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DALHOUSIE UNIVERSITY

INFECTIOUS DISEASES RESEARCH DAY & CANADIAN CENTER FOR VACCINOLOGY SYMPOSIUM

HANDBOOK

April 15, 2025

SPONSORED BY

Canadian Center for Vaccinology

Dalhousie University Division of Infectious Diseases, Department of Pediatrics, and Department and Medicine

Nova Scotia Health Division of Infectious Diseases

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TABLE OF CONTENTS

Welcome

Glenn Patriquin

MD, MSc, FRCP

Associate Professor,
Dalhousie University
Microbiology and Infectious Diseases, Nova Scotia Health

Welcome to the Infectious Diseases Research Day and CCfV Symposium for 2025.

This annual event provides a unique learning opportunity for researchers, trainees, public health professionals, healthcare providers, and community members featuring experienced presenters, and inspired research trainees. Our goal is to highlight Canadian research by established investigators, as well as showcase emerging talent.

Our program this year is filled with a variety of presentations and posters themed around various aspects of vaccinology and infectious diseases. We aim to identify research strengths and build new collaborations to extend local research connections.

Welcome and thank you for joining us!

Scott Halperin

MD, FRCPC

Director, Canadian Center for Vaccinology
Professor, Dalhousie University

The Infectious Diseases Research Day/CCfV Symposium is an important annual platform that allows local researchers to present their work and learn about the work of their colleagues. We encourage everyone to take part in this one-day event that will feature interesting topics surrounding infectious diseases. One of the great aspects of this event is that it gives researchers at different stages in their careers the opportunity to learn about the work of their colleagues, and I encourage everyone to make the most of this educational experience.

I would like to offer my sincerest thanks to our planning committee and the financial support from our corporate sponsors. This event would not be possible without the dedicated work and continued support from these individuals.

30th Annual Infectious Diseases Research Day & 17th Annual Canadian Center for Vaccinology Symposium

Tuesday April 15, 2025 | Lord Nelson Hotel, Halifax

7:15-8:00am	**Registration**	
7:30-8:00am	**Continental Breakfast**	
8:00-9:00am	**Introduction** – Dr. Shelly McNeil **TJ Marrie Lecture** – Dr. Darrell Tan *Mpox then and now: Lessons learned from a re-emerging infectious disease* **Q&A session**	Imperial Ballroom/Zoom
9:00-9:15am	**Opening remarks, Introductions** – Drs. Patriquin, McNeil, Comeau	Imperial Ballroom
9:15–10:30pm	**Oral Presentations (5)**	Imperial Ballroom
10:30-10:45	**Nutrition Break**	
10:45–12:00pm	**Oral Presentations (5)**	Imperial Ballroom
12:00–1:00pm	**Lunch**	
1:00–2:00pm	**Poster judging** *(posters available for viewing 8:00am – 4:00pm)*	Regency Ballroom
2:00–3:00pm	**Introduction** – Dr. Tobias Kollmann **Presentation** – Dr. Buddy Creech *Systems Vaccinology Approaches to Influenza and Pertussis* **Q&A session**	Imperial Ballroom

3:00-3:15	**Nutrition Break**	
3:15–3:45pm	**Introduction** – Dr. Jeannette Comeau **Presentation** – Dr. May ElSherif *CHIM Unveiled: From Origins to Our First In-House Success* **Q&A session**	Imperial Ballroom
3:45-4:15pm	**Introduction** – Bahaa Abu-Raya **Presentation** – Dr. Tobias Kollmann *BCG I.V.?* **Q&A session**	Imperial Ballroom
4:15-4:45pm	**Awards Presentations** **Closing Remarks** – Dr. Glenn Patriquin	Imperial Ballroom

After this program, participants will be able to:

- Review and discuss local research findings in microbiology, immunology, infectious diseases, and vaccinology; and
- Collaborate with other departments and disciplines by being introduced to local areas of expertise.

Educationally co-sponsored by Dalhousie University Continuing Professional Development and Medical Education (CPDME).

In keeping with CMA Guidelines, program content and selection of speakers are the responsibility of the planning committee. Support is directed toward the costs of the course and not to individual speakers through an unrestricted educational grant.

2025 Speakers

TJ Marie Lecturer

Dr. Darrell Tan

Darrell H. S. Tan is an infectious diseases physician and Clinician-Scientist at St. Michael's Hospital, where he leads the Options Collaboratory in HIV/STI Treatment and Prevention Science (www.optionslab.ca). He is also an Associate Professor in the Department of Medicine and Institute of Health Policy, Management and Evaluation at the University of Toronto, with a cross-appointment in the Institute of Medical Science. His research focuses on clinical trials and implementation science in the areas of HIV prevention, HIV treatment and sexually transmitted infections (STIs) including mpox. Dr. Tan holds a Tier 2 Canada Research Chair in Biomedical HIV/STI Prevention, is Co-Lead of the Prevention and Testing Think Tank of the CIHR Pan-Canadian Network for HIV and STBBI Clinical Trials Research and is a member of the Governing Council of the International AIDS Society.

Keynote Speaker

Dr. Buddy Creech

Dr. Buddy Creech is the Edie (*"E-D"*) Carell ("*Carol*") Johnson Chair and Professor of Pediatrics in the Division of Pediatric Infectious Diseases at Vanderbilt University Medical Center in Nashville, Tennessee. He serves as Director of the Vanderbilt Vaccine Research Program; Principal Investigator of the NIH-funded Vanderbilt Vaccine and Treatment Evaluation Unit; and Principal Investigator of the CDC-funded Clinical Immunization Safety Assessment Network. His team conducts clinical and translational research across multiple pathogens and infectious diseases, including pneumonia, osteomyelitis, influenza, *S. aureus* infections, *C. difficile* disease, and pertussis. Dr. Creech is a member of the Society for Pediatric Research, the American Pediatric Society, the Infectious Diseases Society of America, and the Pediatric Infectious Diseases Society, where he serves as Past-President.

Local Speakers

Dr. May ElSherif

Dr. May ElSherif is a Clinical Scientist and the Director for Laboratory Operations at the Canadian Center for Vaccinology (CCfV) and is an Adjunct Assistant Professor in the Department of Microbiology & Immunology at Dalhousie University. Her background and training range from clinical responsibilities as an MD to microbiology and basic science related to infectious disease research, vaccinology, clinical trials, and surveillance, plus ICH GCP, GCLP and GMP. Dr. ElSherif leads a team of research staff and collaborates with researchers from across Canada while supporting numerous research projects, investigators, and students. For the past few years, she has spearheaded the first in North America pertussis Controlled Human Infection Model (CHIM) study, conducted in Canada at CCfV.

Dr. Tobias Kollmann

Prof. Kollmann completed his MD and PhD at the Albert Einstein College of Medicine, Bronx NY, followed by a residency in pediatrics and fellowship in infectious diseases at the University of Washington, Seattle, WA with Prof. Chris Wilson. He then served as Division Head for Pediatric Infectious Diseases at the University of British Columbia, BC Children's Hospital before taking on the Director's position of Systems Vaccinology at Telethon Kids Institute in Perth, Australia. He currently is Prof. of Microbiology & Immunology as well as Pediatric Infectious Diseases at Dalhousie University in Halifax, NS, Canada. Tobi is the CEO of the Born Strong Initiative (https://www.born-strong.org/), a global network of experts working to reduce adverse pregnancy outcomes. His expertise centers around immune ontogeny as well as maternal and early life vaccine responses employing cutting edge technology and analytics to extract the most information out of the small biological samples obtainable.

PRESENTATION NOTES

Dr. Darrell Tan

Presentation Title

Mpox then and now: Lessons learned from a re-emerging infectious disease

Presentation Objectives

At the conclusion of this activity, participants will be able to:

1. Recall the diverse clinical manifestations of mpox infection
2. Describe key research findings on the effectiveness of medical countermeasures against mpox
3. Recognize the importance of community engagement in epidemic response

Notes

Please take the time to provide feedback on this presentation at the end of the day at ***bit.ly/IDDayEval2025***

PRESENTATION NOTES

Dr. Buddy Creech

Presentation Title

Systems Vaccinology Approaches to Influenza and Pertussis

Presentation Objectives

At the conclusion of this activity, participants will be able to:

1. Differentiate between the immune response to whole-cell and acellular pertussis vaccine
2. Identify key immunologic signatures that predict a robust immune response to adjuvanted influenza vaccine
3. Consider ways in which ribosome profiling, RNAseq, and metabolomics may translate to studies of other vaccines and infectious diseases.

Notes

Please take the time to provide feedback on this presentation at the end of the day at ***bit.ly/IDDayEval2025***

PRESENTATION NOTES

Dr. May ElSherif

Presentation Title

CHIM Unveiled: From Origins to Our First In-House Success

Presentation Objectives

At the conclusion of this activity, participants will be able to:

1. Describe what Controlled Human Infection Models (CHIMs) are
2. Discuss the experimental applicability of CHIMs
3. Summarize why pertussis is amenable for CHIM development

Notes

*Please take the time to provide feedback on this presentation at the end of the day at **bit.ly/IDDayEval2025***

PRESENTATION NOTES

Dr. Tobias Kollmann

Presentation Title

BCG I.V.?

Presentation Objectives

At the conclusion of this activity, participants will be able to:

1. Recognize that tuberculosis (TB) is still one of the most important infectious diseases in the world today and recall that the BCG vaccine administered intradermally is the currently only licensed vaccine to prevent TB.
2. Discuss the novel concept that simply changing the route of administration of a vaccine) can substantially alter protective efficacy.
3. Describe how the mechanisms by which BCG protects from Mtb infection differ from the mechanisms by which BCG protects from disease (TB), and recognize that BCG likely induces innate immunity to protect from infection.

Notes

Please take the time to provide feedback on this presentation at the end of the day at ***bit.ly/IDDayEval2025***

Oral Presentation Schedule

Time	Presenter	Discipline	Title of Abstract	#
9:15 - 9:30	Reema Alabulqadar	Fellow	THE PREVALENCE OF CANDIDEMIA IN PATIENTS WITH CANDIDURIA	1
9:30 - 9:45	Adriana Jenkins	UG	INVESTIGATING STRATEGIES OF CHOLESTEROL ACCUMULATION IN HUMAN CORONAVIRUSES	2
9:45 - 10:00	Bailey Selig	Research Associate	EXPLORING IMPLEMENTATION CONTEXTS OF IMMUNIZATION ASSESSMENT TOOLS IN THREE CANADIAN PROVINCES: PERSPECTIVES FROM POLICY MAKERS, VACCINE ADMINISTRATORS, AND COMMUNITY MEMBERS	3
10:00 - 10:15	Zach Robar	UG	VALIDATION OF A PCR TO HELP CHARACTERISE THE RISE OF HYPERVIRULENT *STREPTOCOCCUS PYOGENES* STRAIN M1UK IN NOVA SCOTIA	4
10:15 - 10:30	Bronwyn Rowland	Masters	NOVEL HIGH-POTENCY REVERSIBLE-COVALENT INHIBITORS OF BACTERIAL THYMIDYLYLTRANSFERASE	5
10:30 - 10:45	***NUTRITION BREAK***			
10:45 - 11:00	Jaden Tanner	UG	LET'S GET KIDS TALKING ABOUT VACCINES: AN EXPLORATORY ANALYSIS OF KNOWLEDGE MOBILIZATION IN NEW BRUNSWICK AND ALBERTA PUBLIC MIDDLE SCHOOL QUADRIVALENT MENINGITIS VACCINATION PROGRAMS	6
11:00 -11:15	Shannen Grandy	PhD	COPING WITH STRESS: HOW *PSEUDOMONAS AERUGINOSA* PROTEASES ACTIVATE THE INTEGRATED STRESS RESPONSE IN LUNG EPITHELIAL CELLS	7
11:15 -11:30	Alexa Wilson	PhD	A CANCER-CAUSING HERPESVIRUS ACQUIRES AN ENVELOPE AT THE NUCLEOPLASMIC RETICULUM	8
11:30 -11:45	Breanna Laffin	Masters	IDENTIFYING FACTORS OF SUCCESS IN IMPLEMENTATION OF AN INTERVENTION FOR MANAGEMENT OF INPATIENT BACTERIURIA	9
11:45 - 12:00	Jasmine Cameron	UG	INITIAL SUMMARY AND ASSESSMENT OF OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY IN NOVA SCOTIA HEALTH, CENTRAL ZONE	10

