RIV4) compared with standard-dose quadrivalent inactivated influenza vaccine (SD-IIV4) against lab-confirmed influenza and influenza-related hospitalized outcomes in adults 18-64 years of age during the 2018-2021 influenza seasons.

Methods: We randomized 66 facilities within Kaiser Permanente Northern California to routinely administer RIV4 or SD-IIV4 to adults 50-64-years-old and 18-49-years-old, alternating vaccine formulations weekly by facility during the influenza seasons (ClinicalTrials.gov NCT03694392). We estimated the hazard ratio (HR) against PCR-confirmed influenza in any setting in these age groups using Cox regression on a calendar timeline, adjusting for age, sex, and race, using facility-specific stabilized propensity scores. Adjusted HRs were also estimated for hospitalized outcomes of PCR-confirmed influenza, community-acquired pneumonia, and cardio-respiratory events. We calculated rVE as (1-HR) x 100%.

Results and analysis: Due to low influenza circulation during the 2020-2021 season, the final study population included the 2018-2020 influenza seasons, with 1,630,328 vaccinees 18-64-years-old (RIV4=632,962; SD-IIV4=997,366). There were 1,386 RIV4 vs. 2,435 SD-IIV4 influenza cases. RIV4 vs. SD-IIV4 vaccinees 50-64-years-old had a statistically significant rVE of 15.4% against PCR-confirmed influenza (95% CI: 6.0, 23.9; p=0.002) and 15.9% against influenza subtype A (95% CI: 6.1, 24.6). RIV4 was also significantly more protective than SD-IIV4 against influenza subtype A in vaccinees 18-49-years-old (rVE=10.0%, 95% CI: 1.2, 18.0). rVE was not significant for hospitalized outcomes.

Conclusions and implications for policy, practice or additional research: In this large modified-cluster randomized study of the 2018-2019 and 2019-2020 influenza seasons, RIV4 demonstrated significantly better protection against confirmed influenza than SD-IIV4, especially in adults 50-64-years-old. Recombinant quadrivalent influenza vaccine provided additional benefit when compared with traditional egg-based vaccines.

Burden of hospitalization due to laboratory-confirmed influenza in adults aged 50-64 years, 2010/11 to 2016/17, Toronto and Peel, Ontario.

Kim D, Coleman B, Chung H, Kwong J, Hassan K, Plevneshi A, Green K, McNeil S, Armstrong I, Farshait N, Gold W, Gubbay J, Katz K, Kuster S, Lovinsky R, Matukas L, Ostrowska K, Richardson D, McGeer A

Introduction/Background: We describe the epidemiology of severe influenza in 50-64-year-old residents of Toronto/Peel region over seven influenza seasons.

Methods: Prospective population-based surveillance for hospitalization associated with laboratory-confirmed influenza was conducted from 9/2010-8/2017. Death within 30 days of diagnosis was attributed to influenza. Conditions increasing the risk of influenza complications were as defined by Canada's National Advisory Committee on Immunization; age-specific prevalence of medical conditions was estimated using Ontario administrative data (ICES).

Results: Over 7 seasons, 1,228 patients aged 50-64-years were hospitalized: 40% due to A(H3N2), 30% A(H1N1), and 22% B. Of 971 with data on seasonal influenza vaccination status, 33% had been vaccinated including 37% of those with chronic underlying illness and 17% of those without. Average annual incidence of hospitalization and mortality rates were 22.4 and 0.9/100,000, respectively.

Of 1,125 patients with detailed data available, 86% had ≥1 underlying condition; compared to 40% of 50-64-year-olds with such conditions in the overall population. Common conditions were: chronic pulmonary disease (38%), diabetes mellitus (31%), anemia (31%), and chronic cardiac disease (27%); 25% were immunocompromised. Annual average hospitalization and mortality rates were 41.1 and 1.8/100,000 in those with ≥1 underlying condition and 6.1 and 0.3/100,000 in those without. The highest hospitalization and mortality rates occurred in those with HIV/organ transplant (281.2 and 9.9/100,000), kidney disease (137.5 and 5.6/100,000) and anemia (129.8 and 7.1/100,000). Different underlying conditions increased the risk of hospitalization to 2.5-9 times the rate in healthy 65-74-year-olds.

The case-fatality rate was 4.4% and median length of stay was 4 days (IQR 2-8). Overall, 11% had ≥1 in-hospital complication; most commonly cardiac (8%) and secondary bacterial/fungal infections (8%).

Conclusions and implications for policy, practice or additional research: Despite a universal influenza vaccination program, the burden of severe influenza in 50-64-year-olds is significant. While improving vaccine coverage would provide the greatest benefit, assessing the potential benefits of influenza vaccines is also warranted.

ORAL PRESENTATIONS – SESSION 5

Wednesday 26 April	**11:15 – 12:45**	**Room 202**

Effect of maternal pertussis vaccination on anti-pertussis antibody responses of children with different vaccination schedules

Brousseau N, Febriani Y, Mansour T, Sadarangani M, Amaral K, Ulanova M, Halperin S, Lo M, Hunter O, De Serres G

Introduction/background: Maternal vaccination with tetanus-diphtheria-acellular pertussis (Tdap) vaccine was introduced in Quebec in 2018 to protect newborns against pertussis. In 2019, a (2+1) schedule for children at 2, 4 and 12 months of age replaced the (3+1) schedule at 2, 4, 6 and 18 months for routine childhood immunizations, including pertussis. We compared the anti-pertussis antibody levels between children of Tdap-vaccinated and unvaccinated mothers during pregnancy.

Methods: Blood samples, collected one month after the 12-month dose (2+1 schedule) or 18-month dose (3+1 schedule), were analyzed for antibodies against three pertussis antigens: pertussis toxin (PT), filamentous hemagglutinin (FHA) and pertactin (PRN). Vaccination during pregnancy was assessed by a questionnaire and validated with the Quebec immunization registry. Antibody levels were compared using geometric mean concentrations (GMCs) and GMC ratios (GMRs) between children of Tdap-vaccinated and unvaccinated mothers, adjusted for factors influencing children's immune responses (aGMR).

Results and analysis: Among the 361 participants, 272 received a (2+1) schedule (176 Tdap-vaccinated mothers, 96 unvaccinated mothers), while 89 received a (3+1) schedule (18 Tdap-vaccinated mothers, 71 unvaccinated mothers). For the (2+1) schedule, children of Tdap-vaccinated mothers had lower GMCs at 13 months against PT [aGMR=0.76; 95%CI=0.65-0.90; p=0.001], FHA [aGMR=0.66; 95%CI=0.55-0.79; p<0.001] and PRN [aGMR=0.73; 95%CI=0.53-1.01; p=0.054]. For the (3+1) schedule, GMCs were similar between groups [PT: aGMR=0.89;

95%CI=0.64-1.24; p=0.5, FHA: aGMR=0.96; 95%CI=0.65-1.43; p=0.8, PRN: aGMR=1.61; 95%CI=0.94-2.75; p=0.08]. GMCs were higher after the (3+1) compared to the (2+1) schedule [PT]: 125 IU/ml vs 92 IU/ml; aGMR=1.25; p=0.01].

Conclusions and implications for policy, practice or additional research: Maternal Tdap immunization resulted in lower anti-pertussis antibodies for children vaccinated at 12 months with a (2+1) schedule, but not for children vaccinated at 18 months with a (3+1) schedule. More studies are needed to determine the impact of maternal Tdap vaccination on the immunogenicity and effectiveness of children's pertussis vaccination.

Effect of tetanus-diphtheria-acellular pertussis (Tdap) immunization during pregnancy on children's anti-pneumococcal antibody responses

Brousseau N, Febriani Y, Mansour T, Ulanova M, Sadarangani M, Halperin S, Amaral K, De Serres G

Introduction/background: The diphtheria and tetanus antibodies generated by Tdap immunization during pregnancy may interfere with children's immune responses to pneumococcal serotypes that include a carrier protein similar to diphtheria/tetanus antigens (all serotypes included in Prevnar-13 and serotypes 18C/19F included in the 10-valent Synflorix). We compared pneumococcal antibody levels between children of Tdap-vaccinated and unvaccinated mothers.

Methods: After children received Synflorix at 2-4-12 months of age or a mixed schedule of Synflorix at 2-4 months and Prevnar-13 at 12 months of age, we analyzed concentrations of IgG antibodies against serotypes 4, 18C, 19A, and 19F in blood samples collected at 13 months of age. Information on maternal vaccination was collected by questionnaire and validated using the Quebec immunization registry. Antibody levels were compared using serotype-specific seroprotection rates, geometric mean concentrations (GMCs), and GMC ratios (GMRs) between children of Tdap-vaccinated and unvaccinated mothers. GMRs were adjusted for other factors influencing children's immune responses (aGMR).

