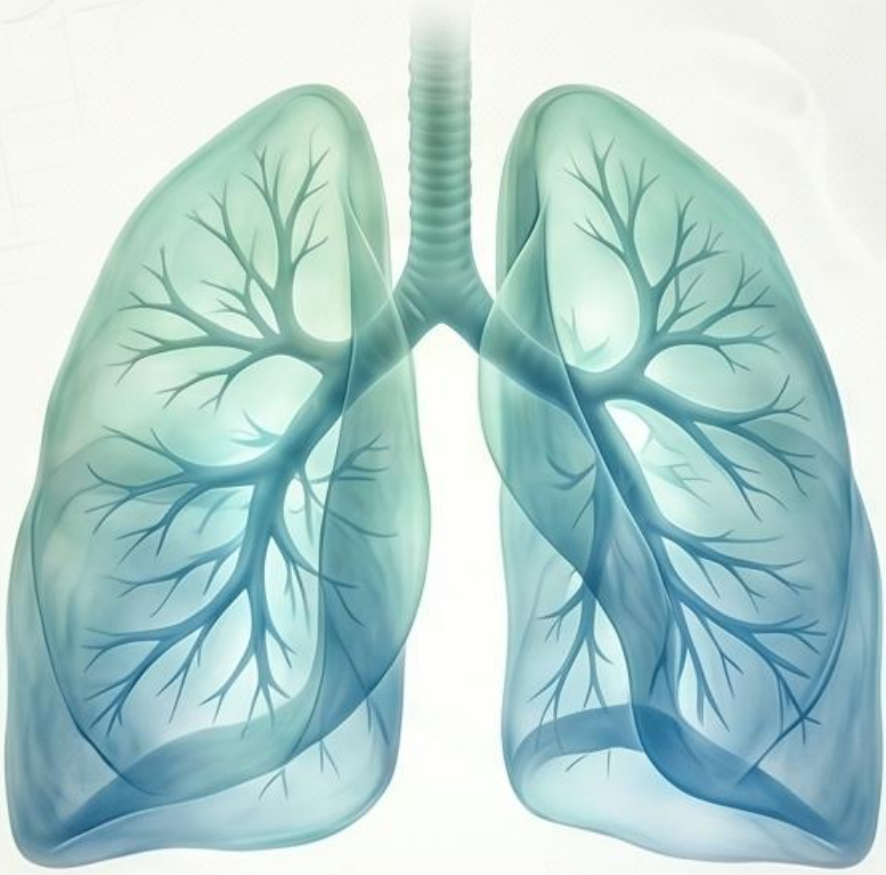
Annual Academic & Awards Day 2026



Wednesday, June 10, 2026
9:00 – 16:30

Division of Respirology
Department of Medicine
Faculty of Medicine

UNIVERSITY OF TORONTO

Li Ka Shing Knowledge Institute
St. Michael's Hospital, 209 Victoria St.

respirologyresearch.com

Annual Academic & Awards Day 2026

Location: Li Ka Shing Knowledge Institute (2nd floor) – St. Michael's Hospital. 209 Victoria Street.

8:30 – 9:15 Registration and Poster Set-up. Continental Breakfast Provided.

9:15 – 9:30 Welcome Remarks:

Opening of the Respirology Research Day: Drs. D. Rozenberg & G. Montandon

Director of the Division of Respirology – Dr. Chung-Wai Chow

9:30 – 10:00 KEY-NOTE SPEAKER

Dr. Carli Lehr

Cleveland Clinic

Associate Professor, Cleveland Clinic

Beyond the Algorithm: How Risk Models and Health Care Systems Interact to Determine Transplant Access

10:00 – 10:30 Coffee/Stretch Break/Complete Poster Setup

10:30 – 11:30 ORAL SESSION 1 – Translational Science

10:30 - Kayla Baker, Abstract #6: Midbrain Somatostatin Cells Stimulate Breathing and Motor Activity In Rodents In Vivo

10:40 - Fei Yu Gao, Abstract #23: Harnessing Lung-kidney Crosstalk: A Novel Ex Vivo Platform For Donor Lung Rehabilitation

10:50 - Jenny Yune, Abstract #57: Developing a Safe and Effective Lipid Nanoparticle for Endothelial Gene Delivery During EVLP

11:00 - Gabriel Siebiger, Abstract #50: Mitochondrial Transplantation for The Recovery Of Donor Lungs Subjected to Prolonged Warm Ischemia: A Novel Strategy to Expand the Donor Pool for Transplantation

11:10 - Deween Piyasena, Abstract #42: Predicting Post-Transplant FEV1 and FVC Using Donor Lung Function Measured During EVLP with Machine Learning

11:30 – 12:00 KEY-NOTE SPEAKER

Dr. Christopher Licskai

Professor, Western University

Best Care: Do The Ordinary Extraordinarily Well: Improving Chronic Disease Care Today, Building Resilient, Sustainable Health Systems for Tomorrow

12:00 – 12:30 Lunch Break. Rooms 240 & 241.

12:30-14:00 Poster Viewing and Judging

14:00 – 15:00 ORAL SESSION 2 - Clinical and Health Science

14:00 - Melissa Valaee, Abstract #55: Evidence-Based Oscillometry Interpretation Algorithm for Resolution Into Lung Function Patterns: A Step To Clinical Implementation

14:10 - Jared So, Abstract #51: Inspiratory Muscle Loading with Dyspnea Limits Simulated Driving Performance in Young Adults

14:20 - Daniel Genkin, Abstract #25: CT-Measured Pectoralis Muscle Loss is an Extrapulmonary Biomarker Associated with Longitudinal COPD Morbidity

14:30 - Ijeoma Itanyi, Abstract #29: Beyond The Lungs: Shifting Trends in Complex And Physical-Mental Multimorbidity Among Adults With Asthma In Ontario

14:40 - Alina Sami, Abstract #47: Online Resources as a Source of Information and Instruction for Caregivers of Individuals with Advanced Pulmonary Disease

14:50 - Zoe Garzouzi, Abstract #24: Reduce, Recycle, Reimagine: The Analysis of a Novel Inhaler Recycling Program

15:00 – 15:40 Highlights from Staff Research

15:00 - Lee Fidler: Lung Transplantationin Rheumatoid Arthritis Related Interstitial Lung Disease

15:12 - Andrew Kouri: Update on the COPD 'My Lung Health Coach' study

15:24 - Alina Blazer: Connected Care COPD: A Community-Led Pathway for Early Detection and Intervention

16:00 - 16:30 Awards and Prizes of the Division of Respirology

Awards Ceremony for Research: G. Montandon

Faculty Research and Trainee Awards: D. Rozenberg

Organizers:

Dr. Dmitry Rozenberg
Dr. Gaspard Montandon
Ms. Rhiannon Davies
Mr. Ali A. Salman Al-Timimi

Abstract Judges:

Dr. Jane Batt
Dr. Marie Faughnan
Dr. Andrew Kouri
Dr. Owen Lyons
Dr. Gaspard Montandon
Dr. Dmitry Rozenberg
Dr. Clodagh Ryan

Annual Research & Awards Day 2026
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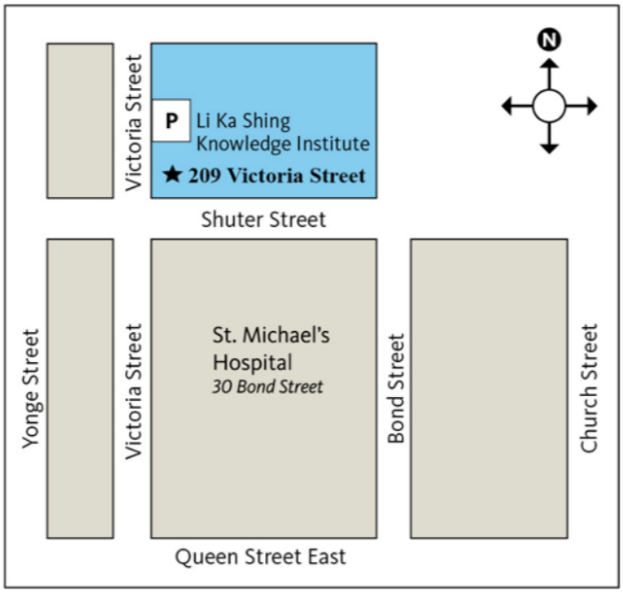
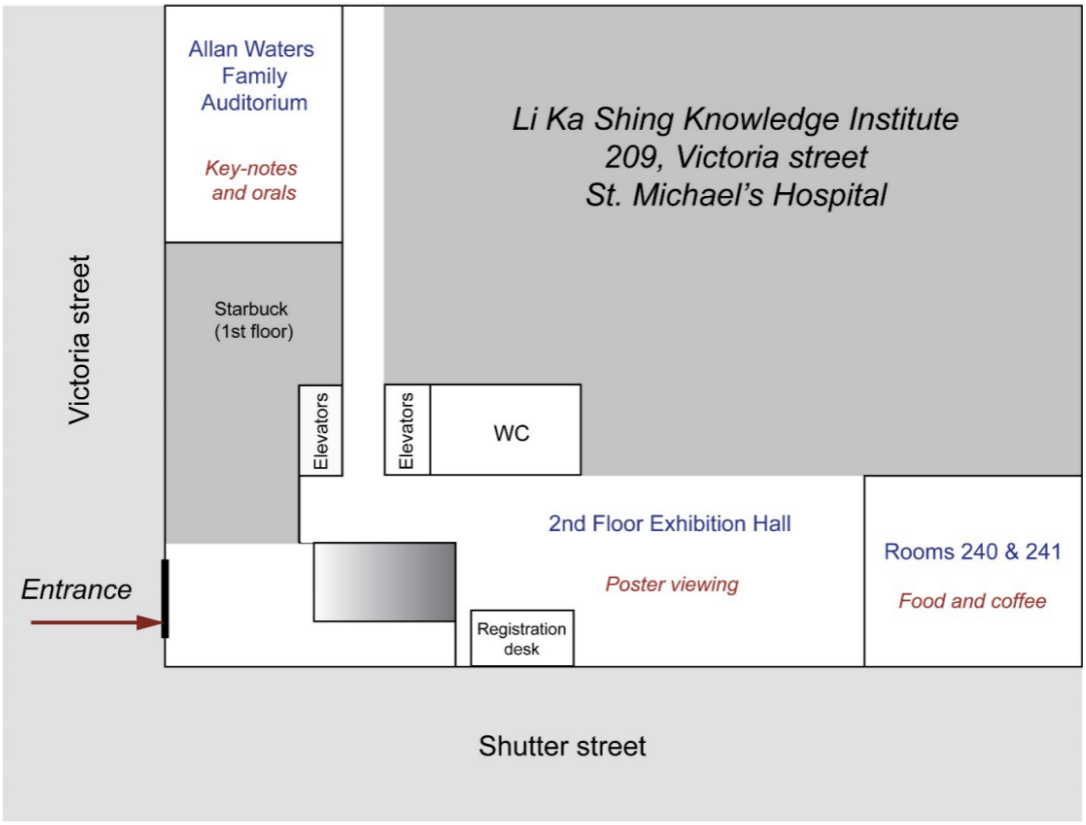
Location and Rooms:

Location: Li Ka Shing Knowledge Institute (2nd floor) – St. Michael's Hospital. 209 Victoria street.





Keynote Speaker
Dr. Carli Lehr, MD, PhD

Beyond the Algorithm: How Risk Models and Health Care Systems Interact to Determine Transplant Access

Dr. Carli Lehr is a distinguished transplant pulmonologist and physician-scientist specializing in the care of patients with advanced lung disease before and after transplantation. Holding the Gregory and Maureen Church Endowed Chair in Lung Transplantation Research at the Cleveland Clinic, her research focuses on optimizing organ allocation, expanding equitable access to transplantation, and refining donor selection.

Beyond her clinical practice, Dr. Lehr is a prominent voice in national transplant policy and education. She serves as Co-Chair of the Scientific Registry of Transplant Recipients (SRTR) Scientific Review Committee, leads the Advanced Lung Failure and Transplantation Network for the International Society for Heart and Lung Transplantation (ISHLT), and actively chairs the Community Education Committee for the American Society of Transplantation (AST). Through her robust leadership and advocacy, Dr. Lehr is deeply committed to strengthening the systems that support transplant care and improving the lives of patients nationwide.