Poster Presentations

#	Title and Authors (Presenter's name in blue)	Page
1	Henrique Pott, Jason LeBlanc, May ElSherif, Todd Hatchette, Melissa K. Andrew, Shelly A McNeil on behalf of SOS Network Investigators PREVALENCE AND IMPACT OF RESPIRATORY VIRUSES ON PATIENT OUTCOMES: FOCUS ON HMPV, RSV, AND INFLUENZA. A REPORT FROM THE CANADIAN IMMUNIZATION RESEARCH NETWORK SOS NETWORK	26
2	Henrique Pott, Jason LeBlanc, May ElSherif, Todd Hatchette, Melissa K. Andrew, Shelly A McNeil on behalf of SOS Network Investigators OSELTAMIVIR REDUCES 30-DAY MORTALITY IN OLDER ADULTS WITH INFLUENZA: A REPORT FROM THE CANADIAN IMMUNIZATION RESEARCH NETWORK SOS NETWORK	27
3	T.D. Ramsey, A. Joy, S. Opie, K. Merrick, A. Keenan, C. Heinstein, S.A. McNeil, T. Hatchette STI CARE NOW INITIATIVE: CHLAMYDIA TRACHOMATIS AND NEISSERIA GONORRHOEAE SELF-TESTING AND LINKAGE TO CARE	28
4	Henrique Pott, Jason LeBlanc, May ElSherif, Todd Hatchette, Shelly A McNeil, Melissa K. Andrew on behalf of SOS Network Investigators INFLUENZA SEVERITY SCALE (ISS): PREDICTING MAJOR CLINICAL EVENTS AMONG HOSPITALIZED CANADIAN ADULTS WITH LABORATORY-CONFIRMED INFLUENZA INFECTION. A REPORT FROM THE CANADIAN IMMUNIZATION RESEARCH NETWORK SOS NETWORK	29
5	Holly Gillis, Harold Taylor RING RING, CALLING HEALTHCARE	30
6	K. Kaupp, S. Smit, S. Burgess, E. Black, O. Loubani, M. MacKenzie ANTIMICROBIAL ADMINISTRATION DELAYS IN PATIENTS WITH SUSPECTED SEPSIS IN A CANADIAN EMERGENCY DEPARTMENT: PREVALENCE AND RISK FACTORS	31
7	Alexander Pupek, Colleen Jackson, Darren Sarty, Jason J LeBlanc, Todd F Hatchett ACUTE HUMAN IMMUNODEFICIENCY VIRUS CONFIRMATION USING REFLEX VIRAL LOAD TESTING ON SERA	32
8	Ziyad Allehebi, Yahya Shabi, Emma K. Reid, Glenn Patriquin, Paul Bonnar ANTIMICROBIAL USE AND INFECTION CONTROL AMONG PATIENTS WITH INFLUENZA	33

9	P. Robertson, A. Polsky, Z. Robar, G. R. McCracken, A. Loder, D. Gaston, J. Pettipas, E. Simms, A. Griffith, A. Golden, I. Martin, R. J. Davidson, J. J. LeBlanc RECENT RISE OF MACROLIDE/CLINDAMYCIN-RESISTANT INVASIVE GROUP A STREPTOCOCCUS IN NOVA SCOTIA ATTRIBUTED TO THE EMERGENCE OF *EMM* TYPE 92	34
10	Parnian Jahanbani, Katherine Wang, Jun Wang INVESTIGATING THE ROLE OF AID ENZYME IN IMMUNE RESPONSE AGAINST *CHLAMYDIA* INFECTION	35
11	Saeideh Jamali, May Elsherif, Kara L Redden, Scott Halperin and Jun Wang PROFILING THE HOST RESPONSES TO RESPIRATORY *BORDETELLA PERTUSSIS* INFECTION IN HUMAN VOLUNTEERS	36
12	Noah Doucette, Audrey Steenbeek, Jennifer Lane THE INTERSECTIONALITY OF HUMAN PAPILLOMAVIRUS (HPV) VACCINE HESITANCY IN NOVA SCOTIA, CANADA: AN EXPLORATORY STUDY	37
12A	Erin McConnell, Christine Cassidy, Audrey Steenbeek IMPROVING INFLUENZA VACCINE UPTAKE AMONGST ADULT KIDNEY TRANSPLANT RECIPIENTS: A MIXED-METHODS STUDY	38
13	Jack R. Case, Denys A. Khaperskyy EFFECTS OF BALOXAVIR RESISTANCE MUTATIONS ON PA-X MEDIATED HOST SHUTOFF BY INFLUENZA A VIRUS	39
14	L. Burton, R. Nickerson, Z. Cheng CHARACTERIZATION OF ERK MITOGEN-ACTIVATED PROTEIN KINASE ACTIVATION BY *PSEUDOMONAS AERUGINOSA* PROTEASE IV	40
15	Bailey M Selig, Donna Halperin, Joanne M Langley, Scott Halperin HOW DO INDIVIDUALS DECIDE TO VOLUNTEER FOR PARTICIPATION IN A PHASE 1 TRIAL OF A COVID-19 VACCINE? A MODIFIED GROUNDED THEORY STUDY	41
16	MacDonald J., Fitzpatrick T., Brundin-Mather R., Parsons Leigh J., Halperin D. PARENTAL ACCEPTABILITY OF NEW PREVENTIVE THERAPIES FOR RESPIRATORY SYNCYTIAL VIRUS IN INFANTS: A CROSS-SECTIONAL SURVEY IN CANADA	42
17	Jade MacDonald, Jeanna Parsons Leigh, Stephana Julia Moss, Sara Mizen, Cristina Zuniga Chacon, Michal S. Cherak, Henry T. Stelfox, Ève Dubé, Kirsten M. Fiest, Donna M. Halperin, Sofia B. Ahmed, Shannon E. MacDonald, Sharon E. Straus, Terra Manca, Josh Ng Kamstra, Andrea Soo, Scott A. Halperin ENGAGING ADULTS IN CANADA TO UNDERSTAND AND ADDRESS THE IMPACT OF VACCINE COMMUNICATION IN THE COVID-19 PANDEMIC ON FUTURE VACCINATIONS: IMPLICATIONS FOR PUBLIC HEALTH MESSAGING	43

18	S. Mizen, K. Salter, B.M. Selig, J. MacDonald, M. Kervin, J.M. Langley UNDERSTANDING WHAT PATIENTS, PARENTS, FAMILIES, AND CARERS UNDERSTAND, NEED AND WANT TO KNOW ABOUT MENB AND MENB VACCINATION: A QUALITATIVE STUDY	44
19	S. Mizen, K. Slayter, T. Ramsey, R. Lawrence, J.E. Isenor, F. Lalji, J. Kaczorowski, N.M. Waite, D. Halperin, S. Halperin, E. Black EXPLORING SOLUTIONS TO COST-RELATED BARRIERS FOR RECOMMENDED BUT UNFUNDED VACCINES IN CANADIAN COMMUNITY PHARMACIES: A CANADIAN IMMUNIZATION RESEARCH NETWORK (CIRN) STUDY	45
20	Megan VanderWal, Alexa Wilson, Craig McCormick DEVELOPMENT OF EATR ASSAY TO STUDY RETICULOPHAGY DURING VIRAL INFECTION	46
21	Adrian C Chan, Tamara MacDonald, Ketan Kulkarni, Stephanie Villenueve, Tim Mailman, Jeannette L Comeau *CLOSTRIDIOIDES DIFFICILE* COLONIZATION: A PILOT STUDY EVALUATING PREDICTION OF INFECTION IN PEDIATRIC ONCOLOGY PATIENTS	47
22	Joann K. Ban, Michael Dolph, Yufan Ho, Dessi Loukov, Emily Matthews MODELLED PUBLIC HEALTH IMPACT OF ADJUVANTED RESPIRATORY SYNCYTIAL VIRUS PREFUSION F PROTEIN (RSVPREF3) VACCINATION IN ADULTS ≥60-YEARS IN CANADA OVER 5 YEARS	48
23	Amanda K. Rudman Spergel, Christine A. Shaw, Iris Wu, Weiping Deng, Jose Cardona, Kimball Johnson, Ivette Espinosa-Fernandez, Melissa Sinkiewicz, Veronica Urdaneta, Lizbeth Carmona, Kristin Schaefers, Bethany Girard, Yamuna D. Paila, Benoit Callendret, Lusine Kostanyan, Jintanat Ananworanich, Jacqueline Miller, Rituparna Das. Presented by Kyle Brown on behalf of the authors. PHASE 3 SAFETY AND IMMUNOGENICITY OF AN MRNA-BASED SEASONAL INFLUENZA AND SARS-COV-2 MULTICOMPONENT VACCINE (MRNA-1083) COMPARED WITH CO-ADMINISTERED LICENSED VACCINES IN ADULTS ≥50 YEARS OLD	48
24	Paul Scott, MD, Jayani Pathirana, MBBS, Akira Kato, MD, Richard Tytus, MD, Carlos M. Perez, MD, Nigel Leslie Gilchrist, FRACP, Hidemi Kanou, MD, Kwang Ha Yoo, MD, Grzegorz Kania, MD, Michael Nissen, FFSc, Michael Livingston, MD, Amy Falk Russell, MS, Doreen Fernsler, BS, Muhammad Waleed, PhD, Jianing Li, PhD, Ulrike K. Buchwald, MD, Heather L. Platt, MD, on behalf of the STRIDE-8 Study Group. Presented by Steven Findlay on behalf of the authors. A PHASE 3, RANDOMIZED TRIAL INVESTIGATING THE SAFETY, TOLERABILITY, AND IMMUNOGENICITY OF V116, AN INVESTIGATIONAL ADULT-SPECIFIC PNEUMOCOCCAL CONJUGATE VACCINE, IN PNEUMOCOCCAL VACCINE-NAÏVE ADULTS 18–64 YEARS OF AGE WITH INCREASED RISK FOR PNEUMOCOCCAL DISEASE	49

Oral Presentation Abstracts

(Presenter's name in blue)

1: THE PREVALENCE OF CANDIDEMIA IN PATIENTS WITH CANDIDURIA

Authors: Reema A Alabdulqader[1], Paul E Bonnar[2], Glenn Patriquin[3], Emma K Reid[4], Valerie Murphy[4], Ziyad Allehebi[5]

Affiliation: [1]Department of Medicine, National Guard Health Affairs, Imam Abdulrahman AL Faisal Hospital, Dammam, Saudi Arabia. [2]Division of Infectious Disease, Department of Medicine, Halifax, NS, Canada. [3]Department of Pathology and Laboratory Medicine, Nova Scotia Health., Halifax, NS, Canada. [4]Department of Pharmacy, Nova Scotia Health., Halifax, NS, Canada. [5]Department of Microbiology, Faculty of Medicine in Rabigh, King Abdulaziz University, Jeddah, Saudi Arabia

Introduction: Candiduria is common among hospitalized patients in large part due to excessive and unnecessary sampling of urine. While typically asymptomatic and benign, many patients receive antifungals unnecessarily. Furthermore, the rate of invasive fungal infection related to candiduria is cited as low. We aimed to review the local prevalence of candiduria and the associated rates of candidemia among inpatients.

Methods: This was a retrospective cohort study conducted in an academic hospital from January 1st 2023 to July 31st 2024. Adult inpatients with a urine culture positive for *Candida* species were reviewed. Duplicates were removed and a randomized sample was used for chart review including demographics, comorbidities, antibiotic use, urine culture results, blood culture results within 90 days of candiduria, and antifungal therapy.

Results: During the study period there were 611 unique inpatients with candiduria. Of them, 377 (61.7%) urine samples were from catheters, 189 (30.9%) from midstream, 30 (4.9%) from cystoscopy, and 14 (2.2%) from nephrostomy tubes. Of the randomized sample of 199 patients, candidemia was only identified in 10 (5%) Most of the blood cultures (8/10) were positive within 48 hours of the urine culture. The remaining 2 were candidemic after 48 hours. All patients with candidemia had received antibiotics within 30 days prior to the onset of candiduria and candidemia. *Candida albicans* was identified in five patients, non-albicans in five patients, and mixed species (albicans and non-albicans) in one patient.

Conclusions: This study underscores the low rate of candidemia in the setting of candiduria. In most cases, candidemia and candiduria were detected at the same time. Therefore, candiduria did not lead to invasive fungal infection within 90-days. Future analysis will review all candiduria patients for assessment of symptoms and antifungal use.