Results and analysis: Among the 219 eligible participants with a Synflorix schedule, there were only small differences in antibody levels at 13 months between 148 children from Tdap-vaccinated and 71 children from unvaccinated mothers (serotype 4: aGMR=0.84; 95%CI=0.71-0.99, serotype 18C: aGMR=1.14; 95%CI=0.94-1.38, serotype 19A: aGMR=0.79; 95%CI=0.61-1.02, serotype 19F: aGMR=0.83; 95%CI=0.67-1.03). For serotype 19A, the percentage of children from Tdap-vaccinated mothers reaching the seroprotective level (1.00 µg/mL) was lower among 148 children with a Synflorix schedule (79%; GMC=1.97; 95%CI=1.71-2.27) compared to 28 children with a mixed schedule of Synflorix at 2-4 months of age and Prevnar-13 at 12 months of age (100%; GMC=5.08; 95%CI 3.33-7.76; p=0.005).

Conclusions and implications for policy, practice or additional research: We only observed a mild interference of maternal Tdap vaccination with children's anti-pneumococcal response after immunization with Synflorix. The use of a mixed schedule combining Synflorix at 2-4 months of age and Prevnar-13 at 12 months was associated with stronger immune response against serotype 19A.

A randomized controlled trial (RCT) to compare a 1-dose vs. 2-dose priming schedule of 13-valent pneumococcal conjugate vaccine (PCV13) in Canadian infants; a Canadian Immunization Research Network (CIRN) study

Sadarangani M, Liu S, Kellner J, Quach C, Goldblatt D, Hu J, Singal M, Marty K, Langley J, Vanderkooi O

Introduction/background: Streptococcus pneumoniae causes pneumonia, septicemia and meningitis. PCVs have been used in Canada since 2003, resulting in a substantial decline in invasive disease due to vaccine serotypes. Most jurisdictions in Canada administer PCV13 to infants in a 2+1 schedule. The aim of this study was to compare the immune response in infants after a 1+1 schedule, compared with a 2+1 schedule.

Methods: Healthy infants at four CIRN sites were randomized 1:1 to receive a 1+1 (age 2, 12 months) or 2+1 (age 2, 4, 12 months) schedule of PCV13. Other routine vaccines were administered according to provincial schedules. Blood was collected at age 13 months (primary outcome) and 5 months to measure IgG antibody against all PCV13 serotypes. Non-inferiority analyses of IgG geometric mean concentrations (GMCs) were performed for each serotype using a ratio of 0.7 as a cutoff for non-inferiority; where non-inferiority was met, superiority testing was done using a two-sided t-test.

Results and analysis: Overall, 248 infants were enrolled with a mean age of 65 days; 56% were male and 66% were of White ethnicity. At age 13 months, IgG GMC met non-inferiority criteria for 12/13 serotypes (except 6B). IgG GMC was superior after a 1+1 schedule for 9 of these serotypes (all except 3, 6A, 23F). At age 5 months, IgG GMC of the 1+1 group was inferior to 2+1 for all serotypes. The proportion of infants achieving a serotype-specific IgG of ≥0.35 mcg/mL (presumed correlate of protection) was 75-100% in both groups at age 13 months, and 1-81% (1+1 group) and 49-100% (2+1 group) at age 5 months.

Conclusions and implications for policy, practice or additional research: A 1+1 schedule of PCV13 was immunologically superior for most serotypes at age 13 months, but inferior to 2+1 at age 5 months. Further risk-benefit and economic analysis is warranted to inform potential use of a 1+1 schedule of PCV13 in Canada.

Safety of Live Rotavirus Vaccine Following Antenatal Exposure to Monoclonal Antibody Biologics: A Canadian Immunization Research Network Study

Fitzpatrick T, Alsager K, Sadarangani M, Pham-Huy A, Murguía-Favela L, Morris S, Piche-Renaud P, Seow C, Jadavji T, Top K, Constantinescu C, on behalf of the Special Immunization Clinic (SIC) Network investigators

Background: Increasingly, people with inflammatory or autoimmune diseases are recommended to continue their monoclonal antibody biologics (mAbs) throughout pregnancy; however, given limited data, concerns regarding potential immunological and hematological abnormalities in the exposed infant have led to recommendations that live vaccines be avoided in the first 6–12 months of life. We examined whether live rotavirus vaccine may be provided safely in a national cohort of mAb-exposed infants assessed in the Canadian Special Immunization Clinic (SIC) Network.

Methods: Seven sites accepted referrals for infants with in-utero mAb exposure for rotavirus vaccination recommendations. Infants with other contraindications to rotavirus vaccination or assessed after 15 weeks of age were excluded. Clinical and laboratory evaluations of immunological markers were performed according to a standardized clinical pathway. Infants recommended for rotavirus vaccination were followed up 8-months post-initiation to capture serious adverse events, i.e., diarrhea lasting >72 hours, severe vomiting, or intussusception. After parental consent, de-identified data were transferred to a central database for analysis.

Results and analysis: Between May 1, 2017 and December 31, 2021, 191 eligible infants were enrolled. Infliximab was the most common mAb product (29.5%), followed by adalimumab (23.7%) and ustekinumab (8.9%). A range of immune measures (e.g. B- and T-cell subsets) were reported and all infants had normal immunological phenotyping for their age. In all, vaccination was not recommended – or the decision was deferred – for only six (3.1%) infants. By August 19, 2022, 166/185 (89.7%) infants for whom rotavirus vaccination was recommended had initiated their vaccine series; 149 (89.8%) were known to have completed their series. No serious post-immunization adverse events were reported in this cohort representing a range of mAb products and serum drug concentrations.

Conclusions and implications for policy, practice or additional research: These findings provide further evidence demonstrating the safety of live rotavirus vaccination is generally not affected by in-utero mAb exposure.

Transfer of SARS-CoV-2 Vaccine Induced Antibodies from Mothers to Infants During Pregnancy via Placenta and Breast Milk

Korchinski I, Marquez C, McClymont E, Andrade J, Elwood C, Jassem A, Krajden M, Morshed M, Sadarangani M, Tanunliong G, Sekirov I, Money D

Introduction/background: Maternal vaccination during pregnancy can result in passive immunization of the fetus through transplacental antibody transfer, with potential for early protection against infections. We assessed the relationships between SARS-CoV-2 IgG antibody titres in maternal and infant samples at delivery and 4-6 weeks post-delivery (4-6W). The relationship between gestational age at time of vaccination and transplacental transfer ratio (TR) was also analyzed.

Methods: Samples were collected from 51 pregnant individuals aged 28-46 years in Vancouver between August 2021-August 2022. All participants received ≥1 dose of a SARS-CoV-2 vaccine during pregnancy. Eleven participants tested positive for SARS-CoV-2 infection prior to delivery. All samples were tested on the V-PLEX COVID-19 Coronavirus Panel 2 for anti-S1 RBD, spike and nucleocapsid IgG. IgG concentrations were log10 transformed and Spearman correlations (R) were performed to assess relationships between samples.

Results and analysis: SARS-CoV-2 vaccination during pregnancy elicits high anti-spike IgG antibody titres at delivery and at 4-6W (delivery GMT: maternal=114,040, cord=180,757; 4-6W GMT: maternal=113,622, infant=155,988). There was a significant positive correlation between maternal and cord serum anti-spike IgG titres at delivery, and maternal titre at delivery and infant titre at 4-6W (n=29, R=0.91; n=14, R= 0.86). The mean anti-spike IgG transfer ratio at delivery was 1.8, and the mean maternal breastmilk-to-serum transfer ratio at 4-6W was 0.003. At 4-6W, maternal serum titre, but not breast milk titre, was significantly associated with infant anti-spike IgG titre. Although anti-spike IgG titres at delivery increased in maternal and infant samples with additional vaccine doses administered, there was no significant correlation between transfer ratio at delivery in relation to gestational age at time of vaccination (n=29, R=-0.3).

Conclusions and implications for policy, practice or additional research: SARS-CoV-2 vaccination elicits a strong IgG antibody response in mothers with successful antibody transfer to the fetus. This mechanistically supports the additional benefits of SARS-CoV-2 vaccination during pregnancy which has been shown to be protective to neonates.

ORAL PRESENTATIONS – SESSION 6

Wednesday 26 April | **11:15 – 12:45** | **Room 205**

COVID-19 pandemic impacts on uptake of human papillomavirus vaccine among Canadian gay, bisexual, and other men who have sex with men

Chambers C, Deeks S, Sutradhar R, Coutlee F, Cox J, de Pokomandy A, Grace D, Grennan T, Grewal R, Hart T, Jollimore J, Lachowsky N, Lambert G, Moravan V, Moore D, Nisenbaum R, Ogilvie G, Sauvageau C, Tan D, Burchell A

Introduction/background: Gay, bisexual, and other men who have sex with men (GBM) aged ≤26 years are eligible for publicly-funded human papillomavirus (HPV) vaccine in British Columbia (since 09/2015), Quebec (01/2016), and Ontario (09/2016). We assessed uptake of HPV vaccine before and during the COVID-19 pandemic among a community-recruited cohort of GBM.

Methods: From 2017-2019, we recruited 2,449 sexually-active GBM aged ≥16 years into the Engage Cohort Study in Montreal, Toronto, and Vancouver. Men were followed every 6-12 months until February 2022. We compared self-reported uptake of HPV vaccine (≥1 dose) during the pre-COVID-19 (February 2020 and earlier) and COVID-19 pandemic (March 2020 and later) periods. We used a mixed-effects Poisson model to calculate incidence rate ratios (IRR) with a random effect for subject and fixed effects for age group, city, and period. Analyses were stratified by age-eligibility for the public programs (≤26 years vs. >26 years).