Keynote Speaker
Dr. Christopher Licskai, MD, FRCPC

Best Care: Do The Ordinary Extraordinarily Well: Improving Chronic Disease Care Today, Building Resilient, Sustainable Health Systems For Tomorrow

Dr. Christopher J. Licskai is a highly respected respirologist whose mission is to advance respiratory health through the integration of technology and clinical research. A pioneer in health informatics, his research focuses on evaluating virtual care and developing innovative moblie-Health solutions, such as the "Breathe" application, to empower patient self-management and improve outcomes for those living with asthma and COPD.

Alongside his clinical and research endeavors, Dr. Licskai has held vital leadership roles in provincial health policy, spearheading integrated care models that optimize lung health delivery across the healthcare system. An award-winning physician, researcher, and educator, he is a recipient of the Professorship in Health System Innovation and the Minister’s Medal Honouring Excellence in Health Quality and Safety.

Authors' List

#	Author	Title of Abstract
1	Mico Abuan	Investigating The Role Of The B Cell Chemokine CXCL13 In Chronic Lung Allograft Dysfunction (CLAD)
2	Melina Alborzi	Caregiver Wellbeing In Lung Disease: A Narrative Review Of Evidence And Intervention Gaps
3	Mahmoud Aljundi	Virtual Malignant Pleural Effusion Care Is Associated With Shorter Time To Definitive Management Without Increased Complications
4	Sabrina Allarakhia	The Impact of Elexacaftor/Tezacaftor/Ivacaftor on Lung Volumes in Patients with Cystic Fibrosis – A prospective cohort study
5	Omri Arbiv	Incidence And Survival For Patients With Pneumocystis Pneumonia In Ontario, Canada
6	Kayla Baker	Midbrain Somatostatin Cells Stimulate Breathing And Motor Activity In Rodents In Vivo
7	Yassmin Behzadian	Improving Lung Cancer Screening In Eligible Patients With Interstitial Lung Disease (ILD)
8	Mariana Bernardes Ribeiro	The Role Of Noradrenergic Neurons In The Locus Coeruleus In The Respiratory Chemoreflex In Mice
9	Ramy Boles	More Than Just Asthma – A Case Of Eosinophilic Bronchiolitis
10	Stacey Butler	Prescribing For The Patient And The Planet: Canadian Healthcare Professionals' Views On Climate Change And Inhaler Selection
11	Zoeen Carter	Chronic Lung Allograft Dysfunction (CLAD) Is Characterized By Reduced Secretoglobin SCGB3A2
12	Zoeen Carter	Correlation Of Endogenous Club Cell Secretory Protein (CCSP) And Fibrosis In Chronic Lung Allograft Dysfunction (CLAD)
13	Eric Choi	Inspiratory Muscle Loading And Associated Dyspnea Impairs Computer-Simulated Driving In Older Adults
14	Sumyia Chowdhury	A Biologically-Inspired Digital Twin For COPD Using Ex Vivo Lung Perfusion
15	Dayana Davoudi	Risk Factors For Baseline Lung Allograft Dysfunction (BLAD): A Retrospective Study
16	Jillian Dhawan	Respiratory Manifestations In Ehlers-Danlos Syndrome (Eds) And Generalized Hypermobility Spectrum Disorder (G-Hsd) : Meeting Report And Future Considerations
17	Allen Duong	Pro-Inflammatory LILRB2+ Pulmonary Macrophages Recruit Activated T Cells In Chronic Lung Allograft Dysfunction (CLAD)
18	Lee Fidler	Impact Of Obstructive Lung Disease On Survival In Patients With Rheumatoid Arthritis Related Interstitial Lung Disease
19	Lee Fidler	Lung Transplantation In Rheumatoid Arthritis Related Interstitial Lung Disease: Risk Factors And Mortality In A Universal Health Care System
20	Julia Forsey	Pathogenically Reprogrammed Club Cells In Diseased Lung Tissue
21	Anne Fu	Post-Transplant Ambient Air Pollution And Respiratory Infections And The Risk Of Baseline Allograft Dysfunction
22	Anne Fu	Non-Tuberculous Mycobacteria (NTM) Infection In Organ Transplant Recipients: Outcomes And Health Resource Utilization
23	Fei Yu Gao	Harnessing Lung-Kidney Crosstalk: A Novel Ex Vivo Platform For Donor Lung Rehabilitation

24	Zoe Garzouzi	Reduce, Recycle, Reimagine: The Analysis Of A Novel Inhaler Recycling Program
25	Daniel Genkin	CT-Measured Pectoralis Muscle Loss Is An Extrapulmonary Biomarker Associated With Longitudinal COPD Morbidity
26	Alberto Guimaraes	Establishment Of An In Vivo Lung Perfusion Model In Rats For Treatment Of Colorectal Lung Metastases.
27	Serena Hacker	Towards Digital Twins Of Ex Vivo Human Lungs For Restrictive And Obstructive Lung Diseases Using Machine Learning
28	Nicholas Hua	Agreement Between Chatgpt 5.4 Extended Thinking And Expert Review Of Online Pulmonary Rehabilitation Websites
29	Ijeoma Itanyi	Beyond The Lungs: Shifting Trends In Complex And Physical-Mental Multimorbidity Among Adults With Asthma In Ontario
30	Flora Jung	Systematic Review Of Obstructive Sleep Apnea In 22q11.2 Deletion Syndrome And The Impact Of Prior Upper Airway Surgery
31	Samin Khannejad	Clinical And Prognostic Implications Of Heart Rate Recovery After Six-Minute Walk Test In Chronic Lung Disease: A Systematic Review
32	Hemn Khdr	Medgate-Fusion: Integrating First-Encounter Clinical Narratives And Physiological Biomarkers For Prospective Stroke Risk Stratification
33	Hemn Khdr	Personalized Marketing In Online Gambling: A Scoping Review Of Behaviour, Harm, And Commercial Determinants Of Health
34	Hemn Khdr	Multimodal Pleural Effusion Classification By Combining Chest X-Rays, Radiology Reports, And Clinical Metadata
35	Yejin Kim	The Role Of Biological Sex On Opioid-Induced Respiratory Depression
36	Manjiri Kulkarni	Impact Of Cognitive Function, Disease Severity And Affect On Dual Tasking In COPD And Healthy Adults.
37	Terry Li	Factors Influencing The Successful Design And Implementation Of A Clinical Decision Support System (CDSS) Intervention For Asthma Management In Community Pharmacies
38	Caoimhe McParland	LOST & FOUND COPD: Undiagnosed COPD Among Ontario Lung Screening Program Participants
39	Paolo Melo	Ketone-Based Energy Supplementation Extends The Limits Of Donor Lung Preservation
40	Francesco Murgolo	Non-Invasive Assessment Of Inspiratory Effort Predicts Extubation Failure Across Three Spontaneous Breathing Trial Modalities: A Multicenter Observational Study
41	Tadahisa Numakura	Trajectory Of Respiratory Oscillometry And Lung Mechanics After Lung Transplantation
42	Deween Piyasena	Predicting Post-Transplant FEV1 And FVC Using Donor Lung Function Measured During EVLP With Machine Learning
43	Darlene Reid	Ventilatory Loading And CO2 Induced Prefrontal Cortex Activity Monitored By Time-Domain Near Infrared Spectroscopy (TD-NIRS)
44	Lielle Ronen	A Machine Learning Algorithm To Quantify The Amount Of Smoking Injury In Donor Lungs Assessed On Ex Vivo Lung Perfusion
45	Zsofia Rosselli	Pre-Transplant Metabolic Phenotype Predicts Long-Term Survival After Lung Transplantation
46	Ali Salman Al Timimi	Experiences And Perceptions Of In-Person And Online Inhaler Technique Education Among Patients With COPD And Asthma: A Qualitative Descriptive Study
47	Alina Sami	Online Resources As A Source Of Information And Instruction For Caregivers Of Individuals With Advanced Pulmonary Disease
48	Sheojung Shin	Opportunities For Waste Reduction In Thoracentesis: A National Physician Survey

49	Raissa Shrestha	Baseline Oscillometry Associated With Baseline Lung Allograft Dysfunction (BLAD) In Lung Transplant Recipients
50	Gabriel Siebiger	Mitochondrial Transplantation For The Recovery Of Donor Lungs Subjected To Prolonged Warm Ischemia: A Novel Strategy To Expand The Donor Pool For Transplantation
51	Jared So	Inspiratory Muscle Loading With Dyspnea Limits Simulated Driving Performance In Young Adults
52	Julie Statler	Lung Transplant And Cystic Fibrosis: Setting The Stage For Shared Care
53	Daniel Vosoughi	GRP78-Directed Autoantibodies In BAL Are Associated With Future CLAD And Define A CLAD-Specific Phenotype Marked By The Unfolded Protein Response
54	Janet Wan	Sex Differences In Trends In All-Cause Healthcare Utilization In Younger Adults With COPD
55	Joyce Wu	Evidence-Based Oscillometry Interpretation Algorithm For Resolution Into Lung Function Patterns: A Step To Clinical Implementation
56	John Wu	Assessment Of Online Educational Materials For Air Travel With Chronic Lung Disease
57	Jenny Yune	Developing A Safe And Effective Lipid Nanoparticle For Endothelial Gene Delivery During EVLP
58	Kevin Zhang	Routine Long-Term Use Of Proton Pump Inhibitors Is Widespread With Unknown Benefit In Clinical Outcomes After Lung Transplantation

Abstracts:

Abstract #1

Investigating The Role Of The B Cell Chemokine CXCL13 In Chronic Lung Allograft Dysfunction (CLAD)

Mico Abuan [1]; Sumiha Ramendra [1]; Rayoun Ramendra [1]; Prodipto Pal [2]; Gregory Berra; [3]; Tereza Martinu [1]; Stephen Juvet [1]

1. Latner Thoracic Surgery Research Laboratories, Toronto General Hospital Research Institute, University Health Network; University of Toronto. 2. Department of Laboratory Medicine & Pathobiology – Anatomic Pathology, University of Toronto. 3. Hôpitaux Universitaires de Genève (HUG), Geneva, Switzerland

Introduction & Objectives: Chronic lung allograft dysfunction (CLAD) is the leading cause of mortality after lung transplantation and is characterized by persistent alloimmune activation and progressive fibrosis. B cell mediated immunity and tertiary lymphoid structures (TLS) are implicated in CLAD pathogenesis, though underlying molecular mechanisms remain poorly defined. CXCL13, a chemokine that regulates B cell recruitment and germinal center organization, is elevated in chronic inflammation and transplant rejection, but its protein-level role in CLAD lung tissue remains unclear. We aimed to quantify CXCL13 protein in CLAD lungs and assess its association with pathological features.

Methods: CXCL13 protein levels were measured in digested lung explant tissues from CLAD patients (n = 44) and normal lung controls (n = 21) using a 96-plex cytokine assay (Luminex®200™), with matched bulk-RNA sequencing data available. Histological parenchymal fibrosis was quantified by pathologist assessment and HALO-based analysis, and RAS-like opacities (RLO) – also representing lung fibrosis – were evaluated on chest CT imaging. Lymphoid aggregate metrics (number, size, density) were quantified using H&E-stained lung sections.

Results: CXCL13 was the most upregulated cytokine in CLAD lungs and was significantly elevated compared to controls ($p < 0.0001$), with protein levels correlating with transcript abundance ($r = 0.778$, $p < 0.0001$). Higher CXCL13 levels were associated with % fibrosis ($r = 0.43$, $p = 0.005$), RLO presence ($p = 0.0011$), and % collagen ($r = 0.5071$, $p = 0.0004$). No associations were observed with lymphoid aggregate metrics, which may reflect spatial mismatch between molecular and histologic sampling. Future analyses will incorporate specific TLS markers to enable more precise characterization of lymphoid structures.

Conclusion: CXCL13 is elevated in CLAD and associated with key clinical CLAD features, supporting its role as a potential biomarker of CLAD.