2: INVESTIGATING STRATEGIES OF CHOLESTEROL ACCUMULATION IN HUMAN CORONAVIRUSES

Authors: A. Jenkins, T. Caddell, E. Pringle, C. McCormick

Affiliation: Department of Microbiology & Immunology, Dalhousie University

Introduction: Human coronavirus (HCoV) infection alters expression of host genes involved in host cholesterol metabolism, but regulatory mechanisms and consequences for viral replication and host responses to infection remain incompletely understood. To address this knowledge gap, we investigated how reducing cholesterol import or inhibiting de novo cholesterol synthesis affects hCoV replication and infection of human cells. We also conducted a screen to identify viral genes that regulate host sterol responses.

Methods: We used a luciferase reporter plasmid that responds to sterol pathway gene expression to screen for SARS-CoV-2 genes that affect de novo cholesterol synthesis. Cultured human cells were infected with HCoV-OC43 or HCoV-229E at an MOI of 0.1 and treated with 10 μM cerivastatin or NB-598 to inhibit de novo cholesterol synthesis, diluted in media containing fetal bovine serum (FBS) or lipoprotein-depleted serum (LPDS), which reduces uptake of exogenous cholesterol, for 24 hours. Intracellular free cholesterol accumulation was visualized by treatment with Filipin III and fluorescence microscopy. Viral particles in cell supernatants were titered using a RT-qPCR assay.

Results: HCoV-OC43 infection caused a striking pattern of intracellular cholesterol accumulation, which was reversed in cells treated with media containing LPDS, suggesting that uptake of exogenous cholesterol could contribute to this phenotype. SARS-CoV-2 Nsp3 activated the sterol pathway luciferase reporter, making it a candidate for follow-up studies of de novo cholesterol synthesis. However, neither cerivastatin nor NB-598 significantly reduced production of HCoV-OC43 or HCoV-229E by infected cells.

Conclusions: We identified a cholesterol accumulation phenotype in HCoV infection that was dependent on exogenous uptake mechanisms, whereas inhibition of de novo cholesterol synthesis had no effect on viral replication. Future research should further explore the virus-host interactions driving cholesterol accumulation and identify the consequence of abnormal intracellular cholesterol distribution coronavirus replication, assembly, and egress.

3: EXPLORING IMPLEMENTATION CONTEXTS OF IMMUNIZATION ASSESSMENT TOOLS IN THREE CANADIAN PROVINCES: PERSPECTIVES FROM POLICY MAKERS, VACCINE ADMINISTRATORS, AND COMMUNITY MEMBERS

Authors: [1]B.M. Selig, [1]J. Mannette, [1]L. Delaney, [1]C. Zuniga Chacon, [1]K. Salter, [1]S.J. Moss, [2]K. McIsaac, [3]E. Bentley, [4]S. Buchan, [1,5]D. Halperin, [1]S. Halperin, [1]J. Parsons Leigh, [1,6]J. Comeau, [7]for CIRN

Affiliation: [1]Dalhousie University, Canadian Center for Vaccinology; [2]NS Department of Health & Wellness; [3]PEI Department of Health & Wellness; [4]Public Health ON; [5]St. Francis Xavier University; [6]IWK Health; [7]PHAC

Introduction: Immunization Assessment Tools (IATs) personalize vaccine recommendations by comparing individuals' demographics/risk factors to guidelines and may improve vaccine uptake. IATs should be user-friendly for community members (CMs) and healthcare providers (HCPs). This study contextualized IAT implementation contexts of Prince Edward Island (PEI) (previously developed-IAT), Nova Scotia (NS) (current-IAT), and Ontario (ON) (future-IAT). This study is phase 2-of-4, aiming to adapt the IAT-PEI to improve Canadian vaccination practices/outcomes.

Methods: Semi-structured interviews were conducted with participants from PEI, NS, and ON to explore IAT implementation contexts. Participants were recruited through research team networks, social media, and environmental scan data. Participants were vaccine administrators, vaccine-related policy makers, and CMs receiving vaccine recommendations. The i-PARIHS framework was used to guide thematic analysis and interpretation of the data to reflect provincial perspectives.

Results: Thirty-four participants (PEI n=5; NS n=20; ON n=9) were interviewed: vaccine administrators (n=20); policy makers (n=9); and CMs (n=5). Four generated themes describe provincial contexts/considerations relevant for IAT implementation: 1) Establishing trust between HCPs and CMs; 2) Creating collaborative/responsive healthcare; 3) Improving resource/information management; 4) Participant recommendations for provincial IATs. Recommendations included the need for intuitive, accessible, and user-friendly IAT design; integrated digital vaccine records; and considering the workload impact for HCPs.

Conclusions: Successful implementation of an IAT requires consideration of the CM-HCP trust-relationship; the IAT's ability to respond to changing healthcare needs; and available regional resources (time, funding, personnel). Next steps include piloting an adapted IAT-NS with users in Spring 2025 to assess impact.

4: VALIDATION OF A PCR TO HELP CHARACTERISE THE RISE OF HYPERVIRULENT *STREPTOCOCCUS PYOGENES* STRAIN M1UK IN NOVA SCOTIA

Authors: Z. Robar[1], P. Robertson[2], G. R. McCracken[3], A. Loder[4], D. Gaston[3], J. Pettipas[5], E. Simms[2,3,5], A. Griffith[4], A. Golden[4], I. Martin[4], R. J. Davidson[1-3], J. J. LeBlanc[1-3]

Affiliation: [1]Department of Microbiology and Immunology, Dalhousie University, Halifax, NS. [2]Department of Pathology, Dalhousie University, Halifax, NS. [3]Department of Pathology and Laboratory Medicine, Nova Scotia Health (NSH), Halifax, NS. [4]National Microbiology Laboratory (NML), Public Health Agency of Canada (PHAC), Winnipeg, MB. [5]Nova Scotia Provincial Public Health Laboratory Network (PPHLN), Halifax, NS.

Introduction: Significant morbidity and mortality are associated with invasive group A streptococci (iGAS) infections caused by *Streptococcus pyogenes*. In 2019, a hypervirulent strain M1UK was associated with increased iGAS activity in the UK (2014-2016). M1UK spread to other countries, including Canada. Compared to ancestral M1global strains, M1UK harbours 27 distinct mutations, one linked to hypervirulence through overexpression of the superantigen SpeA. In this study, two other M1UK-specific adjacent mutations in *rofA* were used for a Taqman real-time PCR aimed to facilitate M1UK surveillance using isolates or throat swabs.

Methods: PCR specificity was assessed using *S. pyogenes* isolates from all 550 non-duplicated iGAS cases from 2012 to 2024 in Nova Scotia characterized by *emm* (M) typing using Sanger or next generation sequencing. Isolates from iGAS cases included 142 *emm1* types (38 M1global, 17 M1intermediate, and 87 M1UK), as well as various other *emm* types that previously circulated in Canada. Non-GAS streptococci or closely related bacteria (n=32) were also evaluated. Next, the M1UK PCR was tested on throat swabs in liquid Amies collected in 2024 and compared to the 514 paired *S. pyogenes* cultures obtained that were characterized by *emm* sequencing. The sensitivity of PCR was compared to culture with triplicate 10-fold serial dilutions of M1UK in liquid Amies media.

Results: The PCR detected all M1UK strains, without cross-reactions with other *emm1* types (M1global or M1intermediate), non-*emm1* types, or closely related streptococci. All 87 M1UK strains were detected, with the first identified in 2015 and large expansions in years 2018/2019 and 2023/2024. Use of the M1UK PCR on throat swabs showed similar performance as culture, and the proportion of M1UK and overall *emm* type distribution in throat swabs mirrored those of iGAS cases.

Conclusions: Overall, the M1UK-specific PCR was a reliable surveillance tool for iGAS isolates and throat swabs and helped characterise the rise of this virulent strain in Nova Scotia.

5: NOVEL HIGH-POTENCY REVERSIBLE-COVALENT INHIBITORS OF BACTERIAL THYMIDYLYLTRANSFERASE

Authors: Bronwyn Rowland, Jesse Fuller, David Jakeman

Affiliation: Department of Chemistry, Dalhousie University

Introduction: As drug-resistant infections continue to rise, rationally designed covalent inhibitors offer a promising strategy for the development of novel antibiotics. To further this field, we focused on Cps2L as an antibacterial target. This enzyme is an essential thymidylyltransferase in Streptococcus pneumoniae, and homologs exist in all “critical priority” drug-resistant pathogens named by the World Health Organization. Cps2L and its homologs catalyze rhamnose biosynthesis, producing thymidine diphosphate-rhamnose (TDP-Rha) used to fortify the bacterial cell wall.

Methods: X-ray crystal structures of Cps2L homologs revealed two lysine residues within the substrate-binding site of the enzymes. To disrupt Cps2L activity, we considered functionalities that could form reversible covalent bonds with the amine side-chains of these residues. Thus, we explored substituted aryl aldehydes as potential inhibitors and measured their half maximal inhibitory concentrations (IC50s) using a NAD/NADH-coupled spectrophotometric assay.

Results: A variety of millimolar inhibitors were discovered from the pool of aryl aldehydes. These initial findings guided the evaluation of a small library of synthesized compounds, with further enhanced potencies. Each compound features an electrophilic “warhead”, designed to form covalent bonds, and a thymidine “directing group” complementary to the Cps2L substrate-binding site. Several compounds bearing aldehyde-based warheads demonstrated potency comparable to or exceeding that of TDP-Rha, the endogenous allosteric inhibitor of Cps2L.

Conclusions: These structure-activity relationship studies reveal how linker length as well as warhead properties and positioning influence inhibitor potency. Together, this work introduces the first low micromolar synthetic inhibitors of Cps2L and lays framework for a new class of reversible-covalent antibiotics that target bacterial thymidylyltransferases.

6: LET'S GET KIDS TALKING ABOUT VACCINES: AN EXPLORATORY ANALYSIS OF KNOWLEDGE MOBILIZATION IN NEW BRUNSWICK AND ALBERTA PUBLIC MIDDLE SCHOOL QUADRIVALENT MENINGITIS VACCINATION PROGRAMS

Authors: Jaden Tanner

Affiliation: Department of Microbiology and Immunology, Dalhousie University

Introduction: Implementation of vaccine recommendations is supported through public immunization efforts that include efforts such as school-based immunization programs (SBIPs). Canadian SBIPs aim to reduce access barriers and increase vaccination rates, supplying youth with vaccines while presenting opportunities to introduce information about immunization, preventable disease vaccination, and health. Recent research suggests that integrating knowledge mobilization (KMb) strategies into public health programming may elicit behaviour change by engaging audiences with evidence-based information in a dynamic and inclusive manner. This study aimed to explore if and how KMb strategies are used in Alberta and Maritime middle school immunization programs, while identifying current practices and challenges within these programs.

Methods: A multi-case study explored AB and Maritime provincial quadrivalent meningitis C, HPV, and flu SBIPs. The SPIDER framework was used to develop both research question and relevant search terms. Cases were constructed using publicly available documents retrieved from multiple databases (n=4), school, and healthcare websites. Data was extracted using queries to inform study objectives: the purpose of SBIPs, information provided to parents, students, and educators, the role of the nurse, identifying decision-makers and their responsibilities.

Results: Of 19 documents identified, 10 were included. Additional documents were retrieved from healthcare, school- and division-level websites. SBIPs were described in terms of KMb strategies, decision-makers, and responsibilities of SBIP developers. Nurses were most often responsible for the success, organization, and implementation of SBIPs. Information was largely aimed at parents and educators, most often focusing on HPV vs other vaccines. Use of integrated KMb was limited to mental health. AB documents focused on SBIPs, while Maritime provinces focused on information related to vaccines and disease.

Conclusions: SBIPs were directed at parents, minimally engaging students, thereby reducing opportunities for conversation with youth about vaccine practices and health decision-making. Integrating KMb in SBIPs may increase student engagement, providing increased opportunities to support vaccine literacy.