Results and analysis: A total of 1961 GBM (416 ≤26 years, 1545 >26 years) had ≥1 follow-up visit over a median of 42 months (IQR=30-48 months). Cumulative uptake increased from a nadir of 39.0% in April-June 2017 to a peak of 80.0% in October-December 2019 then stabilized around 80% during the pandemic among ≤26-year-olds who were eligible for public programs. Uptake increased more steadily from 4.3% in February-March 2017 to 42.8% in January-February 2022 among >26-year-olds. Among 1452 participants who were unvaccinated at enrolment, incident uptake was significantly lower during the pandemic vs. pre-pandemic periods in ≤26-year-olds (IRR=0.55, 95%CI=0.31-0.96) but not among >26-years-olds (IRR=0.85, 95%CI=0.65-1.19) (age*period interaction: p<0.001).

Conclusions and implications for policy, practice or additional research: Diminishing gains in HPV vaccine uptake among GBM aged ≤26 years from March 2020 onwards may be a result of early adoption of targeted HPV vaccination programs and/or limited access during the COVID-19 pandemic. Further research is required to monitor the longer-lasting impacts of the pandemic on HPV prevention among GBM.

COVID-19 Vaccine Uptake among People Living with HIV in Ontario: A Population-based Cohort Study

Freitas C, Chambers C, Cooper C, Kroch A, Arbess G, Benoit A, Buchan S, Habanyama M, Kendall C, Mbuagbaw L, Moineddin R, Moqueet N, Walmsley S, Burchell A, for the CHESS Study Team

Introduction/background: People living with HIV may experience increased risk of severe COVID-19-related illness and outcomes which can be reduced by COVID-19 vaccination. We examined COVID-19 vaccine uptake among people living with HIV in Ontario.

Methods: We identified community-dwelling adults living with HIV aged ≥19 years using a validated algorithm of physician billing claims for HIV diagnoses in the past 3 years using provincial clinical and health administrative data. Data on COVID-19 vaccine doses, product types, and administration dates were ascertained from the Ontario Vaccine Registry (COVaxON) from December 14, 2020, to December 31, 2021.

Results and analysis: Among 21,001 people living with diagnosed HIV, most received at least one (85.6%) or two (83.2%) vaccine doses as of December 31, 2021, with 36.0% receiving a third dose. Among two-dose recipients, most received a Pfizer-BioNTech (49.3%) or Moderna (20.9%) primary vaccine series, or a mix of either mRNA vaccine (18.5%). Vaccine uptake was highest among those aged ≥60 years compared with those aged <60 years (≥1 dose: 89.8% vs 84.4% ; ≥2 doses: 88.3% vs 81.7%; ≥3 doses: 54.6% vs 30.4%) and higher among males versus females (≥1 dose: 86.3% vs 83.3%; ≥2 doses: 84.2% vs 79.9%; ≥3 doses: 39.7% vs 22.4%). Vaccine uptake was highest among residents in the highest (vs. lowest) income quintile neighbourhoods (≥1 dose: 87.9% vs 83.8%; ≥2 doses: 86.1% vs 80.9%; ≥3 doses: 47.4% vs 29.6%).

Conclusions and implications for policy, practice or additional research: Vaccine uptake was high among people living with HIV during the first year that vaccines were available in Ontario. However, there are disparities in uptake which should be addressed in vaccination programs. Continued monitoring of vaccine coverage for this population is critical to inform immunization guidelines for people living with HIV.

Vaccine Safety Surveillance for Imvamune – A Canadian National Vaccine Safety Network (CANVAS), Public Health Ontario (PHO) and Toronto Public Health (TPH) Collaboration and Canadian Immunization Research Network (CIRN) study

Muller M, Lim G, Finkelstein M, Liddy A, Padhi S, McGeer A, Wilson S, Khan S, Bettinger J

Introduction/background: Imvamune is a smallpox vaccine that protects against monkeypox. Imvamune is being offered to at-risk individuals in Canada, but safety data are limited. CANVAS has conducted vaccine safety surveillance since 2009. CANVAS, PHO and TPH collaborated to establish prospective imvamune safety surveillance. We describe our methodology, factors that facilitated implementation, and preliminary results.

Methods: We prospectively monitor for health events in vaccinated and unvaccinated individuals (controls). PHO, through an agreement with TPH, forwards email addresses from those vaccinated and interested in participating in safety surveillance. CANVAS emails a link to an enrolment webpage. Participants from other CANVAS projects served as controls.

Email surveys are sent to participants 7 days after each vaccine dose, and 60 days after the final dose, to identify health events following vaccination. Controls receive a survey eliciting health events over the previous 7 and 60 days. Events requiring an ED visit or hospitalization are followed up with a telephone interview.

The incidence and severity of health events are shared with PHO and TPH weekly. Comparison of health events in vaccinated and control participants will be performed once sufficient data are available.

Results and analysis: Recruitment started within three months of the TPH vaccine campaign launch. An existing collaboration on COVID-19 vaccine safety involving CANVAS, PHO, TPH, and relevant REBs was critical to rapid implementation.

As of November 2, 424 surveys have been completed. Injection site reactions occurred in 58% (245/424). Additionally, 8% (35) had other health events in the week following vaccination. Events affecting >2% of participants included fatigue/weakness/myalgia in 3.5% (n=15), headache in 2.4% (n=10), and gastrointestinal symptoms in 2.0% (n=8).

Conclusions and implications for policy, practice or additional research: We describe the implementation of safety surveillance for imvamune. Prospective vaccine safety surveillance can be implemented quickly, but requires an existing, active and funded surveillance network with close contacts with all relevant health and public health stakeholders.

Lessons learned from implementing a rapid, large-scale vaccine response to contain Monkeypox

Shahin R, Calla D, Kilty M, Mathur A, Liddy A, Sabaliauskas K, Mandel E, Lakhanpaul A, Andrusevich R, Sachdeva H, **Padhi S**

Introduction/program need and objectives: Following the initial cases of Monkeypox in Toronto in 2022, Toronto Public Health (TPH) launched a vaccine response to support the Provincial Monkeypox containment strategy. Approximately 29,000 doses of Imvamune were administered in Toronto from June to October 2022.

Program methods, activities and evaluation: The vaccination response used a multi-faceted, whole system approach, incorporating lessons learned from the COVID-19 vaccination program. TPH leveraged pre-existing relationships with the gay, bisexual and men who have sex with men community to ensure vaccination programing met the needs of this target population, utilized COVID-19 vaccine infrastructure for immediate and flexible deployment of immunizers, collaborated with healthcare providers caring for the target population to optimize vaccine access, and strategically employed communications to reach those at greatest risk. Each strategy was evaluated independently. Evaluation indicators included outcomes such as vaccination rates, process measures such as feedback from community agencies and healthcare providers, and structural measures including readiness and adaptability of immunization clinic and vaccine depot staff.

Program results or outcomes: The rapid vaccine response was instrumental in mitigating the Monkeypox epidemic. Within one month of launching the vaccine response, the Monkeypox epidemic in Toronto reached its peak and cases began declining dramatically.

Recommendations and implications for practice or additional research: Barriers encountered during the Monkeypox vaccination response included lack of nimble information management systems, competing vaccination priorities, vaccine confidence and restricted vaccine supply. Establishing strong, trusting relationships in advance with equity deserving communities and health care providers, as well as maintaining a flexible emergency response structure enabled TPH to overcome these barriers and launch a successful response. Continued close engagement with communities and health care providers will positively impact TPH's

adaptability to emerging outbreaks using a whole system approach that is culturally safe and appropriate. TPH will continue to advocate for improvements to Provincial information management systems and explore practice improvement for vaccine logistics infrastructure to be prepared for future emergencies.

Attitudes, Barriers, and Facilitators to Compliant Completion of the Recombinant Zoster Vaccine Regimen in Canada: Qualitative Interviews with Healthcare Providers and Patients

Regan J, **George S**, Awan A, O'Connor M, Foster A, Raymond K, Gorfinkel I, McNeil S

Introduction/background: The two-dose recombinant zoster vaccine (RZV) was authorized in Canada (2017) for herpes zoster (HZ) prevention in adults aged ≥50 years. However, one study found that between 2018-2019, only 65% of eligible individuals received their second-dose within the recommended 2-to-6-month timeframe.

Methods: Sixty-minute concept elicitation interviews (English/French) were conducted to investigate barriers and facilitators to RZV regimen completion. Healthcare providers (HCPs) prescribing/administering RZV and patients receiving RZV between 2018-2020 were recruited, capturing experiences before/during the COVID-19 pandemic. Patients were categorized as "compliant" (both doses within 2-to-6-months) or "non-compliant" (only one dose/second-dose outside 2-to-6-months). Interview transcripts were coded and analyzed using a thematic analysis approach.