Abstract #2

Caregiver Wellbeing in Lung Disease: A Narrative Review of Evidence and Intervention Gaps

Melina Alborzi [1,2] , Samin Khannejad [1], Ani Orchanian-Cheff [3], Kirsten Wentlandt [4], Dmitry Rozenberg [1,5,6]

Affiliations: 1. Toronto General Hospital Research Institute, University Health Network, Toronto, ON, Canada. 2. Institute of Medical Science, Temerty Faculty of Medicine, University of Toronto, Toronto, ON, Canada. 3. Library and Information Services, University Health Network, Toronto, ON, Canada. 4. University Health Network, Toronto, ON, Canada. 5. Department of Respiratory Medicine, West Park Healthcare Centre, Toronto, ON, Canada. 6. Division of Respirology, Temerty Faculty of Medicine, University of Toronto, Toronto, ON, Canada.

Introduction and Objectives: Family caregivers of individuals with chronic lung disease provide complex, sustained support that often affects their wellbeing. About three-quarters of individuals with advanced COPD rely on informal caregivers to manage dyspnea, oxygen requirements, and unpredictable disease trajectories. While caregiver burden is well characterized in the oncology and dementia populations, the literature remains limited in lung disease. This review summarizes current evidence on caregiver wellbeing in chronic lung disease and potential intervention strategies.

Methods: Ovid MEDLINE and Embase were searched from inception to February 2026 using subject headings (MeSH/Emtree) for lung and heart disease, caregivers, and caregiver burden, combined with multi-field "wellbeing" keywords, limited to adult populations. Title and abstract screening identified 115 papers, of which 31 were relevant to lung disease.

Results: Most studies focused on COPD (24/31), with fewer in ILD and other chronic lung diseases (7/31). The majority were observational or qualitative (n=26), and few tested interventions (n=5). Caregivers reported a high prevalence of anxiety (30–45%), depression (10–25%), fatigue (40–50%), and caregiving burden (35–55%), along with frequent physical health impairments (Table 1). Qualitative studies described the caregiver role as potentially restrictive, contributing to social isolation, gaps in communication, strain in relationships, and feelings of helplessness, especially with respiratory exacerbations (Table 1). Family wellbeing and positive views of caregiving were often preserved, indicating that caregiving is both burdensome and meaningful. A central gap is the limited caregiver-focused interventions evaluated using validated outcomes, with the literature restricted to only several pilot studies (< 80 caregivers total). Existing approaches focus mainly on education, pulmonary rehabilitation, and psychological support for caregivers (Table 1).

Conclusion: Caregivers of individuals with lung disease experience high rates of anxiety, depression, and symptom burden with social disruptions, but report meaningful caregiving benefits. Future research should focus on caregiver-centered interventions utilizing validated outcome measures for program evaluation.

Supported by: Division of Respirology, Department of Medicine, University of Toronto.

Figure for abstract 2.

Table 1. Summary of anchor studies.

Author (Year)	Design / N	Key Findings
Cohort Studies and Cross-Sectional Studies		
Grosbois 2022; Janssen 2012	Retrospective cohort (n=138 COPD caregivers); cross-sectional (n=159 dyads)	• Increased anxiety, depression, fatigue, symptom burden • Higher distress in COPD > CHF • Pulmonary rehabilitation improved caregiver outcomes
Qualitative Studies		
Iyer 2024; Strang 2018; Bajwah 2013	Focus groups, interviews, concept mapping caregivers	• Isolation, role shifts, relational disruption • Helplessness during respiratory exacerbations • Burden under-recognized by clinicians
Review Articles (Systematic & Scoping)		
Gholami 2025; Quarshie 2025; Marsaa 2025; Mansfield 2016	Systematic review (n=27 studies); scoping reviews (ranging from 20 to 36 studies)	• Lack of wellness interventions for caregivers Outcome measures non-validated, heterogeneous • Caregivers framed as adjuncts, not focus

Abbreviations: COPD, chronic obstructive pulmonary disease; CHF, congestive heart failure; n, number of participants.

Abstract #3

Virtual Malignant Pleural Effusion Care Is Associated With Shorter Time To Definitive Management Without Increased Complications

Mahmoud Aljundi [1]; Katarzyna Czarnecka-Kujawa [1, 2]

1. Department of Respirology, University of Toronto, ON, Canada 2. Department of Thoracic Surgery, Toronto General Hospital, University Health Network, Toronto, ON, Canada

Introduction & Objectives: Malignant pleural effusion (MPE) care is often delayed despite guideline-recommended definitive management at first recurrence. We report real-world outcomes from a multidisciplinary MPE care program at a tertiary oncology center in Canada. We compared the historical in-person care model with the virtual care model introduced during the COVID-19 pandemic. We evaluated time from first clinic visit to definitive MPE management and pleural catheter-related outcomes.

Methods: We performed a retrospective cohort study of consecutive patients with MPE managed in the historical in-person care model from 2011 to 2018 and the virtual care model from 2021 to 2023. Patients who received definitive MPE management were included. The primary outcome was time from first clinic visit to definitive management. Secondary outcomes were pleurodesis, empyema, and catheter blockage requiring fibrinolytics. Continuous variables were compared using the Mann–Whitney U test, and categorical variables using chi-square testing.

Results: A total of 125 patients were included in the virtual cohort and 348 in the in-person cohort. Baseline characteristics were similar. Mean (SD) age was 67 (12) years in the virtual cohort and 65 (13) years in the in-person cohort; the most common malignancies were lung and breast cancer. Virtual care was associated with shorter time to definitive management: median (IQR) 0 days (0-12) versus 8 days (5-20) ($p<0.001$). Pleurodesis occurred in 39/125 (31.2%) versus 137/348 (39.4%) ($p=0.105$), empyema in 8/125 (6.4%) versus 25/348 (7.2%) ($p=0.928$), and catheter blockage in 5/125 (4.0%) versus 25/348 (7.2%) ($p=0.210$), in the virtual and in-person cohorts, respectively.

Conclusion: The virtual MPE care model was associated with substantially shorter time to definitive management without increased empyema or catheter blockage rates.

Abstract #4

The Impact of Elexacaftor/Tezacaftor/Ivacaftor on Lung Volumes in Patients with Cystic Fibrosis – A Prospective Cohort Study

Sabrina Allarakhia[1], Jenna Sykes[2], Eva Leek[2], Richard Leung[1], Elizabeth Tullis[1,2], Anne L. Stephenson[1,2].

1. Division of Respirology, Department of Medicine, University of Toronto 2. Adult CF Program, Division of Respirology, St. Michael's Hospital

Introduction: While elexacaftor/tezacaftor/ivacaftor (ETI) is known to improve spirometric outcomes in cystic fibrosis (CF), its effects on lung volumes and hyperinflation across a broad spectrum of disease severity are less well characterized. Lung hyperinflation is a key physiologic abnormality in CF and is associated with symptom burden and adverse clinical outcomes.

Research Question: What is the effect of ETI treatment on gas trapping and hyperinflation, and is there a correlation between change in FEV1 percent predicted and change in lung volumes?

Methods:We conducted an observational prospective cohort study of adults with CF initiating ETI at a single tertiary CF center in at St. Michael's Hospital (Toronto, Ontario) between January 01, 2021 and December 31, 2025. Lung volume measurements obtained by body plethysmography were collected as part of a standardized monitoring protocol. Pre-ETI measurements were defined as those obtained within one year prior to and up to 7 days after ETI initiation; post-ETI measurements were obtained between 30 days and 2 years after initiation, with values closest to 1 year selected for analysis. Changes in lung volumes were assessed using paired analyses. Associations between changes in lung volumes and forced expiratory volume in one second percent predicted ($ppFEV_1$) were evaluated using Pearson's correlation coefficient.

Results: A total of 112 individuals had paired pre- and post-ETI lung volume measurements. Following ETI initiation, significant reductions were observed in residual volume (RV), functional residual capacity (FRC), RV/TLC, and FRC/TLC (all $p<0.001$), while total lung capacity remained unchanged. Improvements in hyperinflation were observed across disease severity strata, with larger absolute reductions among individuals with more severe baseline airflow obstruction. Reductions in gas trapping correlated moderately with improvements in $ppFEV_1$.

Conclusion: ETI therapy is associated with meaningful reductions in lung hyperinflation and improvements in ventilatory mechanics in adults with CF across a wide range of disease severity. Lung volume measurements provide complementary information to spirometry and capture physiologic treatment effects that may not be fully reflected by FEV_1 alone.

Abstract #5

Incidence And Survival For Patients With Pneumocystis Pneumonia In Ontario, Canada

Omri A Arbiv [1-3], Sarah K Brode [1-4], Sindhu R Johnson [1, 5, 6], Kuan Liu [1], Andrea S Gershon [1, 2, 3, 7]

1. Institute of Health Policy, Management, and Evaluation, University of Toronto, Toronto, ON. 2. Division of Respirology, University of Toronto, Toronto, ON. 3. ICES, Toronto, ON. 4. Division of Respirology, University Health Network, Toronto, ON. 5. Toronto Scleroderma Program, Mount Sinai Hospital, Toronto, ON. 6. Toronto Schroeder Arthritis Institute, Toronto Western Hospital, Toronto, ON. 7. Division of Respirology, Sunnybrook Health Sciences Centre, Toronto, ON.

Introduction & objectives: Pneumocystis pneumonia (PCP) is a rare pulmonary infection that occurs in immunocompromised individuals. The incidence of PCP and associated mortality in Canada remains unclear. Our aim was to evaluate the incidence of PCP in Ontario, Canada, as well survival associated with PCP infection.

Methods: We performed a retrospective cohort study using provincial health administrative databases linked to demographic data in Ontario between April 2005 and March 2023. We included individuals ≥18 years eligible for the Ontario Health Insurance Plan and excluded individuals with prior episode of PCP. We defined PCP predisposing conditions including immune-mediated inflammatory disease (IMID), cancer, human immunodeficiency virus (HIV), and organ transplant. Our outcomes were PCP based on hospital admission and survival after PCP diagnosis. We first obtained the yearly incidence of PCP during each fiscal year. Survival was assessed from date of PCP diagnosis using a Kaplan-Meier estimator with 95% confidence intervals (CI).

Results: We identified 2851 individuals with PCP in Ontario between 2005 and 2023. Of individuals with PCP, 881 (31%) had cancer, 608 (21%) had HIV, 206 (7%) had IMID, and 103 (4%) had organ transplant. 371 (13%) of individuals had ≥1 predisposing condition and 689 (24%) did not have a predisposition identified. Incidence of PCP due to cancer is increasing, whereas PCP in individuals with HIV is decreasing over time. The overall 30-day survival with PCP was 71% (95% CI 69-73%). 30-day survival was worse in individuals with IMID (54%, 95% CI 46-63%) and cancer (67%, 95% CI 64-71%), but improved in individuals with HIV (86%, 95% CI 64-71%) and organ transplant (82%, 72-92%).

Conclusion: PCP is a rare disease in Ontario with a high associated mortality, particularly in individuals with cancer and IMID. Future research should aim to identify targeted ways to reduce the high rate of mortality associated with PCP.

Canadian Institutes of Health Research; University of Toronto, Pettit Respirology Block Term Grant

Abstract #6

Midbrain Somatostatin Cells Stimulate Breathing And Motor Activity In Rodents In Vivo

Kayla S. Baker [1, 2], Carolina Scarpellini [2], Gaspard Montandon [1, 2, 3]

1. Institute of Medical Science, University of Toronto, Toronto, Ontario, Canada. 2. Keenan Research Center for Biomedical Science, St. Michael's Hospital, Unity Health Toronto, Toronto, Ontario, Canada. 3. Division of Respirology, Department of Medicine, University of Toronto, Toronto, Ontario, Canada

Introduction: Breathing is an essential process controlled by the brainstem breathing centers; still, it is also highly flexible and can be synchronized with behaviours requiring activation of respiratory muscles. Respiratory neural circuits receive projections from many brain regions, allowing respiratory muscles to be modulated to accommodate various motor behaviours. The periaqueductal grey matter (PAG), located in the midbrain, sends projections to the medulla and can coordinate autonomic functions such as breathing with behaviours. However, the types of PAG neurons involved in breathing and their functions remain unclear.

Aims: Somatostatin (SST) is an inhibitory neuropeptide located in the ventrolateral PAG (vlPAG), and we aim to if SST vlPAG neurons can modulate respiratory rhythm and if it is coordinated with behaviour. We used optogenetics to selectively activate SST vlPAG cells by expressing channelrhodopsin in SST cells using cre-lox recombination.