7: COPING WITH STRESS: HOW *PSEUDOMONAS AERUGINOSA* PROTEASES ACTIVATE THE INTEGRATED STRESS RESPONSE IN LUNG EPITHELIAL CELLS

Authors: Shannen Grandy, Dr. Zhenyu Cheng

Affiliation: Department of Microbiology and Immunology, Faculty of Medicine, Dalhousie University

Introduction: *Pseudomonas aeruginosa* is a Gram-negative bacterium and opportunistic pathogen. It is the most common pathogen to cause chronic lung infection in CF patients, resulting in exacerbated and chronic lung inflammation. *P. aeruginosa* secretes an abundance of virulence factors including proteases that, in combination with the inflammatory response, cause significant damage to host lungs. Our lab has found that inhibiting the integrated stress response (ISR) reduces inflammation, making the ISR a promising therapeutic target. The ISR consists of sensor kinases HRI, PKR, PERK, and GCN2, which become activated through various forms of cellular stress. These kinases phosphorylate eIF2α, inducing expression of downstream effector proteins such as the transcription factor ATF4. The goal of this study is to determine how the ISR impacts the cellular response to acute *P. aeruginosa* infection and the impact this has on infection outcomes. My hypothesis is that specific virulence factors such as secreted proteases activate the ISR during infection leading to a modulation of the inflammatory response.

Methods: Lung epithelial cells (A549 or 16HBE) were infected with *P. aeruginosa* or treated with one of the following four purified proteases from *P. aeruginosa*: elastase A (LasA), elastase B (LasB), alkaline protease (AprA), or protease IV (PrpL). Cell lysates were prepared for western blotting and blots were probed for ISR pathway targets or autophagy targets.

Results: *P. aeruginosa* infection of 16HBE cells resulted in increased expression of ATF4 and phosphorylation of eIF2α on western blots, indicating ISR activation. Additionally, all four purified proteases induced ISR activation in A549 cells. Interestingly, when LasB was added to cells lacking GCN2, phosphorylation of eIF2α did not occur. In contrast, cells lacking HRI, PKR or PERK retained ISR activation in response to LasB. These results indicated that LasB activates the ISR through the GCN2 kinase. GCN2 has been linked to autophagy, therefore 16HBE cells with and without GCN2 were treated with LasB and the accumulation LC3-II, a positive marker for autophagy, was measured via western blot. LasB treatment resulted in an increase in LC3-II accumulation in wildtype cells but not in cells lacking GCN2.

Conclusions: *P. aeruginosa* infection and the secreted proteases LasA, LasB, AprA, and PrpL activate the ISR in lung epithelial cells. LasB activates the GCN2 arm of the ISR which results in downstream activation of the ISR including ATF4 expression and autophagy induction.

8: A CANCER-CAUSING HERPESVIRUS ACQUIRES AN ENVELOPE AT THE NUCLEOPLASMIC RETICULUM

Authors: Alexa Wilson[1], Neale Ridgway[2], Craig McCormick[1]

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Introduction: There are no vaccines or reliable antiviral therapies for oncogenic herpesviruses. Human herpesviruses are classified into three subfamilies: alpha-, beta-, and gamma-herpesviruses. Upon reactivation, these viruses must assemble new progeny and exit the host cell to establish new infections. For decades, the prevailing model of herpesvirus nuclear egress described the virus budding through the peripheral nuclear membrane into the cytosol. Here, I demonstrate that Kaposi's sarcoma-associated herpesvirus (KSHV), a gammaherpesvirus, can obtain its envelope at the nucleoplasmic reticulum (NR)—an intranuclear membrane network that expands during lytic replication. This is the first record of a human gammaherpesvirus budding into the NR.

Methods: 120 000x super resolution transmission electron microscopy and 100 000x immunofluorescence microscopy was used to capture and illustrate KSHV capsids budding into the NR to obtain a primary envelope and exit the NR to gain access to the cytosol.

Results: During early KSHV replication, the nucleoplasmic reticulum (NR) expands, forming a network of tubules and vesicles throughout the host nucleus. Mature KSHV capsids are selectively loaded into the NR, where they acquire an envelope. Enveloped capsids then bud out at the NR-cytoplasmic interface, losing their envelope upon entering the cytoplasm.

The enzyme CCTα, involved in phospholipid synthesis, and VAPA, a key regulator of lipid transfer and endosome trafficking, both relocate to expanding NR regions. Their co-localization with lamin A/C-positive intranuclear structures continuous with the nuclear membrane confirms the NR identity of these compartments.

Conclusions: Current virology textbooks depict herpesvirus egress as occurring exclusively at the peripheral nuclear membrane. Here, I challenge this long-standing model, demonstrating that herpesviruses can undergo envelopment and de-envelopment at the nucleoplasmic reticulum (NR). This work redefines the fundamental understanding of herpesvirus nuclear egress and has significant implications for therapeutic strategies targeting viral release.

9: IDENTIFYING FACTORS OF SUCCESS IN IMPLEMENTATION OF AN INTERVENTION FOR MANAGEMENT OF INPATIENT BACTERIURIA

Authors: Breanna Laffin, Kyle Wilby, Jo-Anne Wilson, Paul Bonnar, Emily Black

Affiliation: Faculty of Health, Dalhousie University

Introduction: Antimicrobial resistance (AMR) is a global health threat largely driven by inappropriate antimicrobial use. A multifaceted intervention incorporating education, audit, and feedback was implemented at four regional hospitals in Nova Scotia to improve prescribing for inpatients with bacteriuria. The intervention had variable success, highlighting the need to understand barriers and facilitators influencing implementation at each site. This study aimed to identify factors that impacted success at individual, unit, and organizational levels.

Methods: This qualitative descriptive study used semi-structured virtual interviews. Pharmacists involved in developing, implementing, or delivering audit and feedback were invited to participate. Interviews were transcribed verbatim and deductively coded to the Consolidated Framework for Implementation Research (CFIR), followed by inductive thematic analysis within each CFIR domain to identify local implementation factors.

Results: All eight invited pharmacists participated. Analysis identified barriers and facilitators across study sites, with most themes falling within the CFIR's inner and outer setting domains. Barriers in both settings included "staffing challenges", and "overuse of microbiology testing," which affected sustainability. Facilitators such as "interprofessional relationships" and "tailoring of the intervention to professional roles" positively influenced implementation. Interconnected factors shaping the intervention's success were identified in these findings.

Conclusions: Barriers and facilitators influencing this intervention were identified at individual, unit, and organizational levels. Findings will inform recommendations to optimize province-wide inpatient antimicrobial stewardship initiatives, with implications for improving practice, policy, and health outcomes in regional hospitals across Nova Scotia.

10: INITIAL SUMMARY AND ASSESSMENT OF OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY IN NOVA SCOTIA HEALTH, CENTRAL ZONE

Authors: Cameron J, Murphy V, Bonnar P, Reid EK

Affiliation: Nova Scotia Health Antimicrobial Stewardship Program

Introduction: Outpatient parenteral antimicrobial therapy (OPAT) can enable earlier discharge from hospital and improve quality of life for patients requiring long courses of IV antimicrobials. Nova Scotia (NS) currently lacks a formal program for clinical oversight of OPAT and no data is collected on the utilization and outcomes. To better understand the local OPAT landscape, we performed a chart review to characterize patient volume, infection types, antimicrobial regimens, referring services, complications, and appropriateness of OPAT in NS Health Central Zone.

Methods: Identifiers were collected for consecutive patients referred for OPAT in Central Zone from January 8 to February 9, 2024. Available electronic health records were reviewed retrospectively for relevant patient and therapy details. Antibiotic appropriateness was assessed using National Antimicrobial Prescribing Survey (NAPS) criteria.

Results: Fifty-one unique patients were referred, and 44 patients were fully assessable. Referrals most often originated from inpatient settings (24/44; 55%). The most common infections were bone and joint (15/44; 34%), skin and soft tissue (9/44; 20%), and infective endocarditis (6/44; 14%). Of the 49 unique antimicrobials prescribed, the most common were cefazolin with probenecid (14/49; 29%), vancomycin (8/49; 16%), and ceftriaxone (8/49; 16%). The median duration of OPAT was 36 days (range: 2 – 208), and CADD pumps were infrequently used for administration (7/44; 16%). Antimicrobial orders were deemed appropriate in 74% of cases (36/49) and patients with Infectious Diseases involvement had higher rates of appropriateness (85% vs. 57%). Excessively long treatment duration was the most common reason for antibiotic inappropriateness. Complications included emergency department visits (15/44; 34%) and hospitalizations (7/44; 16%), with PICC-related issues accounting for 63% (27/43) of ED visits.

Conclusions: This review provides insight on OPAT utilization and appropriateness in Central Zone which was previously unknown. It also highlights the role for a clinical program with antimicrobial expertise to assist with OPAT decision-making and promote efficient resource utilization. We plan to complete a province-wide assessment of OPAT utilization in the coming months to further characterize and understand OPAT practices in NS.

Poster Abstracts

(Presenter's name in blue)

Poster 1

Title: PREVALENCE AND IMPACT OF RESPIRATORY VIRUSES ON PATIENT OUTCOMES: FOCUS ON HMPV, RSV, AND INFLUENZA. A REPORT FROM THE CANADIAN IMMUNIZATION RESEARCH NETWORK SOS NETWORK

Authors: Henrique Pott[1,3], Jason LeBlanc[1,4], May ElSherif[1,5], Todd Hatchette[1,4,6], Melissa K Andrew[1,2], Shelly A McNeil[1,6], on behalf of SOS Network Investigators

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Introduction: Human metapneumovirus (hMPV), influenza, and respiratory syncytial virus (RSV) contribute significantly to respiratory morbidity and mortality. This study compared the epidemiological patterns and clinical outcomes of these infections using data from the CIRN SOS Network to inform public health strategies.

Methods: The CIRN SOS Network gathered information on serious respiratory illnesses caused by hMPV, influenza, and RSV in five provinces between 2012 and 2015. This analysis focused on the survival rate of patients admitted to hospitals for these diseases over a 30-day period. The Kaplan-Meier method calculated the likelihood of survival, and Cox Proportional Hazard (Cox PH) models determined adjusted hazard ratios (HR) and 95% confidence intervals for mortality.

Results: The CIRN SOS Network gathered information on serious respiratory illnesses caused by hMPV, influenza, and RSV in five provinces between 2012 and 2015. This analysis focused on the survival rate of patients admitted to hospitals for these diseases over a 30-day period. The Kaplan-Meier method calculated the likelihood of survival, and Cox Proportional Hazard (Cox PH) models determined adjusted hazard ratios (HR) and 95% confidence intervals for mortality.

Conclusions: Our study examined the epidemiological patterns of hMPV infections, providing insights into its comparisons to Influenza and RSV. Although hMPV mortality was lower than that observed for RSV and Influenza, hMPV infection was still associated with complications and severe outcomes. The findings underscore the need for targeted public health strategies specifically addressing hMPV to better manage and mitigate its impact on respiratory health.

Poster 2

Title: OSELTAMIVIR REDUCES 30-DAY MORTALITY IN OLDER ADULTS WITH INFLUENZA: A REPORT FROM THE CANADIAN IMMUNIZATION RESEARCH NETWORK SOS NETWORK

Authors: Henrique Pott[1,3], Jason LeBlanc[1,4], May ElSherif[1,5], Todd Hatchette[1,4,6], Melissa K Andrew[1,2], Shelly A McNeil[1,6], on behalf of SOS Network Investigators

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Introduction: Oseltamivir is recommended for all adults hospitalized with influenza. Even so, adherence to this recommendation is suboptimal, perhaps owing to the ambivalence of providers about the quality of the evidence of benefit, particularly when initiation is delayed. We aimed to evaluate the effectiveness of oseltamivir in older adults hospitalized due to influenza, with attention to timing of initiation.

Methods: The CIRN-SOS Network collected data on severe respiratory illnesses during influenza season in five Canadian provinces from 2012 to 2019. The study included individuals 65 and over with confirmed influenza and accessible information about their antiviral prescriptions, and compared the 30-day survival rates of hospitalized patients based on whether the participants were prescribed oseltamivir. The Kaplan-Meier approach was used to estimate the probability of survival. IPT-weighted Cox proportional hazard models were used to estimate hazard ratios (HR) and 95% confidence intervals for mortality. Analyses were further stratified by time to antiviral initiation (>48 vs. ≤48 hours).

Results: Of 8,135 patients with influenza, 2,126 received no antiviral treatment, while 6,009 received oseltamivir. Mortality within 30 days of hospitalization was 8.4%, with most deaths (53.9%) occurring during the first week of hospitalization. There was a significant difference in the 30-day survival probability between patients who received oseltamivir and those who did not (log-rank p-value < 0.001). The IPT-weighted HR indicated that individuals who received oseltamivir had a 0.69-fold (95% CI, 0.58-0.83; p < 0.001) lower risk of 30-day mortality than those who did not receive antivirals. This survival benefit was seen for influenza A (HR=0.66 [95% CI, 0.53-0.82]; p < 0.001) but not for influenza B (HR=0.80 [95% CI, 0.57-1.12]; p = 0.189). Oseltamivir was effective even when administered more than 48 hours after hospital admission (IPT weighted HR=0.70, 0.51-0.95); Number Needed to Treat was 55. There was no mediating effect of influenza vaccination over oseltamivir effectiveness.