Results and analysis: Among 12 HCPs interviewed (4 physicians, 2 nurse practitioners, 6 pharmacists), perceived barriers included high out-of-pocket cost (9/12), patient forgetfulness/lack of reminders (5/12), unexpected negative experiences with first-dose (5/12), and inconsistent/lack of coverage by insurance companies or public health authorities (4/12) – including regional differences. Many (10/12) theorized the COVID-19 pandemic resulted in delayed/missed second-doses. Facilitators included encouragement/education from HCPs (11/12), and second-dose reminders (8/12).

Twenty-one patients were interviewed (compliant: 11/21, non-compliant: 10/21). Among non-compliant patients, barriers included unreliable/confusing information about RZV from physicians/family/acquaintances (6/10), high cost (6/10), lack of HCP knowledge/experience with RZV (4/10), lack of insurance coverage (3/10), and forgetfulness/lack of reminders (3/10). Facilitators among compliant patients included self-motivation (11/11), convenient/efficient process for obtaining vaccine (10/11), reminders (10/11), interest in HZ protection (8/11), and insurance coverage (8/11).

Conclusions and implications for policy, practice or additional research: RZV regimen completion is important for optimal patient protection. Cost, lack of insurance coverage, and unreliable/confusing information about RZV were identified as important barriers to completion. HCPs also reported regional particularities in the availability or cost of RZV. HCPs can help patients overcome key barriers by educating patients on the importance of the second-dose. Areas for further development include working to reduce cost burden of RZV and automated reminders.

ORAL PRESENTATIONS – SESSION 7

Wednesday 26 April | **15:00 – 16:30** | **Room 202**

Disrupting misinformation by enabling credible peer-to-peer knowledge-sharing: Training marginalized youth and community leaders on science, social context, and effective communication as an intervention to promote COVID-19 vaccine confidence

Rafi A, Hassan Z, **Al-khooly D**

Introduction/program need and objectives: Misinformation and distrust in public health authorities and pharmaceutical companies have hindered vaccination participation in racialized communities. By democratizing access to credible vaccine-related information and addressing socio-political context, we aimed to 1) increase

the understanding of the need, safety and effectiveness of vaccines, and 2) develop the capacity and confidence of community members to engage in evidence-informed vaccine education.

Program methods, activities and evaluation: We delivered a three-part vaccine education series online to three cohorts: high school youth (ages 12-18, n=25), older youth (ages 18-34, n=29), and local community leaders (ages 18+, n=18), prioritizing Black and other racialized individuals from low-income communities. We comprehensively reviewed the science and politics of COVID-19 vaccines, how to identify misinformation, and effective strategies for vaccine communication. Our mixed-methods evaluation included an anonymous pre-survey, a post-pre feedback survey, and a content quiz. Upon successful completion of the series, participants received a certificate and $100 honorarium.

Program results or outcomes: Our feedback data (N=57) showed that participation in our training program resulted in an increase in trainees feeling knowledgeable about the science and safety of the COVID-19 vaccines (33% to 100%) and an increase in trainees feeling confident about their ability to talk about them (30% to 89%). Prior to the training, participants reported having misconceptions about vaccines and being overwhelmed with the information. After the training, they reported having the knowledge and skills to affirm their choices, combat disinformation, and share credible information with their communities with compassion.

Recommendations and implications for practice or additional research: This training provided relevant, culturally-affirming, and empathetic strategies to address concerns, promote science literacy, and engage the public in critical thinking. Bringing socio-political discourse and science engagement together was an effective strategy for recruiting community leaders to address and tackle the rampant misinformation. More investment is needed for community-directed public health programming and policy promoting community leadership.

Information is Medicine: Culturally Safe Vaccine Hesitancy Reduction Initiatives Driven by NWT Indigenous Peoples.

Beaulieu M, Carpenter A, Schnell A

Introduction/program need and objectives: Immunization acceptance in Indigenous communities is linked to broad issues related to the history of mistreatment, lived experiences of Institutional racism and lack of access to consistent and high-quality health services.

A grant from the Immunization Partnership Fund is being used to understand and address vaccine hesitancy in the context of Northwest Territories Indigenous perspectives on health, wellness, and quality of life. This approach to vaccine hesitancy within the broader framework of Indigenous health and wellness is intended to be inclusive and wholistic, in keeping with the Indigenous conception of health and wellness, which implies a harmonious and respectful relationship between beings, body, mind, spirit, land, water, earth and the universe.

The main objectives of this project are to have NWT Indigenous youth share and discuss their views on vaccination and develop community-based vaccination and Indigenous health and wellness education, promotional materials, activities and outreach strategies.

Program methods, activities and evaluation: In line with Indigenous knowledge-building methodologies, this project takes the form of a four-day territorial gathering on the land, based on creativity, where Indigenous youth, local expertise, knowledge keepers, Indigenous artists, and Elders from the communities most affected by the issue of vaccine acceptance are brought together to provide a safe, non-judgemental, and culturally appropriate space to discuss, share, build their perception of health and wellness concepts, and to connect with their Indigenous values and ways of being and knowing. Addressing the theme of immunization within the broader framework of Indigenous health and wellness, social determinants of health, value systems and Indigenous knowledge, this youth gathering takes a rights-based and strengths-based approach, focusing on key issues that will be creatively explored through art and expression, Indigenous knowledge, digital stories and testimonials.

Program results or outcomes: With the gathering happening on February 23-27, 2023, the CIC23 will be the opportunity to share and reflect on results, evaluation, outcomes and recommendations.

Recommendations and implications for practice or additional research: See above.

COVID-19 vaccine acceptance and preference for future delivery among language minority, newcomer, and Racialized peoples in Canada: A national cross-sectional study.

Lee J, Humble R, Du C, Driedger M, Dube E, MacDonald S

Introduction/background: Despite high COVID-19 vaccine coverage across Canada, vaccine acceptance and preferred delivery methods of vaccines are not well understood for newcomers, Racialized persons, and among those who speak primarily a minority language. Understanding how diverse populations perceive and access vaccines will help current and future vaccination campaigns to optimize equitable access for those who are underserved and who may be at an elevated risk for severe COVID-19 infection.

Methods: Data were collected through an online national survey (Oct/Nov 2021). Minimum quotas of respondents from minority populations were recruited to ensure adequate representation, including newcomers in the last 5 years, those who self-identified as Racialized persons, and those who primarily spoke a minority language. Binary logistic regression was used to determine the association of respondents' acceptance of COVID-19 vaccination with respondents' perspectives on COVID-19 disease, access to vaccination services, and their motivations for vaccine acceptance.

Results and analysis: Among the sample of 1630 respondents, 30.8% had arrived in Canada within the last five years, 87.4% self-identified as a Racialized minority, and 37.2% primarily spoke a minority language. Single dose vaccine uptake was high among our sample with 92.7%. Difficulty accessing vaccine services was identified by 14.8% of respondents, who stated a need for translated resources or associated personnel. Experiences of racism and/or discrimination when accessing health services were reported by 12.3% of respondents, with 3.0% stating this experience impacted the outcome of their vaccination decision. Despite these obstacles, personal protection (53.9%) was the most influential motivator for vaccine acceptance.

Conclusions and implications for policy, practice or additional research: Decreasing future delays in vaccinations among newcomers, Racialized peoples, and those who primarily speak a minority language may be possible by increasing equitable access to vaccine services, and by addressing structural racism and/or discrimination issues associated with vaccinations within our communities.

Co-creation of a video to support vaccine decision-making in a First Nations community in Alberta

Lin M, Graham B, Assi A, MacDonald S

Introduction/background: First Nations children are susceptible to suboptimal vaccine coverage due to a complex interplay of factors. Tailoring vaccine information to the community's needs can improve engagement and promote vaccine knowledge. Through a partnership between researchers and a First Nations community in Alberta, we worked to develop a vaccine video resource. The purpose of the video is to offer encouragement, knowledge, and motivation to improve parental awareness of childhood immunizations.

Methods: This video project was an extension of an ongoing partnership (2017-present) with the community of Maskwacis, named the First Nations Childhood Immunization (FINCH) project. Work began in September 2021 to co-create the video. We first identified and reviewed resources related to immunization supports and barriers among Indigenous populations, childhood vaccine education during pregnancy, findings from FINCH parental interviews, and vaccine information videos available online. An advisory committee of parents and community health nurses from the community was formed to provide input at all stages, such as script creation, refinement, video production, and dissemination.

Results and analysis: We identified three key themes to emphasize: vaccine safety, trust, and community-specific resources. Core principles central to this project were: cultural safety, trauma-informed, trust-building, storytelling, and relevance. The result was a co-developed vaccine informational video that respects the values of the community. Topics addressed through the video include vaccine history, safety, side effects, and after-care, what to expect at immunization appointments, and community resources on childhood vaccines.

Conclusions and implications for policy, practice or additional research: Expectant parents will have a culturally safe, engaging, and evidence-based tool that will inform their decision-making on childhood immunizations. The video will be incorporated into the prenatal program at Maskwacis Health Services and shared on social media. Potential future research would include evaluating the impact of this video through a pre-and post-exposure survey study to assess parental vaccine knowledge, confidence, and acceptance.