Methods: We measured respiratory activity with whole-body plethysmography and recorded motor behaviours in freely-behaving mice while photostimulating SST cells.

Results: We observed that activation of SST vlPAG cells stimulates breathing and also initiates a simultaneous increase in locomotor activity. Additionally, as the PAG is a key region in the descending pain pathway, activating SST vlPAG cells decreased the latency to tail flick, thereby facilitating the nociceptive response.

Conclusion: Our results suggest that stimulation of SST vlPAG neurons independently modulated respiratory, motor activity, and nociception. These cells may be involved in modulating respiratory muscle activity to produce non-respiratory behaviours or in coordinating breathing with other behaviours.

Abstract #7

Improving Lung Cancer Screening in Eligible Patients with interstitial lung disease (ILD).

Yassmin Behzadian; Jolene Fisher (1); Shane Shapera (1); Lee Fidler (1,2).

(1): University Health Network, (2): Sunnybrook Health Sciences Centre

Introduction and Objectives: Patients with interstitial lung diseases (ILDs) experience a higher incidence of lung cancer compared to the general population and frequently share risk factors for pulmonary malignancy (i.e. smoking). ILD patients who are eligible for the Ontario Lung Cancer Screening Program (OLSP) may be overlooked and we aimed to improve lung cancer screening in eligible patients.

Methods: We performed a pre-post study with independent groups to assess the number of eligible and referred patients in the ILD clinic at the Toronto General Hospital. Our intervention was an EMR based tool aimed to remind clinicians and confirm eligibility for screening. The primary outcome was the proportion of eligible patients referred to the OLSP. Descriptive statistics were performed to look for significant differences in referral rates in the pre- and post-intervention periods.

Results:
In the pre-intervention period, 10.3% (31/300) of ILD patients were eligible for the OLSP but none were referred. In the post-intervention period, the EMR based tool was used for 82.7% (248/300) of encounters and correctly identified 64.9% (24/37) of eligible patients. Of eligible patients, 27% (10/37) were referred for screening ($p = 0.001$). For those not referred, 35.1% (13/37) were identified but did not discuss referral, 18.9% (7/37) were incorrectly labelled as not meeting eligibility criteria, 16.2% (6/37) did not have the EMR tool used during their encounter, and 2.7% (1/37) declined referral.

Conclusion: Many ILD patients are eligible for lung cancer screening but are not referred for evaluation. An EMR based tool significantly increased referrals to the OLSP, but opportunities for improving screening practices remain.

Abstract #8

The Role Of Noradrenergic Neurons In The Locus Coeruleus In The Respiratory Chemoreflex In Mice

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The primary function of breathing is to maintain stable arterial partial pressures of oxygen and carbon dioxide, as well as pH. This process relies on the integrated activity of peripheral and central chemosensors. The locus coeruleus (LC) is an important central CO2/pH chemosensory region located in the brainstem, bilaterally adjacent to the fourth ventricle. Is the largest noradrenergic nucleus in the central nervous system and sends projections widely to brain regions, such as the amygdala, involved in behavioral regulation, and the nucleus of the solitary tract, which contributes to cardiorespiratory control. It rats, lesions of LC noradrenergic neurons reduce the ventilatory response to CO_2 by ~64%, indicating a key excitatory role in hypercapnic ventilatory control. However, the contribution of LC-derived noradrenaline to respiratory responses in mice remains unclear, as does its potential role in modulating other respiratory-related regions via noradrenergic signaling. Thus, this study therefore aims to evaluate the role of LC noradrenergic neurons during room air and hypercapnia (7% CO_2) in males and females DBH-Cre mice, and to investigate LC connectivity with respiratory centers such as the pre-Bötzinger Complex. Optogenetics was used to selectively inhibit these neurons via a Cre-dependent AAV expressing an inhibitory opsin in the LC. A separate viral vector expressing mCherry was used to map noradrenergic projections. We hypothesized that photoinhibition response of noradrenergic LC neurons will disrupts the ventilatory response to CO2.

Preliminary findings suggest that unilateral inhibition of the locus coeruleus does not significantly affect ventilation. Our ongoing experiments aim to further define the role of LC-derived noradrenaline and characterize its projections within the respiratory network.

These findings will help clarify species-specific mechanisms of central chemoreception and improve understanding of how brainstem circuits integrate chemical and neural signals to regulate breathing under physiological and pathophysiological conditions such as hypercapnia.

Acknowledgements: FAPESP, CIHR and NIH

Abstract #9

More Than Just Asthma – A Case of Eosinophilic Bronchiolitis

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Introduction: Eosinophilic lung disease in children is a heterogeneous disorder and delineating the differential can be challenging. This case report describes the clinical course and management of a patient with eosinophilic bronchiolitis, an entity rarely reported in children.

Case Description: A 17-year-old previously healthy non-atopic male was referred for severe asthma. He had a 6-month history of abrupt-onset productive cough with no extra-pulmonary features. The cough subsided when initially seen and he did not endorse shortness of breath. His environmental exposures included multiple pets, including a parakeet, and use of inhaled cannabis with no vaping or medication use prior to symptom onset. He failed multiple oral antibiotic courses and was unresponsive to high-dose inhaled bronchodilators and oral steroid courses for presumed asthma.

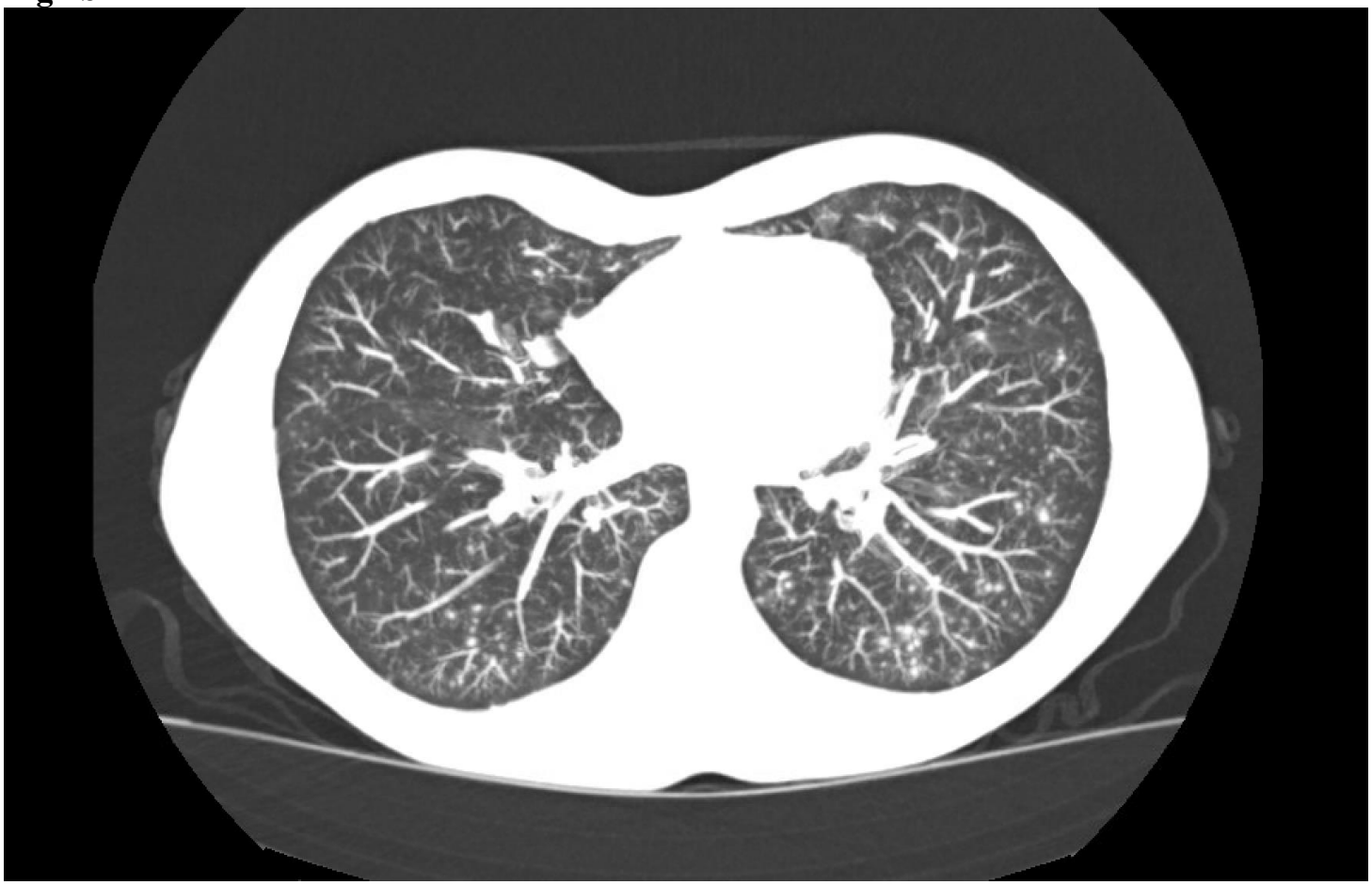
Pulmonary function testing showed moderate obstruction and with repeated forced exhalation maneuvers, he had dramatic bronchoconstriction with wheeze and persistent oxygen desaturation to 70%. Chest radiography revealed bilateral interstitial changes (Fig 1a) and chest CT showed diffuse centrilobular nodules (Fig 1b). At this time, a main diagnostic consideration was hypersensitivity pneumonitis. However, testing revealed significant serum eosinophilia (5.4x109/L) and bronchoscopy confirmed eosinophilic lung disease with 88% eosinophils in alveolar cell count. Extensive workup was negative including ANCA, serum precipitins for aspergillus and parrots, skin testing and specific IgE for aspergillus, parasitic workup, and CT sinus and echocardiogram.
He was treated with a weaning course of systemic steroids (initially methylprednisolone 2mg/kg/day) with improvement in his pulmonary function and imaging after one month (Fig 1c). He continued to have spirometry-induced bronchoconstriction and was started on a combination inhaler (ICS/LABA/LAMA).

Discussion: This case illustrates the diagnostic challenge of identifying the cause of eosinophilic lung disease in children. He currently meets criteria for eosinophilic bronchiolitis, which is a syndrome first described in a series of adult patients in 2013. Our patient responded to a prolonged course of systemic steroids. If he relapses, we plan to add an anti-IL-5 biologic, as this has been successful in other cases.

Conclusion: This case adds to the rare but emerging cohort of eosinophilic bronchiolitis and raises the possibility of a distinct clinical entity, separate from asthma.

Figure for abstract 9.

Fig 1b



Abstract #10

Prescribing for the Patient and the Planet: Canadian Healthcare Professionals' Views on Climate Change and Inhaler Selection

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Introduction & Objectives: Climate change is the number one threat to human health. The propellants in metered-dose inhalers (MDIs) are potent greenhouse gases and disproportionately contribute to healthcare's carbon emissions. Preferential prescribing of inhalers with low carbon footprints over MDIs can reduce healthcare's climate impact. We aimed to assess healthcare professionals' (HCPs) attitudes towards climate change, its health impacts, and inhaler prescribing practices.

Methods: We invited HCPs via professional societies and non-profit organizations to complete an online survey (November 2024-March 2025). Multivariable regression examined associations between sociodemographic characteristics and climate change risk perception index (CCRPI) scores, inhaler carbon footprint awareness, and prescribing behaviours.

Results: In total, 430 HCPs responded (median age: 41 years (IQR: 34-50); 74% women; 94% completion rate). Professions included pharmacists (33%), physicians (30%), nurses and nurse practitioners (11%), and other allied health professionals (26%). Climate change concern was high [median CCRPI score 34/40 (IQR: 30-37)]. Most respondents (85%) were aware of inhaler carbon footprint variability. Nurses and nurse practitioners were less likely than physicians to be aware of this variability (OR: 0.29, 95% CI: 0.11-0.75). Only 48% of prescribers preferentially prescribed low carbon devices to new inhaler users and just 17% routinely switched current MDI users. Higher CCRPI scores were associated with greater awareness of inhaler carbon footprint variability (OR: 1.34, 95% CI: 1.04-1.72) and preferential prescribing of low carbon devices for new inhaler users (OR: 1.70, 95% CI: 1.32-2.23) and current MDI users (OR: 1.30, 95% CI: 1.03-1.68). Carbon footprint ranked 8th (IQR: 7-10) among 12 attributes influencing device selection.