Conclusions: Oseltamivir is associated with a meaningful reduction in mortality risk among older adults hospitalized with influenza, even when administered >48 hours after admission.

Poster 3

Title: STI CARE NOW INITIATIVE: CHLAMYDIA TRACHOMATIS AND NEISSERIA GONORRHOEAE SELF-TESTING AND LINKAGE TO CARE

Authors: T.D. Ramsey[1,2], A. Joy[1], S. Opie[1], K. Merrick[1], A. Keenan[1], C. Heinstein[1], S.A. McNeil[1,2], T. Hatchette[1,2]

Affiliation: [1]Nova Scotia Health, [2]Dalhousie University, Halifax, NS

Introduction: Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) are on the rise in Canada. Accessible testing and linkage to care are crucial for identifying infections, reducing transmission, and providing care. Sexually Transmitted Infection (STI) Care Now is a multiphase Nova Scotia Health Research and Innovation Sprint and Emerging and Re-emerging Infections Network Initiative. Phase 1 aimed to enhance access to CT and NG self-testing and linkage to care.

Methods: STI Care Now was conducted in Halifax and Truro, Nova Scotia. The initiative implemented a CT and NG testing self-referral online webform, mailed self-testing materials with pre-paid supplies to return completed tests to the lab, notified patients by email or phone of test progress and negative results, linked those with a diagnosis of CT or NG to virtual care from a pharmacist, and referred patients for further care when needed. Quantitative referral metrics and quality improvement suggestions via an electronic patient experience questionnaire were collected.

Results: Between July 8, 2024 and February 27, 2025, the initiative received 2540 testing requests. Most testing requests, 87%, were eligible resulting in 2204 kits mailed with a 58% return rate (1273 kits). Kits were mailed to 1929 unique patients and 228 individuals requested more than one testing kit. Kits were predominantly sent to individuals between the ages of 20 and 40 (77%) who identified as a cis-woman (50%). Of the 1273 results, 1183 found no infection, 74 were positive for CT, and 15 were positive for NG providing a 7% positivity rate. All patients diagnosed with CT and NG were linked to care. The patient experience questionnaire had a 40% response rate (508 responses) and indicated a high degree of satisfaction including ease of use and convenience.

Conclusions: STI Care Now successfully connected individuals with CT and NG self-testing and care and has potential for future use with other STIs and blood-borne infections.

Poster 4

Title: INFLUENZA SEVERITY SCALE (ISS): PREDICTING MAJOR CLINICAL EVENTS AMONG HOSPITALIZED CANADIAN ADULTS WITH LABORATORY-CONFIRMED INFLUENZA INFECTION. A REPORT FROM THE CANADIAN IMMUNIZATION RESEARCH NETWORK

Authors: Henrique Pott[1,3], Jason LeBlanc[1,4], May ElSherif[1,5], Todd Hatchette[1,4,6], Shelly A McNeil[1,6], Melissa K. Andrew[1,2] on behalf of SOS Network Investigators

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Introduction: We developed and validated the Influenza Severity Scale (ISS), a standardized risk assessment for influenza, to estimate and predict the probability of major clinical events in patients with laboratory-confirmed infection.

Methods: Data from the Canadian Immunization Research Network's Serious Outcomes Surveillance Network (2011/2012–2018/2019 influenza seasons) enabled the selecting of all laboratory-confirmed influenza patients. A machine learning-based approach then identified variables, generated weighted scores, and evaluated model performance.

Results: This study included 12,954 patients with laboratory-confirmed influenza infections. The optimal scale encompassed ten variables: demographic (age and sex), health history (smoking status, chronic pulmonary disease, diabetes mellitus, and influenza vaccination status), clinical presentation (cough, sputum production, and shortness of breath), and function (need for regular support for activities of daily living). As a continuous variable, the scale had an AU-ROC of 0.73 (95% CI, 0.71–0.74). Aggregated scores classified participants into three risk categories: low (ISS < 30; 79.9% sensitivity, 51% specificity), moderate (ISS ≥ 30 but < 50; 54.5% sensitivity, 55.9% specificity), and high (ISS ≥ 50; 51.4% sensitivity, 80.5% specificity).

Conclusions: ISS demonstrated a solid ability to identify patients with hospitalized laboratory-confirmed influenza at increased risk for Major Clinical Events, potentially impacting clinical practice and research.

Poster 5

Title: RING RING, CALLING HEALTHCARE

Authors: Holly Gillis, Harold Taylor

Affiliation: Nova Scotia Health

Introduction: In early 2021, the Nova Scotia Government established a provincial toll-free number to book COVID-19 vaccine appointments and evolved to supporting Nova Scotians to complete an online webform for reporting positive rapid covid tests and access early COVID therapeutics. In summer 2023, this line was discontinued for booking vaccines and the Public Health Mobile Unit (PHMU) assumed this line for maintaining a phone option for people to access COVID test bookings and complete their webform for reporting positive rapid covid tests. The 833 number was being widely advertised on stickers and instructions affixed to thousands of rapid test kits distributed across the province, as a number for people to call if they required assistance with completing the “Report and Support” form to access COVID early-therapeutics. The decision to maintain this line was determined through a co-leadership model of Central Zone’s COVID services and PHMU. In fall 2023, Nova Scotia Government requested an expansion of services back to also support vaccine booking.

Methods: The phone line transferred from a landline to a digital service. Data collection was captured on the metrics of the callers. This data collection moved from excel to REDcap online system in January 2024. A resource script was created to support booking clerks answering the calls.

Results: Over 100,000 Nova Scotians have been supported with accessible telephone-based healthcare service. Callers are booked into vaccine or respiratory virus testing appointments or provided with responses on ineligibility. Each caller is provided with the information they are looking for including navigation for other immunization access, public health, COVID test results and other health system information.

Conclusions: A toll-free line enhances healthcare access and supports people to access services they might not otherwise follow through with. Many community members rely on more than online access to be successful with preventative health service. This line enhanced immunization during 3 significant vaccine campaigns over 2023-2025.

Poster 6

Title: ANTIMICROBIAL ADMINISTRATION DELAYS IN PATIENTS WITH SUSPECTED SEPSIS IN A CANADIAN EMERGENCY DEPARTMENT: PREVALENCE AND RISK FACTORS

Authors: K. Kaupp, S. Smit, S. Burgess, E. Black, O. Loubani, M. MacKenzie

Affiliation: Nova Scotia Health

Introduction: Timely administration of antimicrobials in sepsis is imperative, with evidence demonstrating an increase in mortality associated with delays. The primary objective of this study was to determine if delays in antimicrobial administration exist among patients with sepsis admitted through the Queen Elizabeth II Health Sciences Centre ED (QEII-HSC-ED).

Methods: A single centre, health records review of adult patients admitted with sepsis through the QEII-HSC-ED between January 1, 2021, and December 31, 2022, was conducted. A first dose delay was considered significant if the antimicrobial was administered more than 1-hour after being prescribed. Subsequent dose delays were considered significant if a) the delay was greater than or equal to 125% of the recommended interval (antimicrobial remained the same OR antimicrobial was changed to an agent with a narrower spectrum of activity) or b) the antimicrobial was administered more than 1-hour after it was prescribed (new antimicrobial was added OR antimicrobial was changed to an agent with a broader spectrum of activity).

Results: In total 275 patient encounters were included containing 1208 antimicrobial doses, 275 first and 933 subsequent doses. Of 275 patient encounters, 216 (78.5%) had at least one significant dose delay, 135 (49.1%) first dose and 169 (61.5%) subsequent dose delays. Subsequent doses were found to be significantly delayed 276 times (29.6%). Surgical patients were found to have a reduced odds of experiencing a significant subsequent dose delay (OR 0.25, 95% CI 0.08 – 0.77).

Conclusions: Patients admitted through the QEII-HSC-ED with sepsis are experiencing significant antimicrobial administration delays of both first and subsequent doses which may increase their risk of negative outcomes. These results can be used for future initiatives aimed at improving time to administration of antimicrobials in patients admitted with sepsis.

Poster 7

Title: ACUTE HUMAN IMMUNODEFICIENCY VIRUS CONFIRMATION USING REFLEX VIRAL LOAD TESTING ON SERA

Authors: Alexander Pupek[1], Colleen Jackson[2], Darren Sarty[2], Jason J LeBlanc[1,2], Todd F Hatchett[1,2]

Affiliation: [1]Dalhousie University, Halifax, NS, Canada. [2]Division of Microbiology, Department of Pathology and Laboratory Medicine, Nova Scotia Health, Halifax, NS, Canada.

Introduction: In Nova Scotia, HIV serology uses a 4th generation chemiluminescent microparticle immunoassay (CMIA) for HIV-1 p24 antigen and HIV-1/2 antibody detection, followed by an HIV-1/2 immunoblot for antibody confirmation. In CMIA(+)/immunoblot(-) cases, p24 antigen testing is referred out to assess the possibility of acute HIV; results can take weeks. To expedite acute HIV detection, this study evaluated whether HIV RNA detection locally on serum could replace p24 testing.

Methods: The ARCHITECT HIV Ag/Ab Combo and BioRad Geenius HIV-1/2 assay were used for CMIA and immunoblot. The National Laboratory for HIV Reference Services Testing performed p24 antigen testing. For RNA detection, the Roche cobas HIV-1 Quantitative Assay was used. Serum and plasma viral loads were initially compared in 44 CMIA(+)/immunoblot(+) patients. Then, sera showing CMIA(+)/immunoblot(-) or CMIA(+)/immunoblot-indeterminate results following routine diagnostic testing were subjected to p24 testing and serum viral loads. These results were compared to a paired plasma viral load and follow-up serology.

Results: Paired serum and plasma viral loads in CMIA(+)/immunoblot(+) patients showed excellent correlation (R^2 = 0.9956) spanning 10^1 to 10^8 IU/ml. In routine diagnostic testing, 9 CMIA(+)/immunoblot(-) cases had high-level RNA in both serum and plasma. Of these cases, 8 were p24 antigen positive; all seroconverted. In the two CMIA+/immunoblot-indeterminate cases, neither were p24 positive. One patient eventually seroconverted, and both serum and plasma samples had low-level RNA at 343 and 61 IU/ml. In the second case, the patient never seroconverted and the plasma viral load was negative; low-level RNA (64 IU/ml) was detected in the serum, which was deemed a false positive.

Conclusions: Reflex HIV-1 viral loads on sera is effective for rapid confirmation of acute HIV infection. However, low-level detections (<1000 IU/ml) should be confirmed with repeat serology and plasma viral loads to avoid false positives.

Poster 8

Title: ANTIMICROBIAL USE AND INFECTION CONTROL AMONG PATIENTS WITH INFLUENZA

Authors: Ziyad Allehebi[1,2], Yahya Shabi[3], Emma K. Reid[4], Glenn Patriquin[5], Paul Bonnar[2]

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Introduction: Annual influenza infections lead to increased hospitalizations, healthcare costs, and productivity losses due to illness-related absenteeism. Canadian guidelines recommend starting antiviral treatment, including oseltamivir, as soon as possible for adults hospitalized with influenza regardless of illness duration prior to hospitalization. Also, delayed diagnosis and implementation of precautions can contribute to nosocomial transmission and outbreaks. In this study, we aimed to review the local practice of antiviral use and precautions among adult inpatients with influenza to guide future interventions.

Methods: A retrospective review was conducted based on positive influenza test reports for hospitalized patients and patients who visited urban Nova Scotian emergency departments during the 2023-2024 influenza season. Using a randomized sample, we measured the number of patients who received antiviral medications appropriately and the appropriateness of Infection Prevention and Control (IPAC) precautions.

Results: We reviewed 126 patients randomized from 567 total influenza cases. IPAC measures were implemented and clearly documented in only 27.8% of patients at the time the swab was done. Only six patients of 126 received oseltamivir empirically before the positive influenza swab result. Overall, 50% of patients received oseltamivir, and 81% of those who needed oxygen were prescribed oseltamivir. The mean time to starting oseltamivir from the time of testing was 34 hours and the time to start after the time of result return was 10.5 hours.

Conclusions: Our study demonstrated an insufficient documentation for the time of IPAC measure implementation. There was a suboptimal use of oseltamivir during influenza season with substantial delays in initiating therapy.