Examining an Altruism-Eliciting Video Intervention to Increase COVID-19 Vaccine Intentions in Younger Adults: Qualitative Assessment using a Realistic Evaluation Framework

Tatar O, Zhu P, Steck V, Haward B, Griffin-Mathieu G, Perez S, Rosberger Z

Introduction/background: Mixed opinions related to COVID-19 vaccination suggest the need to better understand the contextual and personal factors impacting the effect of pro-vaccine messaging. Altruistic interventions have shown promise in addressing COVID-19 vaccine hesitancy. In the present study, we explored younger adults' opinions about eliciting altruism to address COVID-19 vaccine hesitancy.

Methods: We recruited Canadian younger adults aged 18-39 to participate in online focus groups in summer 2022. Three focus groups included participants with varying COVID-19 vaccination status: 1) primary series and at least one additional dose; 2) primary series without an additional dose; or 3) unvaccinated. Participants watched an altruism-based video developed by our team aimed to increase COVID-19 vaccine intentions. We used hybrid deductive-inductive thematic analysis informed by the Realist Evaluation Framework and the Health Belief Model to analyze verbatim transcripts.

Results and analysis: Data was synthesized around three major themes: context, mechanism and intervention specific factors. Regarding the pandemic context, participants identified the following subthemes: attitudes toward COVID-19 health policies; mistrust in government and institutions; return to normalcy; and perceptions about health messaging. Regarding the mechanisms, subthemes revealed that perceived susceptibility to COVID-19; the protection of vulnerable persons; perceived vaccine efficacy; perceived vaccine harms; social influence; antivaccination beliefs; perceived severity of COVID-19; and individualism were determinants of vaccine acceptance or refusal. Participants made specific suggestions for adapting the content and design of the intervention that include providing more data-driven information about efficacy and side effects of the vaccine, and highlighting the consequences of severe infection. Participants felt that altruistic messaging and highlighting personal benefits of vaccination could be effective when targeted to those who have not yet made a decision about vaccination.

Conclusions and implications for policy, practice or additional research: The results of this study can inform future targeted messaging interventions for younger adults at various stages of adoption of COVID-19 and other vaccine-preventable diseases.

ORAL PRESENTATIONS – SESSION 8

Wednesday 26 April | **15:00 – 16:30** | **Room 205**

A Respiratory Syncytial Virus (RSV) Prefusion F Protein Candidate Vaccine (RSVPreF3 OA) is Efficacious in Adults ≥ 60 Years of Age (YOA)

Ison M, Papi A, **Langley J**, Lee D, Leroux-Roels I, Martinon-Torres F, Schwarz T, van Zyl-Smit R, Dezutter N, de Schrevel N, Kostanyan L, Hulstrom V, Van Der Wielen M, Fissette L, David M

Introduction/background: RSV-associated acute respiratory infections (ARI), particularly lower respiratory tract diseases (LRTD), present a significant disease burden in older adults. Currently, there are no approved vaccines against RSV. We present results from an ongoing study designed to demonstrate the vaccine efficacy (VE) of the AS01E-adjuvanted RSVPreF3 OA in adults ≥60 YOA.

Methods: This ongoing, phase 3, observer-blind, placebo-controlled, multi-country study (NCT04886596) enrolled adults ≥60YOA from the northern and southern hemispheres. Participants were randomized (1:1) to receive a single dose of RSVPreF3 OA or placebo before the RSV season. The primary objective was to demonstrate VE of a single dose of RSVPreF3 OA in preventing RSV-confirmed LRTD during one RSV season (criterion: lower limit of VE confidence interval [CI] > 20%). VE is reported also against severe RSV-confirmed LRTD, RSV-confirmed ARI, RSV-confirmed LRTD and RSV-confirmed ARI by RSV subtype (RSV-A and RSV-B), and RSV-confirmed LRTD by age, baseline comorbidity and frailty status. RSV-A/B was confirmed by qRT-PCR.

Results and analysis: A total of 26,664 participants were enrolled. The mean age was 69.5(±6.5) years and 51.7% were women. Over a median follow-up of 6.7 months (maximum 10.1 months), 47 RSV-confirmed LRTD episodes were reported (RSVPreF3 OA: 7; placebo: 40), resulting in a VE of 82.6% (96.95% CI: 57.9–94.1). Consistently high VE across the clinical spectrum of RSV disease, from RSV-confirmed ARI (71.7% [95% CI: 56.2–82.3]) to severe RSV-confirmed LRTD (94.1% [95% CI: 62.4–99.9]) was observed. High VE was seen in different age groups and regardless of RSV subtype, baseline comorbidity or pre-frail status. Cumulative incidence curves for RSV-confirmed LRTD and RSV-confirmed ARI showed persistent efficacy throughout the follow-up.

Conclusions and implications for policy, practice or additional research: A single RSVPreF3 OA dose is highly efficacious against RSV-confirmed LRTD and RSV-confirmed ARI in adults ≥60 YOA, regardless of RSV disease severity, RSV subtype, baseline comorbidity and pre-frail status.

Burden of Illness for Respiratory Syncytial Virus (RSV)-Associated Hospitalizations in Adults in Ontario, Canada

Mac S, Shi S, Millson B, Tehrani A, Eberg M, Myageri V, Langley J, **Simpson S**

Introduction/background: Respiratory Syncytial Virus (RSV) is a common, contagious, and seasonal pathogen that causes 64 million acute respiratory infections every year in adults and children. Our objective was to determine the burden of illness (incidence of hospitalization, healthcare resource use, and costs) associated with RSV in persons >=18 years of age with RSV-associated hospitalization in Ontario, Canada.

Methods: We identified adults hospitalized with RSV using a validated algorithm applied to Ontario administrative data held at ICES. We created a retrospective cohort of adults hospitalized with an RSV-associated illness between September 2010 and August 2017 and followed for up to two years. Each RSV-hospitalized patient was matched to two controls (no RSV hospitalization) on age +/-2 years, sex, index date (incident hospitalization date) +/-30 days, and a propensity score regressed on age, sex, geography, income quintiles, and comorbidities. Patient and admission characteristics were described and mean attributable 6-month and 2-year healthcare costs (2019 Canadian dollars) were calculated.

Results and analysis: We identified 7,091 adult RSV hospitalizations between 2010 and 2019. Overall adult RSV hospitalization rates increased from 1.4 to 14.6 per 100,000 between the 2010-2011 and 2018-2019 seasons. In the 2018-2019 season, the incidence rate was 37.1 and 122.5 per 100,000 for adults aged 70-79 and 80+, respectively. The mean hospital length of stay for RSV-hospitalized patients was 13.5 days, and 10.4% of patients died within 30 days of hospitalization. Overall, 3,897 RSV-hospitalized patients (mean age 74.6 years; 60.4% female) were matched with 7,794 controls. The mean difference in healthcare costs between RSV-hospitalized patients and matched controls was $28,260 (95% CI: $27,728-$28,793) in the first 6 months and $43,721 over 2 years (95% CI: $40,383–$47,059).

Conclusions and implications for policy, practice or additional research: RSV-associated hospitalizations in adults resulted in increased attributable short-term and long-term healthcare costs compared to matched controls. Interventions that could prevent RSV in adults may reduce healthcare costs and burden.

Longitudinal Antibody Response Following Three and Four Dose Vaccination with mRNA-1273, BNT162b2 and/or ChAdOx1-S in Adults 50 and Above Using Dried Blood Spots Samples: Interim Analysis from the PREVENT-COVID Study

McMillan B, Gaultier G, Márquez A, Lo M, Cai B, Shulha H, Simmons K, Bartlett S, Levings M, Steiner T, Sekirov I, Zlosnik J, Morshed M, Skowronski D, Krajden M, Jassem A, Sadarangani M

Introduction/background: Evaluating the antibody immune response following COVID-19 vaccination can provide necessary information to address vaccine immunogenicity, effectiveness and protection. Using dried blood spots (DBS), we compared spike (S)-specific SARS-CoV-2 antibody concentrations between mRNA (mRNA-1273 and BNT162b2) and viral vector (ChAdOx1-S) vaccines up to one-month post dose-four, alongside the surrogate neutralization capacity of these vaccines up to four months post dose-three.

Methods: This ongoing study included 612 adults aged >50 years. Detection of ancestral SARS-CoV-2 lineage anti-S-IgG and neutralization capacity were performed using two multiplex assays (Meso Scale Diagnostics). Differences in concentration and neutralization between vaccine groups were compared using a one-way ANOVA with Tukey Kramer multiple comparisons tests.