Conclusion: Despite significant concern for climate change and awareness of inhaler-related carbon emissions, preferential prescribing of low carbon inhalers is not part of routine practice. Given the urgency of the climate crisis, targeted interventions are needed to support climate-conscious prescribing and reduce inhaler carbon emissions.

Supported by: Choosing Wisely Canada

Abstract #11

Chronic Lung Allograft Dysfunction (CLAD) is Characterized by Reduced Secretoglobin SCGB3A2

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Introduction & Objectives: CLAD is the main barrier to long-term lung transplant survival. Club cell secretory protein (CCSP, gene name: SCGB1A1) has anti-inflammatory and anti-fibrotic effects and is reduced in CLAD. SCGB3A2 is closely related to SCGB1A1 structurally and functionally and its deficiency has been implicated in asthma, but its role in CLAD is unknown. We aimed to characterize SCGB3A2 in CLAD and hypothesized that its expression is reduced.

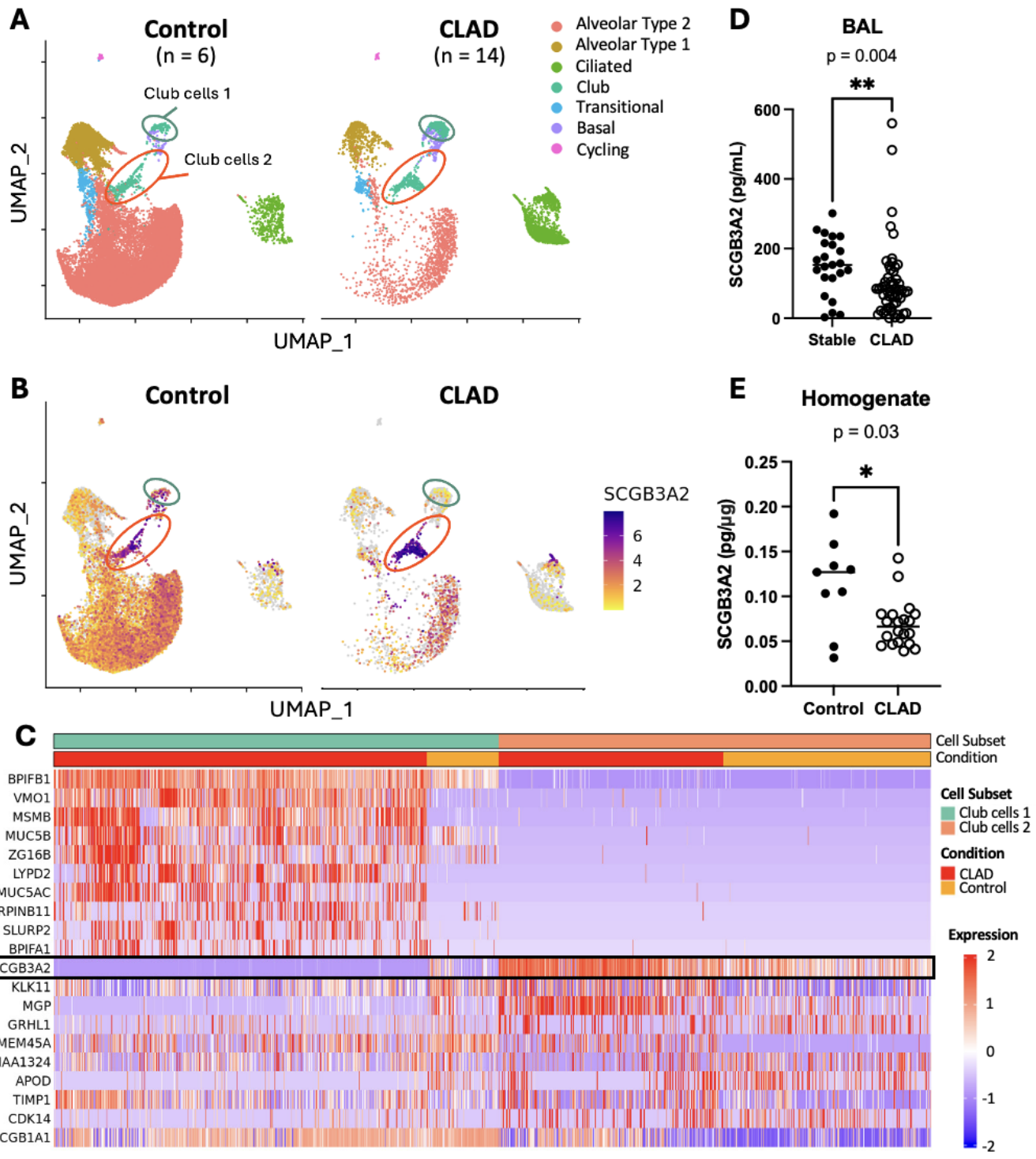
Methods: Explanted CLAD lungs of recipients undergoing retransplantation (n=45) and control donor lungs (n=27) were subjected to bulk RNA sequencing (seq). Single cell (sc) RNA seq was done using 10x Genomics and analyzed using Seurat (3 prime v3.1 chemistry) (n=14 CLAD, n=6 controls). SCGB3A2 protein levels were assessed using ELISA on bronchoalveolar lavage (BAL) samples (n=53 CLAD, n=23 stable) and tissue homogenates (n=20 CLAD, n=9 controls) normalized to total protein.

Results: BulkRNAseq showed significantly lower SCGB3A2 expression in CLAD compared to control lungs ($p<0.0001$). In scRNAseq, lung epithelial cells were clustered into subtypes, including two SCGB1A1+ club cell subpopulations (Fig A). SCGB3A2 was highly expressed in all club cells in control lungs (Fig B). In CLAD, SCGB3A2 expression was high in club cell subset 2, which expresses MGP, a tissue repair-associated gene. SCGB3A2 was reduced in club cell subset 1, characterized by high expression of mucin-associated genes (LYPD2, MUC5AC, SLURP2) (Fig C). SCGB3A2 protein levels were significantly reduced in CLAD compared to stable BAL ($p=0.004$), and in CLAD compared to control lung homogenates ($p=0.03$) (Fig D-E).

Conclusion: Our findings identify SCGB3A2 as a club cell–derived factor altered in CLAD, associated with changes in tissue repair and mucin gene expression in club cells. SCGB3A2 protein levels are reduced in CLAD allografts compared to control lungs. Future studies will focus on determining whether SCGB3A2 has a functional role in CLAD.

This project is partially funded by the CGS-M, Peterborough K.M Hunter Charitable Foundation, University of Toronto's URF, NSERC USRA, Sanofi, Canadian Institutes of Health Research, and the Cystic Fibrosis Foundation

Figure for abstract 11.



Abstract #12

Correlation of Endogenous Club Cell Secretory Protein (CCSP) and Fibrosis in Chronic Lung Allograft Dysfunction (CLAD)

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Introduction & Objectives: CLAD is the main barrier to long-term survival after lung transplant. CCSP has known anti-fibrotic effects and is decreased in CLAD. While CCSP supplementation in murine pulmonary fibrosis models has been shown to increase airway epithelial cell (AEC) proliferation and reduce fibrosis, the relationship between endogenous CCSP (eCCSP) levels with AEC proliferation and fibrosis severity is unclear. We hypothesized that higher eCCSP levels are associated with higher proportions of proliferating AECs and less severe fibrosis in CLAD.

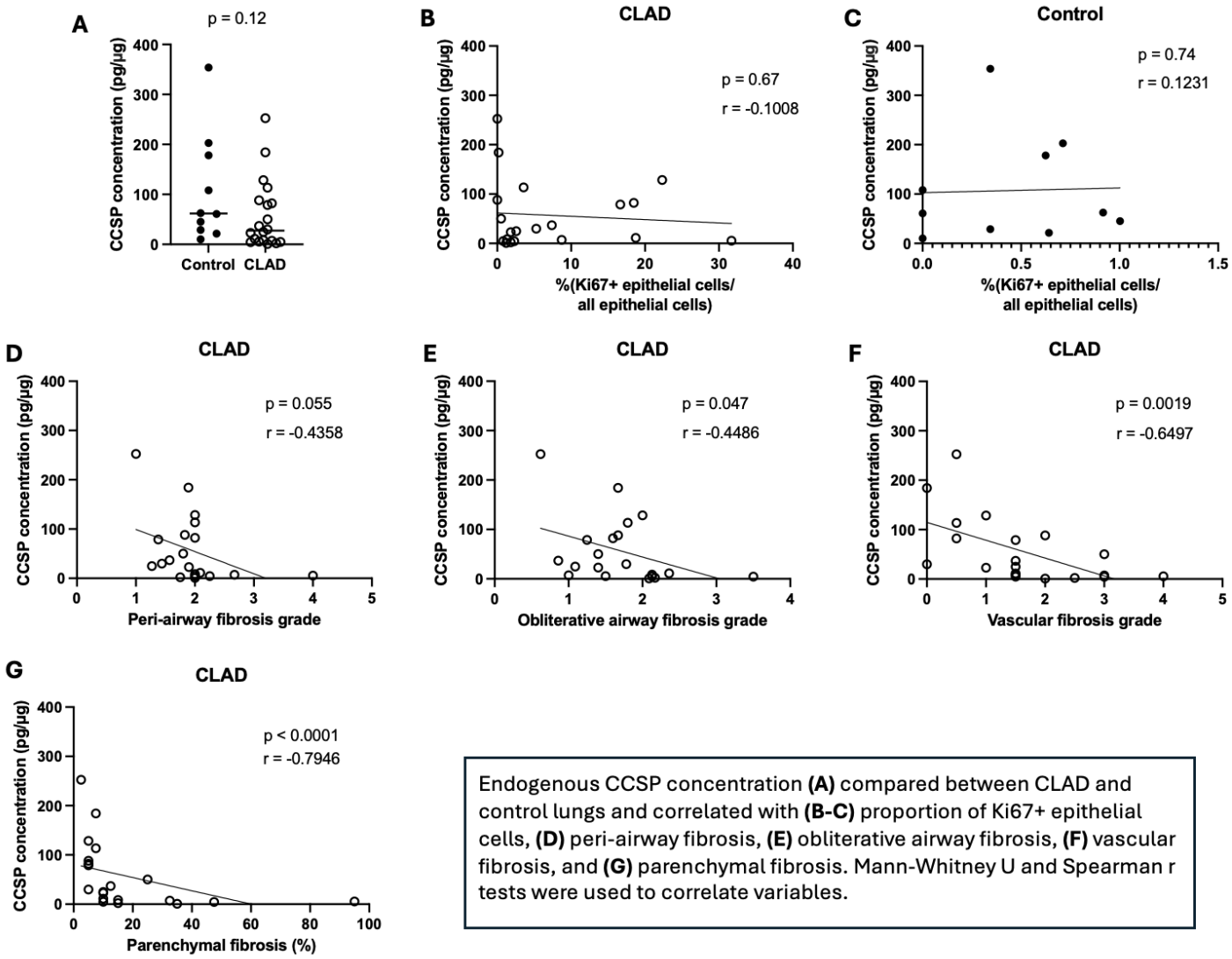
Methods: Explanted CLAD lung samples from lung transplant recipients undergoing retransplantation (n=20) and excess control donor lung tissue (n=10) were collected. Fibrosis severity was scored on elastic-trichrome-stained formalin-fixed paraffin-embedded tissue sections by blinded, semi-quantitative grading. AEC proliferation was evaluated using immunofluorescence for the proliferation marker Ki67. Adjacent frozen samples were homogenized, and eCCSP levels were measured by ELISA and normalized to total protein.

Results: eCCSP levels showed a decreased trend in CLAD compared to control lungs and were not linked to proportions of pancytokeratin+ Ki67+ proliferating AECs (Fig A-C). Higher eCCSP levels in CLAD lungs were associated with a reduced trend in peri-airway fibrosis and significantly correlated with lower severity in obliterative airway ($p=0.047$), vascular ($p=0.0019$), and parenchymal ($p<0.0001$) fibrosis grades (Fig D-G).