Poster 9

Title: RECENT RISE OF MACROLIDE/CLINDAMYCIN-RESISTANT INVASIVE GROUP A STREPTOCOCCUS IN NOVA SCOTIA ATTRIBUTED TO THE EMERGENCE OF *EMM* TYPE 92

Authors: P. Robertson[1], A. Polsky[2], Z. Robar[2], G. R. McCracken[3], A. Loder[4], D. Gaston[3], J. Pettipas[5], E. Simms[1,3,5], A. Griffith[4], A. Golden[4], I. Martin[4], R. J. Davidson[1-3], J. J. LeBlanc[1-3]

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Introduction: Invasive group A streptococci (iGAS) is a significant cause of morbidity and mortality. While universally susceptible to beta-lactams, macrolide and lincosamide (i.e., clindamycin) resistance is possible. As iGAS cases have recently increased nationally, this study investigated whether macrolide/lincosamide resistance has changed in NS.

Methods: Isolates from years 2023/2024 were subjected to a D test on Mueller Hinton agar with 5% sheep blood using disks containing 15µg erythromycin and 2µg clindamycin. Macrolide-resistant strains were subjected to sequencing to characterize *emm* types as well as investigate presence of antibiotic resistance genes [*ermB*, *ermT*, and *ermTR* encode ribosome methylases that mediate resistance to macrolide, lincosamide, and streptogramin B (i.e., MLS_B phenotype) or and the *mefA/E* genes encode an efflux pump conferring resistance to macrolides only (i.e., M phenotype)].

Results: Of 242 iGAS isolates tested from years 2023/2024, 67 (27.7%) were resistant to macrolides and 63(26.0%) to clindamycin. Of macrolide-resistant iGAS, 4 were attributed to efflux [emm12(2), 58(1), or 82(1)]. Eleven iGAS had a constitutive MLS_B phenotype [emm11(5), 28(1), 1(1), 73(2), 82(1), and 87(1)] linked to *ermB* or *ermTR*. Finally, 52 iGAS had an inducible MLS_B phenotype [emm92(37), 83(4), 77(4), 58(3), 89(2), 81(1), and 102(1)]. The $iMLS_B$ phenotypes in emm58, 77, 81, and 83 were attributed to *ermTR*, *ermB* was found in emm102, and *ermT* was found in the most predominant macrolide-resistant strain emm92 as well as emm89.

Conclusions: At 26.0%, macrolide-resistance in NS iGAS is nearly double the national rate (of 14.1%). This far exceeded the <10% rates seen in the pre-COVID-19 pandemic era in NS (9.1% in years 2012-2016 and 8.8% in years 2017-2019). In NS in years 2023/2024, emm92 represented more than all other macrolide-resistant iGAS types combined at 55%. Emm92 had not circulated prior to 2023 (and remains scarce nationally). In the US, macrolide-resistant emm92 was shown to carry a plasmid-borne inducible *ermT,* and all emm92 in this study harbored an inducible *ermT.* With recent rise of macrolide/lincosamide resistance attributed to and an inducible *ermT* in emm92 as well as another iGAS type (emm89), ongoing surveillance is needed to monitor this changing epidemiology of macrolide/lincosamide resistance in iGAS.

Poster 10

Title: INVESTIGATING THE ROLE OF AID ENZYME IN IMMUNE RESPONSE AGAINST *CHLAMYDIA* INFECTION

Authors: Parnian Jahanbani[1,2], Katherine Wang[1,2], Jun Wang[1,2]

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Introduction: *Chlamydia trachomatis* is the leading cause of bacterial STI worldwide. This pathogen preferentially targets epithelial cells of the reproductive tract. If left untreated, it can lead to pelvic inflammatory diseases and infertility. While the cellular immunity, especially Th1 response, has the primary role in host defense against *Chlamydia,* humoral immunity is also of a great importance in response to this infection. B cell-mediated humoral response relies on the formation of structures in lymphoid organs named germinal centers, in which B cells interact with cognate follicular T helper (Tfh) cells and acquire the ability to transform into memory B cells and high affinity IgG producing plasma cells. Germinal center reaction is governed by a key enzyme named Activation Induced cytidine Deaminase (AID). It is proven that impairment in AID results in compromised IgG production and hyper IgM syndrome. But how AID deficiency impacts B cell phenotype and its interaction with cellular immunity is not fully understood.

Methods: AID knockout and wild type mice are intravaginally infected with five doses of *Chlamydia muridarum*. At different timepoints after infection (D10, D17, D30, D53) mice are euthanized and various organs (spleen, iliac lymph nodes, genital tract) are collected. Several assays including flowcytometry, qPCR, cytokine ELISA and are done to characterize immune response.

Results: Our preliminary data show that AID deficiency has a critical role in clearance of secondary but not primary Chlamydia infection. In addition, AID impairment leads to B cell hyper-activation and -proliferation. Furthermore, in the absence of AID, the balance between Th1/Tfh cell differentiation is impaired which results in deficient cellular response against *Chlamydia*.

Conclusions: AID deficiency not only impairs IgG production by B cells, but also impacts other aspects of immune response including B cell function, helper T cells balance, cellular immunity and bacterial clearance.

Poster 11

Title: PROFILING THE HOST RESPONSES TO RESPIRATORY *BORDETELLA PERTUSSIS* INFECTION IN HUMAN VOLUNTEERS

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Introduction: Despite high vaccine coverage, pertussis, commonly known as whooping cough, remains a significant public health concern worldwide. Our understanding about the intricate interplay between pathogen and human immune system is crucial for developing new effective vaccines. A Controlled Human Infection Model (CHIM) was established by researchers at the Canadian Center for Vaccinology. Healthy adult volunteers with equal sex and infant vaccination (wP vs aP) history were intranasally challenged with different doses of *B. pertussis* and observed as inpatients for 16-21 days. Various biological specimens (blood, nasopharyngeal aspirate, and nasal wash) were collected the day before and at multiple time points after challenge. The goal of this research project is to identify key immune components involved in host susceptibility to the *B. pertussis* infection.

Methods: Participants were classified into three clinical outcome groups: spontaneous clearance, asymptomatic infection (colonization without symptoms), and symptomatic infection (colonization with symptoms) according to defined clinical parameters. Multi-color flow cytometry was used to longitudinally monitor cellular responses to the *B. pertussis* challenge and Luminex assay was used to examine the soluble mediators in nasal washes at selected time points. The results were analyzed in all participants before and after challenge and compared between three groups.

Results: The flowcytometry panel used effectively monitored major immune cell subsets in peripheral blood samples. These include neutrophils, monocytes, natural killer (NK) cells, and mucosal associated invariant T cells (MAIT), as well as T cells and B cells. Our preliminary data showed that participants with and without clinical symptoms displayed a distinct early innate immune activation profile that involved different subsets of innate immune cells.

Conclusions: The role of early innate cellular immune responses in controlling host susceptibility to *B. pertussis* following exposure warrants further investigation.

Poster 12

Title: THE INTERSECTIONALITY OF HUMAN PAPILLOMAVIRUS (HPV) VACCINE HESITANCY IN NOVA SCOTIA, CANADA: AN EXPLORATORY STUDY

Authors: Noah Doucette, Audrey Steenbeek, Jennifer Lane

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Introduction: Human Papillomavirus (HPV) is the most common sexually transmitted infection, responsible for more than 630,000 new cancer diagnoses annually. Vaccination remains the most effective way of preventing HPV-related infections and diseases, yet uptake remains below national targets, particularly among various Canadian sub-populations (e.g., transgender individuals, men who have sex with men, young adults).

Existing evidence about HPV vaccine hesitancy- an attitude/sentiment of indecision/uncertainty that precedes one's decision to become vaccinated (or not)- focuses predominantly on gendered experiences of hesitancy, with scant attention to other vital determinants of uptake (e.g., sexual orientation, race/ethnicity, age, etc.).

Methods: We propose a multi-phased project to explore the intersectionality of HPV vaccine hesitancy in Nova Scotia. Phase 1 will include a scoping review to map out existing determinants of HPV vaccine uptake across social categories of identity (e.g., sex, gender, race/ethnicity, age, etc.). Phase 2 will involve purposeful selection of 20 diverse service users (10 vaccinated & 10 unvaccinated) and 10 service providers to complete interviews (informed by phase 1 findings) exploring their perspectives and/or experiences of HPV vaccine hesitancy. Interview findings will be organized by the 5C model of vaccine acceptance and hesitancy. Using a collaborative approach (e.g., focus groups), phase 3 will develop HPV vaccine promotion material (e.g., prevention messaging) aimed at normalizing inclusive vaccine uptake.

Results: Anticipated findings include: advancing the science of HPV vaccine hesitancy, understanding determinants of HPV vaccine uptake across social categories of identity, and providing recommendations for making equitable advances to HPV vaccine delivery.

Conclusions: Understanding the intersectionality of HPV vaccine hesitancy can normalize inclusive and equitable vaccination, particularly among under-represented and under-vaccinated Nova Scotian populations.

Poster 12A

Title: IMPROVING INFLUENZA VACCINE UPTAKE AMONGST ADULT KIDNEY TRANSPLANT RECIPIENTS: A MIXED-METHODS STUDY

Authors: Erin McConnell, Christine Cassidy, Audrey Steenbeek

Affiliation: Dalhousie University

Introduction: Kidney transplant recipients (KTRs) are immunocompromised and more susceptible to infections like influenza. Despite their increased risk of severe illness and mortality with influenza infection, uptake of the influenza vaccine is sub-optimal amongst KTRs, warranting further investigation. The main objectives of the proposed, mixed-methods design include: (Obj. 1) Examine barriers and facilitators to influenza vaccine uptake amongst KTRs in Nova Scotia; (Obj. 2) Co-design tailored implementation strategies to support influenza vaccine uptake in KTRs.

Methods: A scoping review will be utilized to map existing evidence on vaccine hesitancy and KTRs. Review findings will then be used to inform a qualitative study guided by the Behaviour Change Wheel (BCW) and Theoretical Domains Framework. Semi-structured interviews on the barriers and facilitators to influenza vaccine uptake in KTRs will be conducted with KTRs and clinicians (Obj. 1). We will use the BCW to map implementation strategies onto the identified barriers and facilitators. Nominal group technique will be conducted to assess the implementation strategies on their affordability, practicability, effectiveness and cost-effectiveness, acceptability, side-effects/safety and equity (Obj. 2).

Results: This project will explore knowledge and gaps in influenza vaccine uptake with a unique population with complex health needs and considerations. Understanding the barriers and facilitators to vaccine uptake amongst KTRs is integral to addressing vaccine hesitancy systematically in this vulnerable population. Using an integrated knowledge translation approach, which meaningfully engages patient partners and other knowledge users, will ensure the relevancy and responsiveness of the project to end-user needs and priorities. The findings will be used to tailor appropriate implementation strategies to enhance influenza vaccine uptake. The insight gained from selecting, tailoring and evaluating implementation strategies in this context can also help inform vaccine uptake in other priority populations.

Conclusions: The proposed research will explore vaccine hesitancy and factors impacting vaccine uptake in KTRs. Based on the findings, evidence-informed implementation strategies will be tailored to improve influenza vaccine uptake and ultimately, health outcomes amongst KTRs.

Poster 13

Title: EFFECTS OF BALOXAVIR RESISTANCE MUTATIONS ON PA-X MEDIATED HOST SHUTOFF BY INFLUENZA A VIRUS

Authors: Jack R. Case, Denys A. Khaperskyy

Affiliation: Dalhousie University

Introduction: The polymerase acidic (PA) protein is a subunit of the trimeric influenza A virus (IAV) RNA-dependent RNA polymerase and the target of the anti-influenza drug baloxavir marboxil (BXM). Since its introduction, multiple BXM resistance-associated mutations in the PA nuclease domain have been identified, with I38T and I38M amino acid substitutions occurring frequently. These mutations have been reported to have minimal to no effect on viral polymerase activity, virus replication, or transmission in animal models. However, for reasons that are not well understood, viruses with BXM resistance substitutions have not been able to compete with parental wild-type strains. The IAV genome segment encoding PA also encodes the host shutoff nuclease PA-X, which shares the endonuclease domain with PA but has a unique C-terminal domain accessed through ribosomal frameshifting. Because PA-X shares the nuclease domain with PA, it contains the BXM binding site and any BXM resistance-associated substitutions. Unlike their effects on PA activity, the effects of BXM or the I38T/M substitutions on PA-X function remain uncharacterized.