Results and analysis: Post dose-three mRNA-1273/mRNA-1273/mRNA-1273 was associated with significantly higher anti-S IgG concentration than BNT162b2/BNT162b2/BNT162b2 or ChAdOx1-S/mRNA/mRNA at one-month (geometric mean concentration [GMC], 21838 AU/mL vs. 13488 AU/mL vs. 12781 AU/mL, $p<0.01$) and four months (GMC, 9465 AU/mL vs. 5331 AU/mL vs. 5801 AU/mL, $p<0.05$). No significant differences in antibody concentration were observed between mRNA-1273/mRNA-1273/mRNA-1273 and mixed mRNA/mRNA/mRNA series ($p>0.05$). A mixed series of mRNA vaccines elicited significantly higher anti-S IgG concentration compared to BNT162b2/BNT162b2/BNT162b2 and ChAdOx1-S/mRNA/mRNA at one-month (GMC, 16710 AU/mL vs. 13488 AU/mL vs. 12781 AU/mL, $p<0.01$) and four months (GMC, 6991 AU/mL vs. 5331 AU/mL vs. 5801 AU/mL, $p<0.05$) post dose-three. Similar patterns were observed for antibody neutralization at both one- and four months post dose-three.

At one-month post dose-four, mRNA-1273/mRNA/mRNA/mRNA elicited significantly higher anti-S IgG concentration compared to BNT162b2/mRNA/mRNA/mRNA (GMC, 30919 AU/mL vs. 19159 AU/mL, $p<0.05$).

Conclusions and implications for policy, practice or additional research: Vaccination with mRNA vaccine only schedules, including at least one dose of mRNA-1273, elicited the most robust antibody response against SARS-CoV-2, compared with BNT162b2 alone or regimens containing ChAdOx1-S. There is no established correlate of protection for COVID-19, and as such this data should be interpreted alongside vaccine effectiveness studies.

Predicted Likelihood and Impact of mRNA Vaccine Technologies for Canadian Vaccine Programs

Killikelly A, Forbes N, **Krishnan R**, Almasri S, Baclic O, Tunis M

Introduction/background: The utlization of the mRNA platform for delivery of SARS-CoV-2 antigens demonstrates the utility of mRNA technology for rapid and effective vaccine development. Here we assess the likelihood and impact of mRNA vaccine platform technologies on the Canadian vaccine landscape.

Methods: In this focused literature review, we evaluate: A) the likelihood of mRNA vaccines against pathogens, based on the stage of mRNA in clincial testing and the suitability of known correlates of protection for use in mRNA vaccine technologies; and B) the impact of mRNA vaccines against pathogens, based on the distruptive potential for mRNA vaccines to fill gaps in Canadian vaccine programs for current and novel vaccines.

Results and analysis: Through this analysis, we have identified four categories of potential mRNA vaccines:

1) High likelihood and impact. For example, mRNA vaccines against respiratory syncycial virus for which an mRNA vaccine candidate is currently in phase 3 clinical trials.

2) High likelihood but low impact. For example, mRNA vaccines against Zika virus which has a very low disease burden in Canada.

3) Low likelihood and impact. For example, MMR and DTaP where very efficacious vaccines are readily available and broadly used.

4) Low likelihood but high impact. For example, Methicillin-resistant Staphylococcus aureus (MRSA), Enterotoxigenic Escherichia coli (ETCT) and other diseases caused by bacterial pathogens for which mRNA vaccines will have limited utility.

Conclusions and implications for policy, practice or additional research: Although diverse types of pathogens impact the health of Canadian, only a limited number of pathogens, particularly viruses, represent opportunities for mRNA vaccine development. mRNA vaccines may be a positive distruptive technology in select Canadian immunization programs.

Safety and Immunogenicity of a Quadrivalent, mRNA-Based Seasonal Influenza Vaccine (mRNA-1010) in Adults: Interim Findings from a Phase 1/2 Randomized Clinical Trial

Lee I, Nachbagauer R, Carmona L, Schaefers K, Avanesov A, Stadlbauer D, Choi A, Henry C, Chen R, Huang W, Ananworanich J, Paris R, **Thompson M**

Introduction/background: Despite the availability of vaccines, influenza remains a global public health concern, causing an estimated 290,000-650,000 deaths each year. We present interim clinical trial findings on a messenger RNA (mRNA)–based quadrivalent seasonal influenza vaccine (mRNA-1010) encoding the hemagglutinin surface glycoproteins of 4 influenza strains recommended by the World Health Organization.

Methods: This randomized, stratified, observer-blind, phase 1/2 study assessed the safety, reactogenicity, and immunogenicity of different mRNA-1010 dose levels (NCT04956575) in adults aged ≥18 years. This interim analysis describes safety and reactogenicity of mRNA-1010 (25-100 µg) or an active comparator (standard-dose influenza vaccine) and humoral immunogenicity at 28 days after vaccination as measured by hemagglutination inhibition (HAI) antibody titers against vaccine-matched influenza A and B strains.

Results and analysis: All dose levels of mRNA-1010 had an acceptable reactogenicity profile, with the majority of solicited adverse reactions (ARs) of grades 1 or 2. Overall, mRNA-1010 recipients more frequently reported solicited ARs than the active comparator group. No treatment-related serious adverse events or treatment-related deaths were reported. A single dose of mRNA-1010 elicited high HAI antibody titers against vaccine-matched strains at Day 29 across all dose levels. Compared with a standard-dose active comparator, mRNA-1010 induced higher HAI titers for influenza A strains and comparable titers for influenza B strains.

Conclusions and implications for policy, practice or additional research: No safety concerns were identified and at the dose levels assessed in this preliminary analysis, mRNA-1010 was more immunogenic than a standard-dose active comparator vaccine for influenza A strains, while immunogenicity for influenza B strains in younger and older adults was similar. These interim data support continued development of mRNA-1010.

ORAL PRESENTATIONS – SESSION 9

Thursday 27 April | **10:30 – 12:00** | **Room 202**

Impact of the 13-valent pneumococcal conjugate vaccine (PCV13) on the epidemiology of invasive pneumococcal disease (IPD) in Canada, 2010-2019; a Canadian Immunization Research Network study

Ramos B, Vadlamudi N, Sadarangani M, Demczuk W, Martin I, Griffith A, Tyrrell G, Brousseau N

Introduction/background: IPD remains a major cause of morbidity and mortality in Canada despite the implementation of PCVs, primarily due to the emergence of non-vaccine serotypes including those in the more recently available vaccines (PCV15 and PCV20). This study aimed to describe the current epidemiology of IPD in

Canada after PCV13 introduction during 2010-2011 and evaluate the potential future impact of PCV15 and PCV20.

Methods: Data were collected from IPD cases in children and adults captured by the National Microbiology Laboratory during 2010-2019; this includes the majority of isolates from IPD across Canada, excluding Quebec. We calculated annual age-, and serotype-specific incidence rates and serotype distribution using population estimates (Statistics Canada).

Results and analysis: There were 24,223 IPD cases during 2010-2019, and age-adjusted IPD incidence increased by 17% overall. Following PCV13 introduction, there was an initial decrease from 8.5 cases/100,000 population in 2010 to 7.6/100,000 in 2014. There followed an increase to 10.0.0/100,000 in 2019. PCV13 serotypes decreased from 3.3/100,000 in 2010 to 2.8/100,000 in 2019 and accounted for 30% of all IPD cases in 2019. PCV15 serotypes increased from 0.8/100,000 in 2010 to 1.3/100,000 in 2019 and PCV20 serotypes increased from 1.1/100,000 in 2010 to 1.6/100,000 in 2019. The proportion of serotypes covered by different PCVs in 2019 was 13% (PCV13), 28% (PCV15) and 49% (PCV20) in infants aged 0-23 months and 26% (PCV13), 41% (PCV15) and 53% (PCV20) in adults aged ≥65 years.

Conclusions and implications for policy, practice or additional research: IPD rates in Canada continue to increase despite the widespread use of PCV13. While PCV15 and PCV20 will increase coverage of current circulating serotypes, there continues to be an urgent need for more broadly protective vaccines against IPD and for direct protection in adults.

A randomized controlled trial (RCT) to compare protection in adolescents between different meningococcal immunization schedules used in Canada; a Canadian Immunization Research Network (CIRN) study

Sadarangani M, Shulha H, Kellner J, Brown E, Alcantara J, Bettinger J, Hu J, Naus M, Singal M, Marty K, Langley J, Vanderkooi O

Introduction/background: Neisseria meningitidis causes septicemia and meningitis. Use of MenC conjugate vaccines in infants in Canada since 2001 resulted in a substantial decline in disease incidence. Most jurisdictions include a single dose of MenACWY vaccine in adolescent school-based programs. Different vaccine products are used, and different provinces/territories use different MenC priming schedules in infants. The aim of this study was to compare the immune response to a single MenACWY adolescent dose (booster) with different products and following different MenC priming schedules.

Methods: Healthy adolescents at three CIRN sites were randomized 1:1:1 to receive MenACWY-DT, MenACWY-TT or MenACWY-CRM. Participants had received 1, 2 or 3 doses of MenC vaccine as infants (age 2-12 months). Blood was collected before booster, then 1-month and 1-year post-booster, measuring serum bactericidal antibody (SBA) against MenC. Pairwise non-inferiority analyses of SBA geometric mean titers (GMTs) were performed using a cutoff ratio of 0.5 in SBA GMT.