Conclusion: eCCSP levels do not correlate with AEC proliferation in CLAD or control lungs, but higher eCCSP levels are significantly associated with lower fibrosis severity in CLAD. Future studies will explore CCSP supplementation and its potential effects on fibrosis in human CLAD.

This project is partially funded by the CGS-M, Peterborough K.M Hunter Charitable Foundation, University of Toronto’s URF, NSERC USRA, and the Cystic Fibrosis Foundation

Figure for abstract 12.



Endogenous CCSP concentration **(A)** compared between CLAD and control lungs and correlated with **(B-C)** proportion of Ki67+ epithelial cells, **(D)** peri-airway fibrosis, **(E)** obliterative airway fibrosis, **(F)** vascular fibrosis, and **(G)** parenchymal fibrosis. Mann-Whitney U and Spearman r tests were used to correlate variables.

Abstract #13

Inspiratory Muscle Loading and Associated Dyspnea Impairs Computer-Simulated Driving in Older Adults

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Introduction and Objectives: Respiratory muscle effort with associated dyspnea increases cortical activation related to respiratory muscle recruitment, attention, emotional regulation, and motor planning. These added cognitive loads may interfere with the complex interactive cognitive and physical demands of driving. This study aimed to determine if inspiratory threshold loading (ITL) increases computer-based simulated driving error with associated subjective experiences of dyspnea and affect in older healthy adults.

Methods: Fifteen healthy adults (age 63±12 years, 8M:7F) were recruited and performed maximal inspiratory pressures (MIP) and spirometry (FEV1). Using a repeated measures design, three tasks were performed in a randomized, counterbalanced sequence: Driving (Drv), ITL at 20 cmH2O, and combined Drv+ITL. Simulated driving was conducted via computer-based software featuring preplanned routes matched for length and difficulty. Infractions were tallied and weighted according to the following: Vehicle Control (4 points), Speed Limits (3 points) and Signalling (2 points). Functional connectivity of prefrontal cortex was evaluated by functional near infrared spectroscopy. Also evaluated were: Borg Dyspnea Intensity; Self-Assessment Manikin (SAM) responses of happiness, control and chest pressure; ventilatory measures; mean arterial pressure (MAP); and heart rate (HR).

Results: Driving errors were greater during Drv+ITL versus Drv: Vehicle control (Drv+ITL: 15.5±7.1, Drv: 10.4±5.8; p=0.004) and Total (Drv+ITL 26.5±9.8, Drv: 20.4±7.9, p=0.015). Functional connectivity was less during Drv+ITL compared to Drv - two versus seven significant correlations between dorsolateral and medial prefrontal cortex channels, respectively. Compared to Drv, Drv+ITL increased Borg Dyspnea Intensity ($p \leq 0.013$) and decreased sense of control compared to baseline ($p \leq 0.013$). For Drv+ITL, DASS-21 subscales were strongly associated with Vehicle Control error (r=0.71, p=0.001) and Total Driving error (r=0.620, p=0.007).

Conclusions: Inspiratory loading associated with dyspnea in older healthy adults impaired simulated driving performance and induced divergent functional connectivity. Negative affect was associated with more driving error when driving was combined with inspiratory loading.

The study was financially supported by CIHR (PJT 183640), Pettit Block Grant and the Department of Physical Therapy, University of Toronto. DR receives research support from NSA Chair in Respiratory Rehabilitation West Park Health Center (UHN).

Abstract #14

A Biologically-Inspired Digital Twin for COPD using Ex Vivo Lung Perfusion

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) involves airflow obstruction and respiratory complications due to alveolar remodeling. COPD has no cure, and traditional treatments focus on symptom management. Emerging biotherapeutics target COPD's complex pathogenesis, but progress is limited by inadequate preclinical models. This project leverages digital twins (DTs) of human lungs generated during ex vivo lung perfusion (EVLP) as a novel preclinical platform for therapeutics. Previous work by our group has shown that the DT can accurately forecast lung function using multimodal data collected during EVLP. The objective of the current study is to finetune the DT to incorporate biological parameters of emerging COPD biologics, specifically testing the feasibility and forecasting accuracy of interleukin-33 (IL-33), a key mediator of inflammation and drug target for COPD.

Methods: We investigated whether IL-33 was detectable at the gene and protein level during clinical EVLP. Retrospective microarray data were available for 88 EVLP cases conducted between 2009-2015. Lung tissue biopsies were taken pre-EVLP and post-EVLP, and microarray analysis was performed using the Clariom D assay. Protein concentrations were measured in 8 EVLP cases conducted between 2025-2026. Perfusate samples were collected 60, 75, 90, and 105 minutes after the start of perfusion. The IL-33 assay was performed using an automated sandwich ELISA. DT gene expression forecasting was performed using an eXtreme Gradient Boost model.

Results: IL-33 mRNA and protein levels were detectable during all clinical EVLP cases. mRNA expression ranged from 3 to 7 RMA, with protein concentrations reaching 100pg/mL. Pilot DT forecasting performance for predicting post-EVLP IL-33 mRNA expression achieved a 92.1% accuracy.

Conclusion: IL-33 is detectable during clinical EVLP. Moreover, IL-33 can be accurately forecasted using an ex vivo digital twin. These results highlight the feasibility of incorporating the IL-33 biomarker into a COPD-specific digital twin that will support the development of novel therapeutics.

Abstract #15

Risk Factors for Baseline Lung Allograft Dysfunction (BLAD): a Retrospective Study

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Introduction & Objectives: BLAD is a form of lung allograft dysfunction defined by abnormally low baseline spirometric measurements after transplantation that has been linked to poor long-term survival. However, risk factors for the development of BLAD remain incompletely understood. In this study we studied a large single center cohort to discover risk factors for the development of BLAD.

Methods: We retrospectively analyzed 1,415 adult first lung transplant recipients (LTRs) in our center from 2000 to 2018. BLAD was defined as the baseline FEV_1 or FVC (based on two highest measurements at least three weeks apart) <80% predicted, assessed at 1 year +/- 1 month post-transplant. Recipient and donor characteristics were compared between LTRs with and without BLAD and analysed using t and χ^2 tests. Continuous data are reported as median [IQR].

Results: Of 1,415 LTRs, 613 (43%) met criteria for BLAD at 13 months. BLAD recipients were more often male (61% vs 55%, $p = 0.03$), less likely to have bilateral transplants (75% vs 91%, $p < 0.001$), and more frequently transplanted for pulmonary fibrosis (50% vs 29%, $p < 0.001$). BLAD recipients were heavier (69 vs 65 kg, $p < 0.001$) with higher urgency status (31% vs 20% status 3, $p<0.001$) at transplant. Donors of BLAD recipients were older (49 vs 46 years), shorter (170 vs 173 cm), and had smaller predicted lung volumes (6.23 vs 6.68 L; all $p < 0.001$). Categorically, undersized grafts (donor/recipient pTLC < 0.8) were more common in BLAD (8.9% vs 3.8%), while oversized grafts (> 1.2) were less frequent (11% vs 19%, $p < 0.001$). Other donor characteristics were similar between groups (Table 1 - please see attached file).

Conclusion: Male, heavier, and sicker recipients were at higher risk of BLAD. Importantly, characteristics that highlight a lower lung volume for a given recipient appear to be associated with BLAD. These findings suggest that relative graft undersizing may contribute to the development of BLAD and this information may help guide donor-recipient size matching and selection strategies to optimize post-transplant lung allograft function.

Figure for abstract 15.

Table 1. Recipient, Donor, and Transplant Characteristics by Presence of Baseline Lung Allograft Dysfunction (BLAD)

Variable	No BLAD (n = 802)	BLAD (n = 613)	p-value
Recipient characteristics			
Age at transplant, years	57 [45–63]	56 [43–63]	0.3
Sex, male	439 (55%)	371 (61%)	0.03
Transplant type			
Bilateral	732 (91%)	457 (75%)	<0.001
Left single	38 (4.7%)	77 (13%)	
Right single	32 (4.0%)	79 (13%)	
Primary diagnosis			
Pulmonary fibrosis (other specified)	232 (29%)	309 (50%)	<0.001
COPD / Emphysema	249 (31%)	88 (14%)	
Cystic fibrosis	161 (20%)	84 (14%)	
Other (combined minor diagnoses)	160 (20%)	132 (22%)	
Status at transplant admission			
0	2 (0.2%)	0 (0%)	<0.001
1	257 (32%)	128 (21%)	
2	384 (48%)	298 (49%)	
3	159 (20%)	187 (31%)	
Donor characteristics			
Age, years	46 [30–57]	49 [36–59]	<0.001
Sex, female	337 (42%)	296 (48%)	0.02
Type (DBD vs DCD)	88% vs 12%	88% vs 12%	0.7
Cigarette use	421 (52%)	286 (47%)	0.11
Anthropometrics and size matching			
Recipient weight, kg	65 [55–75]	69 [56–81]	<0.001
Recipient height, cm	168 [161–174]	169 [160–175]	0.12
Donor height, cm	173 [165–180]	170 [162–178]	<0.001
Donor pTLC, L	6.68 [5.48–7.58]	6.23 [5.23–7.22]	<0.001
Recipient pTLC, L	6.08 [5.19–7.04]	6.47 [5.20–7.13]	0.07
Donor/Recipient pTLC ratio (categorical)			
<0.8	30 (3.8%)	54 (8.9%)	<0.001
0.8–1.2	615 (77%)	487 (80%)	
>1.2	150 (19%)	68 (11%)	

Abstract #16

Respiratory Manifestations In Ehlers-Danlos Syndrome (EDS) And Generalized Hypermobility Spectrum Disorder (G-HSD) : Meeting Report And Future Considerations

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Introduction/Objectives: EDS and G-HSD are multifaceted and can impair quality of life, but management strategies remain poorly established. We lack validated patient-reported outcome measures (PROMs) and traditional pulmonary investigations often fail to capture multifactorial contributions to respiratory symptoms, limiting diagnosis and management. To address these knowledge gaps, a multidisciplinary panel was convened to (1) review the pathogenesis, evaluation, diagnosis and management of respiratory manifestations in EDS/G-HSD; (2) discuss interdisciplinary practices to improve the patient and provider experience; and (3) develop future research directions.

Methods: A two-day virtual meeting of 35 international multidisciplinary experts from respirology, cardiology, gastroenterology, otolaryngology, anesthesiology, physical therapy, nursing, psychology and patient partners took place in April 2025. The meeting included didactic presentations, panel discussions, interactive breakout sessions, and group discussions, which were synthesized.

Results: The meeting discussions were grouped into four themes which were endorsed by patient partners: 1) Symptom framework and pathogenesis: Respiratory symptoms often arise from the interplay of structural, functional, inflammatory, and autonomic mechanisms. 2) Multisystem considerations: Conditions such as dysautonomia, gastroesophageal reflux symptoms, thoracic spine and rib cage instability with impaired proprioception, craniocervical instability, increased collapsibility of the airway, dysimmunity, and anxiety may exacerbate respiratory manifestations, including during sleep. 3) Diagnostic tools and limitations: Standard pulmonary investigations may overlook functional impairments; thus, diaphragmatic ultrasound and cardiac autonomic assessments may be helpful. 4) Management strategies: Nonpharmacologic approaches (e.g., breathing strategies, exercise/rehabilitation programs, whole body postural optimization) were deemed important. Key research priorities were proposed (see Table 1).

Conclusion: The meeting brought together multidisciplinary experts to discuss key respiratory manifestations, assess current diagnostic and management strategies and establish important research priorities to improve quality of life in EDS/G-HSD. The meeting outcomes emphasized management strategies and research priorities that combine medical, rehabilitative, and psychosocial interventions to support multidisciplinary care.

Supported by: (1) CIHR Meeting Grant ; (2) The Ehlers Danlos Society

Figure for abstract 16.

Table 1. Clinical and Research Gaps in EDS/G-HSD Respiratory Care

1. Symptom framework and pathogenesis	• What are the mechanistic contributions (i.e. asthma, diaphragm dysfunction, etc.) to respiratory manifestations in EDS and G-HSD?
2. Multisystem considerations	• What is the best way to promote collaborative care models integrating pulmonology, cardiology, allergy/immunology, gastrointestinal, neurological, and physical therapy assessments to address overlapping symptoms?
3. Diagnostic tools and limitations	• Can access to sleep assessment be expanded with portable or novel home-based sleep testing in the EDS/G-HSD population?
4. Management strategies	• What is the best approach to evaluate mechanisms underlying cellular and genetic alterations (i.e. extracellular matrix remodelling, fibroblast dysfunction) with clinical phenotypes?