Methods: PA-X and a fluorescent reporter were co-transfected in HEK293A cells. A decrease in reporter fluorescence was used to measure PA-X host shut off activity. Recombinant H1N1 viruses with I38T/M substitutions in PA were used in immunofluorescence- and qPCR-based assays in A549 cells. These viruses were also used to generate growth curves in MDCK cells.

Results: Using transfection-based reporter assays, we show, for the first time, that baloxavir acid (active metabolite of BXM) inhibits PA-X activity in a dose dependent manner. We also show that the I38T/M mutations impair the host shutoff activities of PA-X proteins from different strains of IAV of H1N1, H3N2, and H5N1 subtypes. Using cell culture infection models with recombinant H1N1 viruses with I38T/M substitutions in PA, we demonstrate that BXM-resistant viruses lack key phenotypic markers of host shutoff and maintain higher levels of host transcripts compared to cells infected with wild-type viruses.

Conclusions: The high genetic conservation of IAV PA-X points to its important role in viral fitness. Our work suggests that the deleterious effects of the BXM resistance mutations on PA-X function may represent an important barrier to the spread of viruses that acquire this substitution.

Poster 14

Title: CHARACTERIZATION OF ERK MITOGEN-ACTIVATED PROTEIN KINASE ACTIVATION BY *PSEUDOMONAS AERUGINOSA* PROTEASE IV

Authors: L. Burton, R. Nickerson, Z. Cheng

Affiliation: Dalhousie University

Introduction: *Pseudomonas aeruginosa* is an opportunistic bacterial pathogen capable of causing a variety of infections. One of *P. aeruginosa*'s secreted virulence factors, protease IV (PrpL), was found to exacerbate inflammation in lung infection and degrade proteins important for host immunity. Previously, our lab found that PrpL activates a conserved inflammatory signaling pathway, the extracellular-signal regulated kinase (ERK) mitogen-activated protein kinase pathway. In this study, we investigated how PrpL activates this pathway and the resulting inflammatory effects.

Methods: Purified PrpL was intratracheally instilled into the lungs of mice at a dose of 0.5 µg per g body weight. Inactive mutant PrpL was used as a negative control, and *P. aeruginosa* lipopolysaccharide (LPS) served as a positive control. Lungs and bronchoalveolar lavage fluid (BALF) were collected at various timepoints post-instillation (2, 4, 8, 12, 16, and 24-hours). Lung homogenate was used for western blotting analysis to detect activation of ERK and other related signaling proteins, and cytokines were measured in BALF and lung by ELISA.

Results: Mice that received wild-type PrpL, LPS, or both PrpL and LPS experienced similar weight loss and clinical symptoms. PrpL and/or LPS also resulted in increased levels of inflammatory cytokines IL-1β, IL-6, and TNF. Phosphorylation (activation) of ERK was more strongly induced following PrpL instillation compared to LPS. ERK activation was observed as early as 2-hours post-instillation, peaked starting at 4-hours, and remained elevated at 24-hours. The lungs also showed phosphorylation of c-Jun and c-Fos, which are subunits of the AP-1 transcription factor that can assemble downstream of activated ERK.

Conclusions: PrpL was shown to activate ERK in the lungs of mice as early as 2-hours post-instillation. Activation of c-Jun and c-Fos was also detected in the PrpL-treated lungs, suggesting that activated ERK is triggering the assembly of AP-1. This transcription factor is known to lead to inflammasome formation, and this may be responsible for the inflammatory cytokines that we see in response to PrpL. This project is ongoing, and future directions include mapping the upstream signaling cascade leading to ERK activation.

Poster 15

Title: HOW DO INDIVIDUALS DECIDE TO VOLUNTEER FOR PARTICIPATION IN A PHASE 1 TRIAL OF A COVID-19 VACCINE? A MODIFIED GROUNDED THEORY STUDY

Authors: Bailey M Selig[1], Donna Halperin[1,2], Joanne M Langley[1], Scott Halperin[1]

Affiliation: [1]Canadian Center for Vaccinology; [2]St. Francis Xavier University

Introduction: Phase 1 vaccine trials assess safety, dosage, and immune response in healthy volunteer participants (VPs). These trials pose potential risks with little personal benefit. While VP motivations have been explored in broader clinical trials, phase 1 vaccine trials remain understudied. Existing research often relies on surveys with predefined responses, limiting insight into VP decision-making (DM). Understanding motivating factors, especially in the pandemic context, is critical for improving recruitment and retention in future trials.

Methods: This study used a modified grounded theory approach to analyze DM in two phase 1 COVID-19 vaccine trials at our center. Semi-structured interviews (n=37) were conducted at trial entry and completion to capture evolving motivations. An interpretive framework guided data analysis, allowing theory to emerge from participant-led insights.

Results: Interview data from VPs (n=32) and non-VPs (n=5) informed a theoretical model of the DM process and contributing factors. The core category, "*Harmonizing Self and Circumstance Amid a Pandemic"* captures evolving participation in 2 phases: 1) Foundational Motivations, shaped by personal (health, curiosity), professional (field of work), and altruistic (contributing to pandemic efforts) factors; and 2) Re-evaluation and Adaptation, as VPs reassessed their decision in response to emerging factors, such as an approved vaccine's availability.

Conclusions: This study highlights key influences on trial participation in an evolving context. Findings emphasize the dynamic nature of trial engagement, illustrating how external shifts and personal factors shape VP commitment. These insights inform strategies to enhance VP trust, participation, and retention by addressing concerns, improving communication, and adapting to shifting trial landscapes. Strengthening transparency and responsiveness to participant needs is essential for sustaining engagement in future vaccine research.

Poster 16

Title: PARENTAL ACCEPTABILITY OF NEW PREVENTIVE THERAPIES FOR RESPIRATORY SYNCYTIAL VIRUS IN INFANTS: A CROSS-SECTIONAL SURVEY IN CANADA

Authors: MacDonald J., Fitzpatrick T., Brundin-Mather R., Parsons Leigh J., Halperin D.

Affiliation: Canadian Center for Vaccinology

Introduction: Respiratory syncytial virus (RSV) is the leading cause of infant hospitalization. In 2023, Health Canada approved two new preventive options: (1) RSVpreF (Abrysvo), a vaccine for pregnant individuals, and (2) nirsevimab (Beyfortus), a long-acting monoclonal antibody for infants. Prior to immunization program implementation, we surveyed Canadian parents to assess RSV knowledge, product acceptability, and factors influencing their immunization decisions.

Methods: We conducted an anonymous, bilingual online survey of parents who had a baby within the past 12 months and those expecting a baby. A polling firm recruited a sample nationally representative by region, sex, age, income, and education. Our primary outcomes were parents' willingness *(disagree, undecided, agree*) to: (1) receive or support their partner receiving RSVpreF during pregnancy, and (2) immunize their baby with nirsevimab. We used descriptive statistics to summarize responses and logistic regression to identify factors associated with parental acceptance of RSV immunization.

Results: In July 2024, we collected 1,015 surveys, including 49% expecting and 51% recent parents. Although 79% had heard of RSV, only 7.6% knew how common RSV is, 27.3% recognized its severity, and 6.8% understood the term 'monoclonal antibody'. Approximately 71% accepted at least one preventive option; 61.5% for RSVpreF and 58.9% for nirsevimab. Acceptance of either product was higher among older, more educated, and higher income parents, and among those who reported Tdap or influenza vaccination or intention. Unexpectedly, parents with a medically high-risk child had lower odds of accepting RSVpreF (OR 0.43, CI 0.27–0.69) or nirsevimab (OR 0.36, CI 0.22-0.60), as did those who self-researched RSV monoclonal antibody products (OR 0.51, CI 0.30–0.88). Safety, effectiveness, and perceived RSV risk were key factors influencing immunization decisions, as was healthcare provider recommendation, but less so among hesitant parents.

Conclusions: Parental acceptance of new preventive therapies is critical to reduce RSV in infants. Addressing concerns and improving communication are key to successful program uptake.

Poster 17

Title: ENGAGING ADULTS IN CANADA TO UNDERSTAND AND ADDRESS THE IMPACT OF VACCINE COMMUNICATION IN THE COVID-19 PANDEMIC ON FUTURE VACCINATIONS: IMPLICATIONS FOR PUBLIC HEALTH MESSAGING

Authors: Jade MacDonald, Jeanna Parsons Leigh, Stephana Julia Moss, Sara Mizen, Cristina Zuniga Chacon, Michal S. Cherak, Henry T. Stelfox, Ève Dubé, Kirsten M. Fiest, Donna M. Halperin, Sofia B. Ahmed, Shannon E. MacDonald, Sharon E. Straus, Terra Manca, Josh Ng Kamstra, Andrea Soo, Scott A. Halperin

Affiliation: Dalhousie University, Canadian Center for Vaccinology

Introduction: Vaccine hesitancy increased after the COVID-19 pandemic. We sought to develop a comprehensive understanding of vaccine-related information needs among adults in Canada to co-create effective vaccine communication and messaging interventions.

Methods: Participants (≥18 years) were purposively sampled (age, sex, gender, geographical region) between December 2023 and February 2025 for a multi-phased study. First, semi-structured interviews were conducted to understand how experiences with vaccine-related information and communication challenges during the COVID-19 pandemic impacted vaccine intentions and behaviours. Second, two rounds of serial focus groups informed by the Theoretical Domains Framework were conducted to evaluate specific needs of two vaccine profiles (Cautious Acceptors & Fence-sitters). Communication and messaging interventions were developed (Round 1) and iteratively refined (Round 2).

Results: Sixty-two interviews were conducted. Most participants were woman (n=32, 51.6%); the median age was 44 years. Mapped to the Information-Motivation-Behavioral Skills Model, themes included: 1) accessibility of information; 2) ability to assess information accuracy and validity; 3) trust in communications from practitioners and decision-makers; and 4) information seeking behaviors. Eight focus groups were conducted (4 per round) with 31 total participants (61.3% [n=19] Cautious Acceptors; 38.7% [n=12] Fence-sitters). Most participants were women (n=16, 51.6%); the median age was 50 years. Themes from discussions included: 1) confidence in the message; 2) distrust in the message; 3) engaging with the message; 4) clear understanding of the message; and 5) positive perceptions of the message. Cautious Accepters preferred vaccine-related information to be evidence-based and originate from governmental and public health sources. While Fence-sitters also preferred vaccine-related information to be evidence-based, they preferred that government or public health authorities were not the source of information. Three vaccine communication and messaging interventions (per vaccine profile; 6 total) were co-created.

Conclusions: Findings highlight the need for targeted vaccine communication and messaging interventions that deliver vaccine-related information to diverse vaccine profiles. Future work includes pilot testing the intervention to assess acceptability and perceived effectiveness.

Poster 18

Title: UNDERSTANDING WHAT PATIENTS, PARENTS, FAMILIES, AND CARERS UNDERSTAND, NEED AND WANT TO KNOW ABOUT MENB AND MENB VACCINATION: A QUALITATIVE STUDY

Authors: S. Mizen[1], K. Salter[1], B.M. Selig[1], J. MacDonald[1], M. Kervin[1], J.M. Langley[1]

Affiliation: [1]Canadian Center for Vaccinology, Dalhousie University, IWK Health, Nova Scotia Health

Introduction: Invasive Meningococcal Disease (IMD) is an uncommon, but severe life-threatening disease, generally caused by one of six serogroups (A,B,C,W,X,Y) of the bacterium *Neisseria meningitidis*. Given the severity of IMD and limited public awareness about available vaccines, there exists a need for clearer information, guidelines, and recommendations on IMD, MenB and MenB vaccination. We interviewed patients, parents, families, and carers (PPFC) with lived experience to learn what they understand, need, and want to know about IMD, MenB and MenB vaccination.

Methods: Thirty-two semi-structured virtual interviews were conducted between November 2023 and July 2024 with PPFC from across Canada with lived experience with IMD/MenB or MenB vaccination. Framework analysis, informed by the CFIR and i-PARIHS Frameworks, was used to identify patterns within and across the interview transcripts.

Results: The analysis provided key insights into the current climate of IMD and MenB awareness among PPFC: 1) *The Urgency of Proactive Awareness*: Interviewees found the current approach was largely reactive, following cases/outbreaks, rather than the preferred proactive and ongoing approach to public education and awareness; 2) *Duty of Public Health (PH) to Inform and Educate*: PH was viewed as a trusted source of information and should take a leading role in disseminating information and raising awareness around MenB and MenB vaccination; 3) *The Impact of Personal Experience*: Stories describing personal experiences with MenB infection were valued and seen to elicit a profound public response; 4) *Shedding Light on Obstacles to MenB Vaccination*: Barriers to equitable access to the MenB vaccine should be identified, such as cost and limited availability of healthcare providers.