Results and analysis: There were 289 individuals enrolled with 52% female, 77% White ethnicity, and mean age 13.7 years. The highest MenC SBA GMTs were observed in participants who had received 2 doses of MenC vaccine in infancy: 907 pre-booster, 13,105 at 1-month and 1,257 at 1-year post-booster. Participants who received 1 or 3 doses of MenC in infancy had MenC SBA GMTs that were inferior to those who received 2 MenC doses, at both 1-month and 1-year post-booster. Pairwise comparisons of the different vaccine products all met non-inferiority criteria at 1-month and 1-year post-booster. All participants had a MenC SBA titer of ≥8 (the presumed correlate of protection) at both 1-month and 1-year post-booster.

Conclusions and implications for policy, practice or additional research: Three different quadrivalent vaccines used in Canada all elicited similarly immunogenic MenC SBA titers. Two MenC doses in infancy followed by an adolescent MenACWY booster resulted in the highest MenC SBA GMTs.

Immunogenicity of acellular pertussis vaccination in pregnant women living with and without HIV, and their newborns in Uganda: interim analysis from the WOMANPOWER randomized controlled trial (RCT)

Amaral K, Nakabembe E, Abu-Raya B, Lo M, Gaultier G, Harn T, Cai B, Hunter O, Tusubira V, Komugisha C, Kyohere M, Nakimuli A, Musoke P, Sekikubo M, Sadarangani M, Le Doare K

Introduction/background: Globally, pertussis accounts for approximately 400,000 deaths annually, with the disease more severe in infants less than six months. To prevent infant mortality, the World Health Organization (WHO) recommends pertussis vaccination during pregnancy. There is a relative lack of immunogenicity data for tetanus-diphtheria-acellular pertussis (Tdap) vaccines from low to middle-income countries, or from pregnant women living with human immunodeficiency virus (HIV) (WLWH). The aim of this study was to evaluate immunogenicity of acellular pertussis vaccination in pregnant WLWH and without HIV, and their newborns in Uganda.

Methods: Samples were collected from a phase II observer blind RCT from WLWH and women without HIV randomized to receive Tdap or Td vaccine during pregnancy. Maternal samples were collected pre-vaccination, 4 weeks post-Tdap/Td vaccine and at delivery, and from cord blood and in infants 4-weeks post-whole cell pertussis (wP) vaccine series. IgG concentration against filamentous hemagglutinin (FHA) was measured by enzyme-linked immunosorbent assay (ELISA). Geometric mean concentrations (GMCs) of each group were compared using a one-way ANOVA, Tukey-Kramer post-hoc, or Welch's t-test. (Note that groups remain blinded in the current overall analysis, but expect to be unblinded by time of the conference)

Results and analysis: There was a significant increase overall ($p<0.001$) in anti-FHA IgG GMCs at both 4-weeks post-vaccination and delivery compared to pre-vaccination (55.78 IU/mL vs. 47.10 IU/mL vs. 18.36 IU/mL). Fold change was highest between pre-vaccination and 4-weeks post-vaccination (12.2), followed by pre-vaccination and delivery (8.5), then 4-weeks post-vaccination and delivery (0.97). There was a significant decrease overall ($p<0.001$) in anti-FHA IgG concentration post-infant vaccine series compared to cord blood (19.49 IU/mL vs. 38.84 IU/mL), with a fold change of 2.33.

Conclusions and implications for policy, practice or additional research: Tdap immunization was immunogenic in this group of pregnant women, with responses persisting to delivery. These results may suggest that Tdap is immunogenic in pregnant women with and without HIV.

Measurement of Population-Level Measles Immunity in Ontario Using Serology Data Linked to Health Administrative Data

Ariyarajah A, Brown K, Crowcroft N, Kwong J, Bolotin S

Introduction/background: Preventing measles outbreaks requires ≥95% of the population to be immune. Canada eliminated measles in 1998, but risk of importation persists. Immunity can be acquired through previous infection or vaccination with measles-containing-vaccine (MCV). We aimed to measure the proportion of individuals with measles IgG antibodies above the threshold of protection in Ontario populations.

Methods: We linked measles IgG test results (2014-16) from Public Health Ontario laboratories to health administrative databases at ICES to obtain sociodemographic and immigrant (available as of 1985) information.

Results and analysis: We included 349,706 individuals tested for measles IgG, among whom 83.4% (95% confidence interval (CI) 83.2-83.5%) had measles IgG above the threshold of protection (275 mIU/mL). Measles IgG seroprevalence was comparable by sex and immigrant status, but not birth year. Individuals born before 1970, who are presumed to be immune through previous infection, had a seroprevalence of 94.9% (95%CI 94.8-95.1). Comparatively, individuals born in 1970-1976 (one-dose MCV eligibility), 1977-1991 (one-dose MCV eligibility with catch-up for second dose), 1992-1997 (two-dose MCV eligibility), and 1998-2016 (elimination setting) had a seroprevalence of 85.2% (95%CI 84.9-85.6), 80.2% (95%CI 80.0-80.4), 74.6% (95%CI 74.2-74.9), and 74.3% (95%CI 73.7-74.9), respectively. Immigrant status appears to interact with birth year. Among individuals born in 1970-1976, immigrants (arrival ≥1985) had a higher seroprevalence of 91.3% (95%CI 90.9-

91.7) compared to 81.4% (95%CI 80.9-81.8) among non-immigrants and immigrants (arrival <1985). Among individuals born in 1998-2016, immigrants had a lower seroprevalence of 65.2% (95%CI 63.8-66.5) compared to 77.3% (95%CI 76.6-77.9) among non-immigrants.

Conclusions and implications for policy, practice or additional research: These results suggest that the proportion of Ontarians adequately protected by measles IgG is below the herd immunity threshold, meaning that endemic transmission could be re-established. Older individuals may have acquired a more robust immunity through infection, compared to vaccine-induced immunity in younger individuals, which appears to be waning. These results may help identify susceptible sub-populations for future measles vaccination.

How are we doing? A vaccine safety update after the authorization of pediatric COVID-19 vaccines in Canada

Wijayasri S, **Barbeau P**, Biggs K, Spruin S, Shaw A, Ogunnaike-Cooke S

Introduction/program need and objectives: In Canada, the pediatric BNT162b2 (Pfizer) COVID-19 vaccine was authorized for use in children 5-11 year olds in November 2021, followed by the pediatric mRNA-1273 (Moderna) COVID-19 vaccine for 6-11 year olds in March 2022. As of May 2022, over three million pediatric COVID-19 vaccines doses were administered in Canada. We provide an update on post-market vaccine safety surveillance in this age group to inform effective mass vaccination campaigns.

Program methods, activities and evaluation: Adverse event reports following COVID-19 vaccination submitted between December 1, 2020 and May 13, 2022 were extracted from the Canadian Adverse Events Following Immunization Surveillance System and the Canada Vigilance Database. Reporting rates were calculated using COVID-19 vaccine doses administered in Canada. Given the safety signal for myocarditis/pericarditis in younger ages, observed versus expected analysis was conducted.

Program results or outcomes: The rate of adverse events following COVID-19 vaccination was lower in children aged 5-11 year olds (20.1/100,000, n=604) compared to youth aged 12-17 year olds (31.3/100,000, n=1,536). Most reports for children were following a pediatric BNT162b2 vaccine (n=565), 36 following an adult/adolescent BNT162b2 vaccine (all 11-year-olds), and three following unspecified vaccines. Most reports for children were considered non-serious (85.1%) and most had recovered at the time of reporting (64.5%); median time to onset following vaccination was two days (interquartile range: 1-4 days). Of the adverse events of special interest for this age group, myocarditis/pericarditis (n=12, 0.40/100,000), seizures (n=8, 0.27/100,000), and events managed as anaphylaxis (n=6, 0.20/100,000) were most frequently reported. Observed myocarditis/pericarditis counts was significantly higher than expected at the 1% significance level.

Recommendations and implications for practice or additional research: To date, rates of adverse events following COVID-19 vaccination in 5-11 year olds are low in Canada, and serious adverse events are rare. While the observed myocarditis/pericarditis following COVID-19 vaccination is above expected, the reporting rate remains low in this age group. Canada continues to monitor adverse events following COVID-19 vaccination in children to inform national immunization programs and guidance.

ORAL PRESENTATIONS – SESSION 10

Thursday 27 April | **10:30 – 12:00** | **Room 206**

An equity-focused evaluation of COVID-19 vaccine rollout implementation plans proposed by six Canadian provinces between January 2021 and April 2022

Atukorale V, Ouedraogo M, Dharma C, Mauer-Vakil D, Sobers M, Bashir K, Ataullahjan A, Fadel S, Allin S

Introduction/background: Due to early vaccine shortages, Canadian jurisdictions made difficult decisions regarding whom to prioritize for COVID-19 vaccine distribution. The National Advisory Committee on Immunization (NACI) established guidelines on priority populations to ensure equitable vaccine distribution. However, variations exist in how provinces adapted NACI guidelines to their local contexts. This study compared

strategies used from 2021-2022 across selected provinces (Alberta, British Columbia, Manitoba, Nova Scotia, Ontario, Quebec) to promote equitable COVID-19 vaccine access and uptake among five high-risk populations prioritized by NACI: First Nations, Inuit, and Metis (FNIM); Black communities; essential workers; individuals experiencing homelessness; and individuals with disabilities.