Note: EDS = Ehlers-Danlos syndrome, G-HSD = generalized hypermobility spectrum disorder

Abstract #17

Pro-Inflammatory LILRB2+ Pulmonary Macrophages Recruit Activated T Cells In Chronic Lung Allograft Dysfunction (CLAD)

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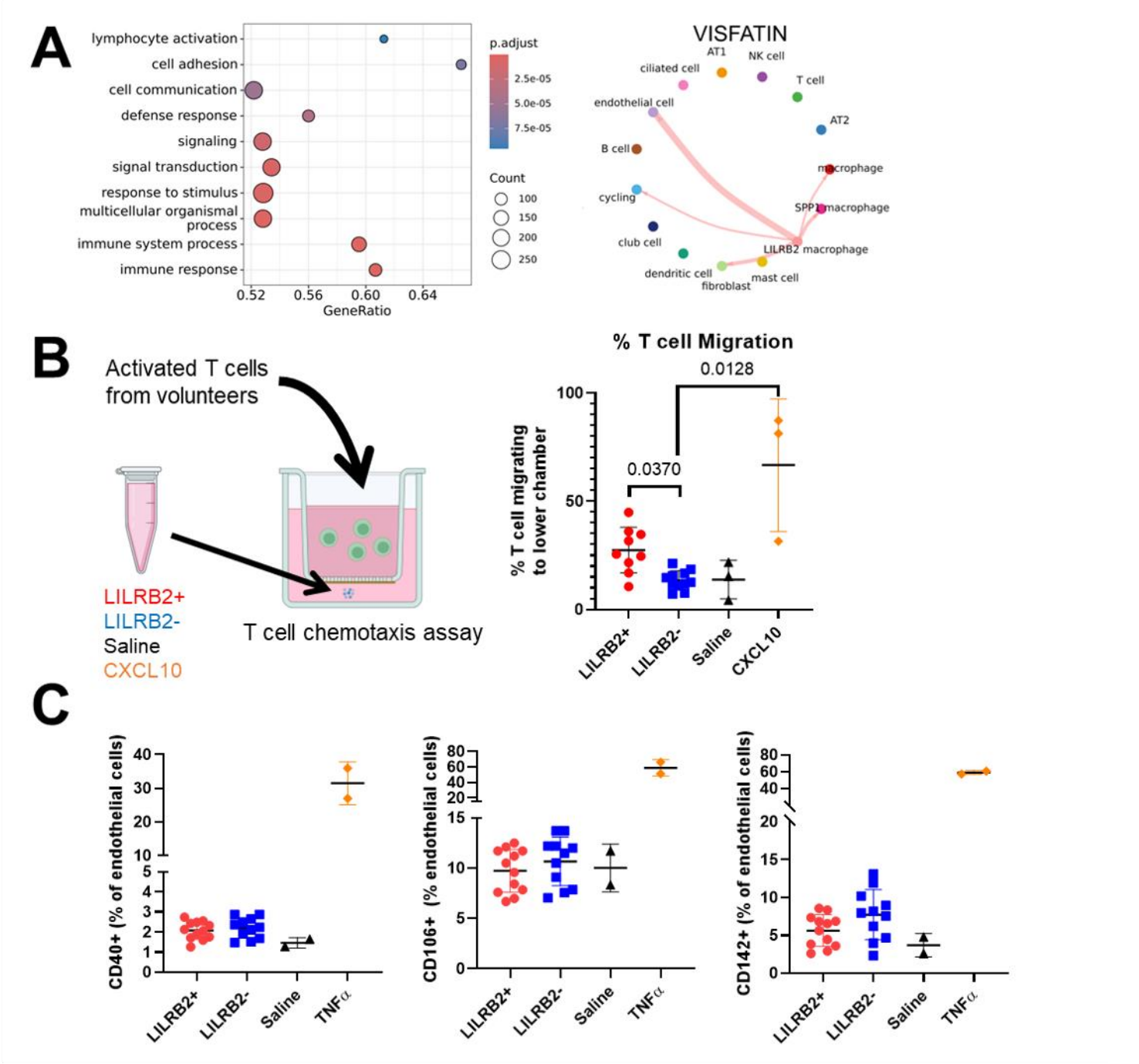
Introduction & Objectives: CLAD is the leading cause of death in lung transplant recipients. In single cell RNA sequencing data from explanted CLAD lungs, we identified a distinct subset of macrophages (MΦ) expressing pro-inflammatory genes (AIF1, IFITM1, IL1B) and surface marker LILRB2. Cell-cell interactions inference revealed potential LILRB2+ MΦ-T cell and LILRB2+ MΦ-endothelial cell communications that required validation. We hypothesized that LILRB2+ MΦ can drive inflammation in CLAD through these interactions.

Methods: Single cell suspensions from CLAD (n = 12) and donor (n = 4) lung tissue underwent spectral-enhanced fluorescence-activated cell sorting to isolate LILRB2+ and LILRB2- MΦs. Sorted MΦ were cultured for 24h and supernatants was harvested. Healthy volunteer T cells were activated (anti-CD3/anti-CD28 beads for 3 days) and chemotaxis was assessed using a transwell migration assay, measuring T cell migration into the lower chamber with media supplemented with LILRB2+ or LILRB2- MΦ supernatant, saline or positive-control CXCL10 (100 ng/ml). HULEC-5a endothelial cell line was cultured in media supplemented with LILRB2+ or LILRB2- MΦ supernatant, saline, or positive-control TNFα (10 ng/ml), until reaching confluency and subsequently assessed via flow cytometry for activation markers (CD40, CD106, CD142).

Results: More T cell chemotaxis was observed with LILRB2+ versus LILRB2- MΦ supernatant (Figure A). HULEC-5a endothelial cells treated with LILRB2+ MΦ showed no change in activation markers when compared to endothelial cells treated with LILRB2- MΦ or saline controls (Figure B).

Conclusion: LILRB2+ MΦ promoted T cell chemotaxis via soluble factors, which may contribute to greater inflammatory and T cell-mediated responses observed in CLAD. Endothelial cells were not affected by LILRB2+ MΦ supernatant, implying that a direct cell-cell contact may be required to have an effect on endothelium; this possibility will be tested in a direct co-culture assay.

Figure for abstract 17.



Abstract #18

Impact Of Obstructive Lung Disease On Survival In Patients With Rheumatoid Arthritis Related Interstitial Lung Disease

Lee Fidler (1,2,3,4); Omri Arbiv (1,2,5); Jolene Fisher (2,3); Shane Shapera (2,3); Andrea S. Gershon (1,2,4,5,6)

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Introduction & Objectives: Chronic obstructive pulmonary disease (COPD) and asthma are common comorbidities in rheumatoid arthritis related interstitial lung disease (RA-ILD), yet their impact on health outcomes is poorly understood. Using health services data from Ontario, Canada, we aimed to evaluate the effect of COPD, asthma and COPD/asthma overlap (ACO) on survival in patients with RA-ILD.

Methods: We utilized health services data from the validated Ontario Rheumatoid Arthritis Disease database to identify people with RA-ILD between 2003 and 2022. Kaplan-Meier curves were generated with unadjusted median survival estimates and Log-Rank testing to evaluate between groups differences. We applied a Cox-proportional hazards model to estimate the hazard for mortality in RA-ILD patients with COPD, asthma and ACO compared to RA-ILD without obstructive lung disease.

Results: Among 6,470 RA-ILD patients, 4,437 (68.6%) were diagnosed with obstructive lung disease: 2,517 (38.9%) with isolated COPD, 560 (8.7%) with asthma, and 1,360 (21.0%) with both ACO. The unadjusted survival for RA-ILD patients with COPD, asthma and ACO was measured as 4.8, 13.0, and 6.0 years respectively compared to 9.4 years in RA-ILD without obstructive airways disease. After adjusting for patient demographics and comorbidities, RA-ILD patients with isolated COPD experienced the highest hazard for mortality [HR 1.45 (95%CI 1.32-1.59), $p<0.0001$], followed by ACO [HR 1.18 (95%CI 1.06-1.31), $p=0.003$], and asthma alone [HR 0.90 (95%CI 0.76-1.07), $p=0.24$] compared to RA-ILD patients without obstructive lung disease.

Conclusions: The burden of obstructive lung disease in RA-ILD is high. Mortality is increased among patients with RA-ILD and comorbid COPD or ACO compared to those with RA-ILD alone.

This study was supported by ICES, which is funded by an annual grant from the Ontario Ministry of Health (MOH) and the Ministry of Long-Term Care (MLTC). The University of Toronto Pettit Block Grant and the Canadian Pulmonary Fibrosis Foundation provided funding for this research. This document used data adapted from the Statistics Canada Postal CodeOM Conversion File, which is based on data licensed from Canada Post Corporation, and/or data adapted from the Ontario Ministry of Health Postal Code Conversion File, which contains data copied under license from © Canada Post Corporation and Statistics Canada. Parts of this material are based on data and/or information compiled and provided by the Ontario Ministry of Health. Parts of this material are based on data and/or information compiled and provided by the Canadian Institute for Health Informatics (CIHI). Parts of this report are based on Ontario Registrar General (ORG) information on deaths, the original source of which is ServiceOntario. Parts of this material are based on data and/or information compiled and provided by the Immigration, Refugees and Citizenship Canada (IRCC) Permanent Resident Database current to 2022. The analyses, conclusions, opinions, and statements expressed herein are solely those of the authors and do not reflect those of the funding or data sources; no endorsement is intended or should be inferred.

Abstract #19

Lung Transplantation In Rheumatoid Arthritis Related Interstitial Lung Disease: Risk Factors And Mortality In A Universal Health Care System

Lee Fidler [1,2,3,4]; Omri Arbiv [1,2,5]; Joseph Munn [4,6]; Jolene Fisher [2,3]; Shane Shapera [2,3]; Peter Austin [4,5,6]; Andrea Gershon [1,2,4,5,6]

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Introduction & Objectives: Despite best therapy, some patients with rheumatoid arthritis related interstitial lung disease (RA-ILD) require lung transplantation for progressive disease. We aimed to identify factors associated with lung transplantation and post-transplantation survival in RA-ILD.

Methods: We performed a retrospective observational cohort study using data from Ontario, Canada between 2003 and 2022. RA-ILD patients were identified from the Ontario RA Database. We used a cause-specific hazards model, considering the competing risk of death, to identify factors associated with lung transplantation. A Cox proportional hazards model was used to evaluate post-transplant survival.

Results: Among 6,470 RA-ILD patients, 77 (1.2%) underwent lung transplantation, equating to 2.40 transplants per 1,000 person years. The median time to transplant was 3.7 years. Younger age [HR 1.08 per declining year (95%CI 1.05-1.10), p<0.0001], male sex [HR 2.40 (95%CI 1.52-3.78), p=0.0002], and comorbid diabetes [HR 1.70 (95%CI 1.06-2.73), p=0.003], congestive heart failure [HR 1.87 (95%CI 1.15-3.04), p=0.01] and COPD [HR 2.14 (95%CI 1.25-3.68), p=0.006] were associated with transplantation. The median survival following transplantation was 4.3 years.

Conclusions: Lung transplantation is an uncommon, but important therapy for RA-ILD. Select comorbidities are associated with lung transplantation. Post-transplant survival in RA-ILD is shorter than the median survival for lung transplantation reported elsewhere.

This study was supported by ICES, which is funded by an annual grant from the Ontario Ministry of Health (MOH) and the Ministry of Long-Term Care (MLTC). The University of Toronto Pettit Block Grant and the Canadian Pulmonary Fibrosis Foundation provided funding for this research. This document used data adapted from the Statistics Canada Postal CodeOM Conversion File, which is based on data licensed from Canada Post Corporation, and/or data adapted from the Ontario Ministry of Health Postal Code Conversion File, which contains data copied under license from © Canada Post Corporation and Statistics Canada. Parts of this material are based on data and/or information compiled and provided by the Ontario Ministry of Health. Parts of this material are based on data and/or information compiled and provided by the Canadian Institute for Health Informatics (CIHI). Parts of this report are based on Ontario Registrar General (ORG) information on deaths, the original source of which is ServiceOntario. Parts of this material are based on data and/or information compiled and provided by the Immigration, Refugees and Citizenship Canada (IRCC) Permanent Resident Database current to 2022. The analyses, conclusions, opinions, and statements expressed herein are solely those of the authors and do not reflect those of the funding or data sources; no endorsement is intended or should be inferred. Funding Previous grants provided by the University of Toronto Pettit Block Grant and the Canadian Pulmonary Fibrosis Foundation contributed to this research.