Conclusions: Findings show a need to implement effective MenB & MenB vaccination messaging, emphasizing the need to address knowledge gaps and tailor messages by incorporating stories of personal experience. PH seen as a trusted source that should be primarily responsible for disseminating information in a consistent, proactive manner to risk groups (targeting parents and university students) to address the massive knowledge and awareness gaps identified. Lastly, authorities should better communicate cost assistance options available to reduce financial barriers to MenB vaccination.

Poster 19

Title: EXPLORING SOLUTIONS TO COST-RELATED BARRIERS FOR RECOMMENDED BUT UNFUNDED VACCINES IN CANADIAN COMMUNITY PHARMACIES: A CANADIAN IMMUNIZATION RESEARCH NETWORK (CIRN) STUDY

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Introduction: Many vaccines recommended by the National Advisory Committee on Immunization are not publicly funded in Canada requiring individuals to pay out-of-pocket or use private insurance, which may contribute to low uptake. Research indicates that the public and many healthcare professionals perceive unfunded vaccines as having less value. Cost-related barriers are also important concerns among prescribers who may be hesitant to recommend unfunded vaccines due to concerns about affordability. This study explored key informant perspectives on a novel funding approach (i.e., a phased cost-reduction strategy) for recommended but unfunded vaccines (RUVs) implemented in community pharmacies.

Methods: Seventeen semi-structured interviews were conducted between April and October 2024 with government representatives, pharmacists, pharmacy associations, pharmacy regulatory authorities, private insurers, and advocacy organizations across Canada. Thematic analysis informed by the Theoretical Framework of Acceptability, was used to identify patterns within the transcripts.

Results: The analysis identified five key insights: 1) *Skepticism,* regarding the effectiveness and benefits of the proposed funding model; 2) *Burden on workload*, which could be addressed by offering compensation to pharmacies; 3) *Equal funding does not mean equitable access*, leading to concerns about financial inequities within this funding model; 4) *Untangling logistical challenges*, which included concerns and confusion on implementing this funding model and explaining the model to the public; and 5) *Improved access: When something is better than nothing*, with many respondents feeling that any reduction in cost is better than paying full price. While key informants agreed on the importance of addressing cost-related barriers, many emphasized that any funding changes should be accompanied by pharmacist education and a public awareness campaign to maximize effectiveness.

Conclusions: Findings highlight the widespread understanding that cost-related barriers have a negative impact on the uptake of RUVs and the proposed funding model could be an effective solution to address low uptake for RUVs. A combination of reducing the vaccine cost and promoting vaccine awareness and education were seen as important solutions to addressing cost-related barriers for RUVs.

Poster 20

Title: DEVELOPMENT OF EATR ASSAY TO STUDY RETICULOPHAGY DURING VIRAL INFECTION

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Introduction: Reticulophagy (ER-phagy) is a subset of selective autophagy in which portions of the endoplasmic reticulum (ER) are targeted for degradation through ER-phagy receptors. This is a normal phenomenon which occurs in response to ER stress such as the unfolded protein response (UPR). The ER Autophagy Tandem Reporter (EATR) assay uses mCherry-eGFP-RAMP4 construct (RAMP4) to monitor and quantify reticulophagy. When located in the ER, both mCherry and eGFP fluorescence are detected, but once in the lysosome eGFP becomes inactivated and only mCherry fluorescence is detected. Viruses are known to cause ER stress due to the increased burden of synthesizing viral proteins.

Kaposi's sarcoma-associated herpesvirus (KSHV) is a gamma herpesvirus that establishes latency in B-cells. As the B-cell undergoes differentiation into a plasma cell, the ER undergoes expansion to accommodate the increased need for protein synthesis, thus activating the UPR. KSHV exploits this stress response to reactivate from latency and we have previously reported that KSHV induces ER stress. It is evident that there is a connection between viral infections, ER stress and reticulophagy, however the details such as specific viral genes involved in this process remain to be determined. Based on these findings, we hypothesize that there is a change in ER-phagy activity during KSHV infection.

Methods: We subcloned RAMP4 into pLJM1B*puro then transfected it into 293A cells. Cells were subjected to 16 hr amino acid starvation or treatment with thapsigargin, a drug which induces ER-stress. 100X immunofluorescence microscopy was used to visualize the RAMP4 construct in the ER under normal and stressed conditions to visualize translocation of this construct to the lysosome.

Results: RAMP4 colocalizes with the ER. Upon amino acid starvation, RAMP4 is taken up by autophagosomes and transported to the lysosome where eGFP becomes inactivated. Similarly, ER-specific stress caused by thapsigargin also induces ER-phagy. Lastly, co-transfecting RAMP4 with KSHV ORFS alters ER-phagy.

Conclusions: In conclusion, the EATR assay is a new tool to measure reticulophagy in a herpesvirus epithelial cell model. We are currently conducting a high-throughput screen of the KSHV ORFS to better understand how each ORF alters ER-phagy during infection.

Poster 21

Title: *CLOSTRIDIOIDES DIFFICILE* COLONIZATION: A PILOT STUDY EVALUATING PREDICTION OF INFECTION IN PEDIATRIC ONCOLOGY PATIENTS

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Introduction: *Clostridioides difficile* (CD) is an important cause of morbidity in pediatric oncology patients with CD infection (CDI) leading to gastrointestinal pathology and cancer treatment delays. Identifying at-risk patients could enable targeted prevention strategies to reduce CDI. This study investigates whether CD colonization at the time of oncologic diagnosis is associated with an increased likelihood of CDI during cancer treatment.

Methods: This nested retrospective study evaluates pediatric oncology patients diagnosed and treated at IWK Health between July 01, 2016, and June 30, 2024. Stool samples previously procured early in the malignancy treatment course were analyzed for CD colonization using Lateral flow and PCR, classifying patients as CD-colonized or non-CD-colonized. Patient charts were reviewed to collect data on CDI development during oncologic treatment, its clinical course, demographics, and potential confounders. Odds Ratio (OR) for CDI with 95% confidence interval (CI) and p-value were calculated.

Results: Forty-six patients, aged 1-17 years, were identified. 15% (n=7) patients were CD-colonized at diagnosis. Overall, 22% (n=10) developed CDI; 43% (n=3) in the CD-colonized group developed CDI compared to 18% (n=7) in the non-CD-colonized group. OR for development of CDI if CD-colonized was 3.43 (95% CI: 0.64-18.30, p-value = 0.12) relative to those who were non-CD-colonized. Among patients who developed CDI, average days to onset in the CD-colonized group was 161 (range 71-259) compared to 374 (range 72-1335) days in the non-CD-colonized group.

Conclusions: This pilot study suggests a potential association between CD colonization and an increased risk of CDI during the treatment course in pediatric oncologic patients. While the small sample size poses a limitation, the findings offer novel preliminary findings. Further research using a prospective study design may further help identify risk factors for CDI development and allow for study of potential targeted prevention interventions.

Poster 22

Title: MODELLED PUBLIC HEALTH IMPACT OF ADJUVANTED RESPIRATORY SYNCYTIAL VIRUS PREFUSION F PROTEIN (RSVPREF3) VACCINATION IN ADULTS ≥60-YEARS IN CANADA OVER 5 YEARS
Authors: Joann K. Ban, Michael Dolph, Yufan Ho, Dessi Loukov, Emily Matthews

Further details for this poster are not yet permitted for publication.

Poster 23

Title: PHASE 3 SAFETY AND IMMUNOGENICITY OF AN MRNA-BASED SEASONAL INFLUENZA AND SARS-COV-2 MULTICOMPONENT VACCINE (MRNA-1083) COMPARED WITH CO-ADMINISTERED LICENSED VACCINES IN ADULTS ≥50 YEARS OLD

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Introduction: A safe, effective, multicomponent vaccine against seasonal influenza and SARS-CoV-2 could increase compliance with vaccination recommendations and reduce disease burden against both infections. We present interim phase 3 results for mRNA-1083, an investigational mRNA vaccine against influenza and SARS-CoV-2, in adults aged ≥50 years.

Methods: This phase 3, observer-blind study conducted in 2 age cohorts (50-64 and ≥65 years) randomized adults (1:1) to receive mRNA-1083 (and saline placebo) or co-administered influenza (Fluarix [50-64 years] or Fluzone HD [≥65 years]) and COVID-19 (Spikevax [all ages]) vaccines. Primary objectives were reactogenicity, safety, and noninferiority of humoral immune responses elicited by mRNA-1083 relative to comparators against vaccine-matched influenza and SARS-CoV-2 strains at Day 29.

Results: All co-primary immunogenicity endpoints were met, with noninferiority of mRNA-1083 versus comparators demonstrated against influenza and SARS-CoV-2 based on geometric mean ratios (GMR; 97.5% CI lower bound [LB] >0.667) and seroconversion/seroresponse rate (SCR/SRR) differences (97.5% CI LB >-10%). Overall, frequency of solicited adverse reactions was higher after mRNA-1083 than comparators; most were grade 1 or 2 in severity. No safety concerns were identified in either age group through 90-days post-vaccination.

Conclusions: Multicomponent mRNA-1083 had an acceptable safety and tolerability profile and elicited higher immune responses than comparator vaccines against 3 clinically-relevant influenza strains and SARS-CoV-2 in adults aged ≥50 years.

Poster 24

Title: A PHASE 3, RANDOMIZED TRIAL INVESTIGATING THE SAFETY, TOLERABILITY, AND IMMUNOGENICITY OF V116, AN INVESTIGATIONAL ADULT-SPECIFIC PNEUMOCOCCAL CONJUGATE VACCINE, IN PNEUMOCOCCAL VACCINE-NAÏVE ADULTS 18–64 YEARS OF AGE WITH INCREASED RISK FOR PNEUMOCOCCAL DISEASE

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Introduction: Adults with certain underlying chronic medical conditions are at increased risk of pneumococcal disease (PD). V116 is an investigational, 21-valent, adult-specific pneumococcal conjugate vaccine (PCV) containing the most prevalent serotypes (STs) associated with PD in adults from regions with established pediatric vaccination programs. The Phase 3 STRIDE-8 study (NCT05696080) evaluated the safety and tolerability of V116 in adults 18–64 years of age at increased risk of PD. Immunogenicity of V116 was compared with sequential administration of 15-valent PCV (PCV15) followed by 23-valent pneumococcal polysaccharide vaccine (PPSV23).

Methods: Pneumococcal vaccine-naïve participants with ≥1 underlying chronic medical conditions (including diabetes mellitus, heart disease, kidney disease, liver disease, and lung disease) at increased risk of PD were randomized 3:1 to receive one dose of V116 on Day 1 followed by placebo at Week 8 or one dose of PCV15 on Day 1 followed by one dose of PPSV23 at Week 8. Safety was evaluated as the proportion of participants with adverse events (AEs). Immunogenicity was assessed by serotype-specific opsonophagocytic activity (OPA) geometric mean titers (GMTs) and immunoglobulin G (IgG) geometric mean concentrations (GMCs) for STs in V116 at baseline (Day 1) and 30 days post-vaccination (Day 30 for V116 + placebo and Week 12 for PCV15 + PPSV23).

Results: Of 518 participants randomized, 516 were vaccinated and received either V116 (n=386) or PCV15 (n=130) on Day 1; 96.7% of participants completed the trial. One or more AEs occurred in 265 (68.7%) and 118 (90.8%) participants vaccinated with V116 + placebo or PCV15 + PPSV23, respectively (Table 1). V116 was immunogenic for all 21 STs based on OPA GMTs, with comparable responses to PCV15 + PPSV23 for the 13 STs common to V116 and PCV15 + PPSV23, and higher responses for the eight STs unique to V116 (Figure 1). IgG GMCs were consistent with OPA GMTs (Figure 2).

Conclusions: V116 is well tolerated and immunogenic in adults 18–64 years of age at increased risk of PD, with comparable immune responses to PCV15 + PPSV23 for common STs and higher immune responses for unique STs. These findings support V116 as a novel population-specific vaccine for the prevention of PD in adults with chronic medical conditions at increased risk of PD.

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Evaluations

Feedback and evaluation is important, and your input is essential for our future planning. You will receive an evaluation form to give us your feedback to improve this learning event. You can fill it out on paper, or online at: bit.ly/IDDayEval2025