Methods: We applied the RE-AIM framework commonly used to evaluate the impact of public health initiatives. Using this framework, we conducted both environmental scans of provincial documents and key informant interviews to examine: (a) contextual factors around timing and prioritization of these key populations; (b) strategies or interventions used to engage with populations and to overcome barriers to vaccine access; and (c) methods employed to build trust and improve vaccine confidence.

Results and analysis: Provinces prioritized study populations to varying degrees, although key sub-groups were consistently missed or delayed (e.g. urban FNIM). To justify prioritization, provinces relied on NACI recommendations, evolving evidence-informed data (or lack thereof), and the power of community advocacy. Strategies to reach populations were an iterative process that included community engagement; adapting vaccine communication methods to local contexts; and developing innovative approaches to overcome access barriers (e.g. pop-up clinics). All informants discussed the complexities of building trust among groups with extensive histories of discrimination and neglect, and the challenges of improving vaccine confidence in an increasingly political landscape.

Conclusions and implications for policy, practice or additional research: We highlight the disparity between well-intentioned, macro-level policy decisions and the reality of on-the-ground implementation. Study results provide lessons and recommendations for equitable vaccine distribution in future mass vaccination emergency situations in Canada and globally.

COVID-19 Vaccine Intentions Among Black Communities in British Columbia

Bankole-Longe M, Allen S, Booth A, Blais D, Racey S, Bettinger J, Ogilvie G

Introduction/Background: Racialized communities† consistently bear a disproportionate burden of the COVID-19 pandemic. However, Canada has not systematically collected health data by race and/or ethnicity. Limited Canadian data generated through neighbourhood analysis found racialized communities are at greater risk of developing, being hospitalized, and dying from COVID-19, and report greater vaccine hesitancy. There is an urgent need for race/ethnicity-based data to guide COVID-19 vaccination programs.

Methods: The Women's Health Research Institute and Hogan's Alley Society (HAS), a non-profit that highlights the presence of Black history in British Columbia (BC), collaborated to measure vaccine intentions among Black communities in BC. A convenience sample recruited through HAS membership completed a web-based survey on sociodemographic variables and vaccine confidence and attitudes using validated scales. The primary outcome was 'intention to receive a COVID-19 vaccine or additional dose', which was measured on a 5-point Likert scale. All respondents completed the survey after BC's COVID-19 vaccine mandates were in place.

Results and analysis: Of the 303 Black respondents (63% between 25-44 years; 73% women), 96% received at least one dose of a COVID-19 vaccine. Among those vaccinated with at least 1 dose, 85% were likely to receive an additional dose. There were statistically significant associations between intention to receive an additional dose and low vaccine hesitancy. No significant associations were observed between sociodemographic variables and intention to receive an additional dose.

Conclusions and implications for policy, practice or additional research: This survey of a highly vaccinated population was one of the first to explore the experience of Black community members in Canada during the COVID-19 pandemic and showed low hesitancy was associated with intent to be vaccinated. Black survey participants were highly educated, which may introduce bias, underscoring the need to for population-level disaggregated data. Overall, our results show community-specific studies that collect disaggregated

race/ethnicity data provide important insights that can help shape public health policies to support health equity.

The Alberta Métis-led COVID-19 vaccination effort: Enhancing community engagement in public health

King K, **Bartel R**, James A, MacDonald S

Introduction/program need and objectives: The Métis Nation of Alberta (MNA) is the government for the Métis people in Alberta. In January 2021, the COVID-19 vaccine became available to First Nations, Métis, and Inuit (FNMI) seniors (65+) living in First Nations communities or Métis settlements in Alberta. In March 2021, vaccine eligibility in Alberta expanded to include FNMI people of younger ages and in urban settings. The MNA recognized early on that FNMI populations would be better served by tailored vaccine programs and successfully advocated for resources from provincial and federal partners.

Program methods, activities and evaluation: During the pandemic, the MNA supported its citizens through cultural programming, financial and mental wellness support, access to personal protective equipment, and messaging regarding public health orders. When COVID-19 vaccines became available, culturally appropriate virtual vaccine information sessions were provided. In March 2021, the MNA delivered the first Métis-led COVID-19 vaccination clinic in Edmonton and four additional clinics in Lac La Biche, Fort McMurray, Calgary, and another in Edmonton. The locations, booking process, and community presence were unique to the clinics' success. The clinics focused on cultural safety, including Indigenous health professionals and cultural reference points throughout.

Program results or outcomes: In the first MNA clinic, over 1300 people were vaccinated. Additional clinics saw similar success. Visitors shared appreciation for the culturally specific aspects of the clinics, which contributed to increased safety and comfort.

Recommendations and implications for practice or additional research: Through the success of the first Métis-led vaccination clinics and the various community supports provided to citizens, the MNA COVID-19 response successfully met many of the needs of MNA citizens. This innovative Métis-led initiative provides a model of COVID-19 vaccine service delivery that could be used to meet the needs of Métis citizens in other jurisdictions in Canada, as well as reinforce the need for allocation of resources to Indigenous nations to address their needs in their own ways in their communities.

Does where you start your vaccines impact vaccine coverage? Learnings from the First Nations Childhood Immunization (FINCH) project in Alberta

MacDonald S, **Graham B**, Huang L, Colquhoun A, King K, Nelson G

Introduction/background: Due to complex relationships between health systems, governments, and First Nations communities, accurate measurement of vaccine coverage for First Nations children is often challenging. To address this issue, some First Nations communities in Alberta have entered into data-sharing agreements with the Ministry of Health to enable sharing of individual-level data from electronic immunization registries in the Nation with the provincial government's immunization repository. Using this linked data, our team of researchers and First Nations partners assessed vaccine coverage for children living in Maskwacis, a large First Nations community in Alberta.

Methods: In this retrospective cohort study, we calculated routine vaccine coverage at ages two and seven years for children living in Maskwacis between 2015 and 2019, regardless of where in Alberta the vaccines were received. We compared this with vaccine coverage for a subset of children who received their first vaccine dose at Maskwacis Health Services (MHS), the community health centre on the Nation.

Results and analysis: For two-year-old children who started their vaccine series at MHS, coverage was 9.3% higher for measles, 7.7% higher for pneumococcal, and 9.7% higher for meningococcal vaccines, compared to

those who initiated vaccines anywhere in Alberta. Coverage was also higher for seven-year-old children who had their first vaccines at MHS (2.8% for measles, 4.2% for pneumococcal, and 4.2% for meningococcal vaccine).

Conclusions and implications for policy, practice or additional research: Compared to children who received their first dose of vaccine anywhere in Alberta, children who received their first vaccines at MHS had higher vaccine coverage. This study highlights the value of families engaging with the Nation's health centre at the initiation of the vaccine series, and is an example of the benefits of Indigenous self-determination and devolved healthcare services in the Nation. The ability to measure accurate vaccine coverage through data-sharing agreements will support Nations to identify individual and community immunity for their people.

"Unless everyone gets vaccinated, not everyone will be safe": An intersectional analysis of inequities in responsibility to access a COVID-19 vaccination

Manca T, Aylsworth L, Cha E, Hunmble R, Wilson S, Meyer S, Greyson D, Sadarangani M, Driedger S, MacDonald S, on behalf of the Canadian Immunization Research Network investigators C

Introduction/background: Many people who received COVID-19 vaccines faced barriers to access and had concerns about safety or effectiveness. The aim of this study was to explore Racialized minority and Indigenous Peoples' motivation to receive COVID-19 vaccines, including their perception of the role of personal responsibility to overcome barriers to access for underserved communities.

Methods: We conducted semi-structured qualitative interviews about vaccination motivations and barriers to access COVID-19 vaccines in Spring 2021. Interview participants were purposively selected from respondents to a national online survey via email invitations to include Racialized minority and Indigenous Peoples (including First Nations and Métis) who reported barriers to accessing healthcare. Three researchers analyzed the interviews for emergent themes using critical feminist methodologies in NVivo.

Results and analysis: Interview participants (N=27) included diverse Racialized minority (n=17) and Indigenous Peoples (n=10). We coded interview transcripts around three emergent themes relating to motivations, perceptions of responsibility, and effort needed to get vaccinated. Most participants emphasized the importance of collective responsibility to get vaccinated. For example, one participant stated, "unless everyone gets vaccinated, not everyone will be safe," implying that the individual action of getting vaccinated was the only means to minimize personal health risks and disease transmission. Yet, many participants also described how systemic inequities restricted the ability for many equity-denied populations to follow public health recommendations and access vaccines (e.g., lack of paid sick leave, crowded housing, financial costs of travel, childcare).

Conclusions and implications for policy, practice or additional research: Participants repeated public health discourses about the communal need for individuals to get vaccinated but critiqued the burden placed on individuals to access vaccines despite barriers. Programming to minimize inequities in the effort needed to access to vaccination must be implemented early and maintained throughout vaccine rollout, including the expansion of vaccines to more eligible populations (e.g., children), and with booster vaccine doses (e.g., third, fourth, and future COVID-19 boosters).