Abstract #20

Pathogenically Reprogrammed Club Cells in Diseased Lung Tissue

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Introduction and Objectives: Club cells are an important airway epithelial population that contribute to lung homeostasis through the secretion of club cell secretory protein (CCSP). Club cell loss has been widely associated with pulmonary diseases like chronic lung allograft dysfunction (CLAD) and chronic obstructive pulmonary disease (COPD). Our preliminary single-cell RNA-sequencing (scRNAseq) data suggest that an aberrant subpopulation of club cells, characterized by pro-inflammatory and pro-fibrotic gene signatures and expression of fibroblast growth factor binding protein 1 (FGFBP1) (Figure 1A), is enriched in CLAD. This cluster was revealed to have reduced CCSP expression, necessitating the use of novel scRNAseq-informed surface markers such as tetraspanin 8 (TSPAN8) to identify club cells. In this study, we aim to identify club cells through TSPAN8 expression, and validate FGFBP1 expression at the protein level.

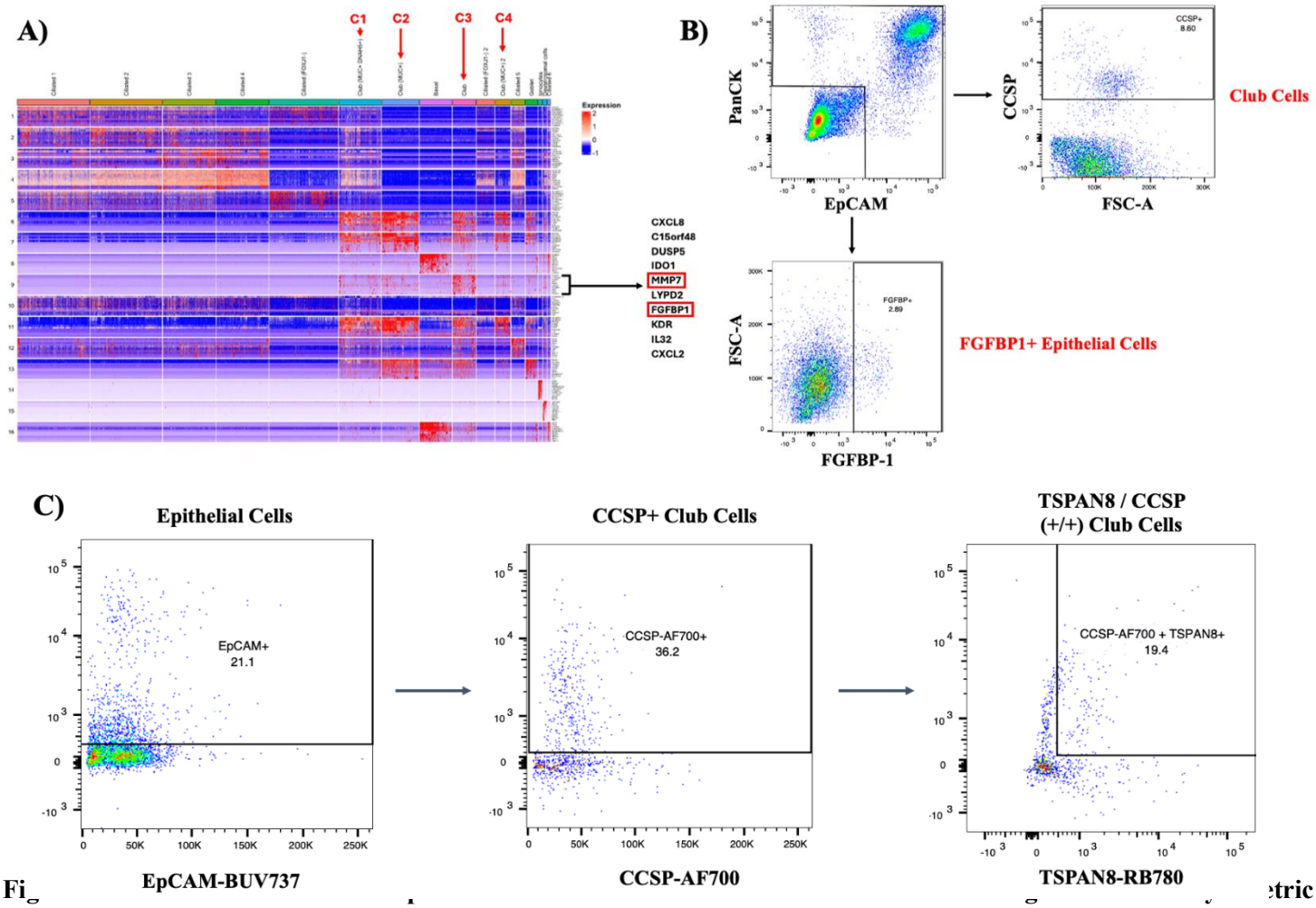
Methods: Using a tissue dissociation protocol optimized for enrichment of pulmonary epithelial cells, diseased lung tissue was made into single-cell suspensions and analyzed using flow cytometry. Epithelial cells (defined as EpCAM+ and/or PanCK^{+}) were identified and assessed for FGFBP1, TSPAN8, and CCSP expression.

Results: We have identified epithelial cells and club cells positive for intracellular CCSP (Figure 1B) in COPD and CLAD lung tissue. Epithelial, specifically club cell, FGFBP1+ expression was successfully detected at the protein level in preliminary analyses of COPD lung (Figure 1B). TSPAN8 was detected in only a subset of CCSP+ epithelial cells in CLAD lung tissue (Figure 1C).

Conclusion: While additional replicates are warranted, our data illustrate that epithelial cells can express FGFBP1 in disease contexts. The restricted expression of TSPAN8 to a fraction of club cells suggests limited utility as a broadly applicable surface marker, but instead may serve as indicative of distinct club cell states. Future studies are required to assess the expression spectrum and role of FGFBP1 in CLAD club cells.

Acknowledgements: The University of Toronto, University Health Network, Toronto Lung Transplant Program (TLTP), and my CLAD Team!

Figure for abstract 20.



Fi **tric Panels that Corroboration Preliminary Transcriptomic Data.** Transbronchial brushing samples collected from n = 5 stable and n = 5 ALAD/CLAD patients underwent single cell RNA-sequencing, and analysis was conducted using the R package Seurat. Club cells were defined as TSPAN8^{+} and SCGB1A1^{+}: SCGB1A1 is the gene that encodes CCSP. (A) Within identified club cell subclusters, cluster 3 ("C3") had differentially upregulated expression of pro-fibrotic and pro-inflammatory markers such as FGFBP1, and was significantly expanded in the context of lung fibrosis. (B) For all analyses, epithelial cells were gated as EpCAM+ and/or PanCK^{+}, of which a distinct FGFBP1^{+} population was detected in the context of fibrosis: epithelial cells were gated following the exclusion of non-epithelial lineages and autoflourescence. In all flow cytometry analyses, samples are derived from explanted lung tissue (CLAD, Idiopathic Pulomnary Fibrosis, Chronic Obstructive Pulmonary Disease, healthy donor) and single-cell suspensions were prepared following the Fujino Method—a tissue dissociation protocol optimized to enrich yield of pulmonary epithelial cells. (C) Club cells are traditionally defined by their intracellular expression of CCSP, which hinders downstream functional analysis due to cellular fixation and membrane permeabilization. Thus, the identification of club cells aside from CCSP, using novel surface markers such as Tetraspanin 8–enriched on club cell surfaces in preliminary 3' based sc RNA-seq data—is of utmost importance in order to identify, isolate, and functionally characterize club cells contributing to CLAD progression. An example gating strategy is shown for TSPAN8 / CCSP dual-expression airway epithelial cells.

Abstract #21

Post-Transplant Ambient Air Pollution And Respiratory Infections And The Risk Of Baseline Allograft Dysfunction

Anne Fu (1); Teresa To (3,4); Ella Huszti (5); Chung-Wai Chow (1,2)

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Background: Lung transplant recipients with baseline lung allograft dysfunction (BLAD), defined as failure to achieve forced expiratory volume in 1 second and forced vital capacity ≥ 80% predicted, have impaired survival. Air pollution is one of the world's most significant health and environmental concerns. The current study investigated the risk attributable to air pollution and the frequency of respiratory infections in the development of BLAD.

Methods: The cohort comprised of bilateral lung transplant recipients from January 2010-December 2017, who survived more than 1-year and were followed for a minimum of 2 years (n=601). Patient demographic, clinical parameters, and respiratory infections were extracted from the Toronto Lung Transplant Database. Pollution parameters PM2.5, NO2, and smoke were obtained from the Canadian Urban Environmental Health Research Consortium for the first two years post-transplant. Statistical analysis included one-way ANOVA, Kruskal–Wallis, and Pearson's chi-squared test for comparisons among groups. Conditional multivariable logistic regression analysis was used to assess the strength of associations between pollution parameters and BLAD.

Results: In the cohort, 250 patients achieved a normal baseline, while 351 patients had BLAD. Compared to patients who achieved a normal baseline, BLAD patients were significantly younger, of higher weight, higher prevalence of positive panel of reactive antibodies (PRA) at the time of transplant, and interstitial lung disease as the primary diagnosis. BLAD patients were exposed to higher NO2 ($p=0.005$) and smoke ($p=0.035$), had a higher rate of infections per month ($p=0.013$) compared to normal patients.
PM2.5, smoke, and NO2 were individually associated with BLAD after adjustments for clinical covariates. NO2 remained significant in the multi-pollutant model (OR: 1.47 [1.01-2.14], $p<0.05$), and this association is partially mediated by infection rate.

Conclusion: Exposure to higher levels of ambient air pollution was positively associated with BLAD and was significantly associated with more frequent respiratory infections post-transplant.

The study was funded by the CIHR-NSERC Collaborative Health Research Projects, the Peterborough K.M. Hunter Charitable Foundation Graduate Award (AF), and the CLA and CIHR-ICRH Research Studentship (AF). Dr. Hantos is supported by Hungarian Scientific Research Fund Grant K128701. We thank all the patients, Chow Lab members, and Toronto General Pulmonary Function Lab for their contributions.

Abstract #22

Non-Tuberculous Mycobacteria (NTM) Infection In Organ Transplant Recipients: Outcomes And Health Resource Utilization

Anne Fu (1); Sarah Brode (1,3,4); Teresa To (4,5,6); Ella Huszti (7); Anne Stephenson (1,8); Chung-Wai Chow (1,2)

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Rationale: NTM is an emerging threat to immunocompromised individuals such solid organ transplant (SOT) recipients. Treatment is guided by multiple factors and usually requires prolonged multi-drug regimens of months to years. Despite evidence to support NTM as a significant comorbidity in SOT recipients that increases the risk of graft failure and death, there is limited data regarding its impact on health resource utilization (HRU). This study compared the clinical characteristics of SOT recipients with NTM infection and HRU in Canada.

Methods: A retrospective analysis of 10,799 solid organ recipients transplanted between April 1, 2002, and March 31, 2018. The HRU was tabulated up to December 31, 2023, using the health administrative databases housed at ICES: physician claims, hospitalization data, and emergency department visits. NTM infection was identified by the ICD-10-CM diagnosis codes: A31.0 for pulmonary mycobacterial infection and B37-B49 for fungal infections. Pairwise comparisons between groups were performed with Wilcoxon tests followed by Bonferroni correction. HRU was calculated as use per person year.

Findings: In the study cohort, 188 patients experienced an NTM infection post-transplant. Individuals with NTM infection had significantly longer hospitalization post-transplant surgery ($p<0.001$) and higher percentage had pulmonary co-morbidities pre-transplant ($p<0.001$). Compared to the other SOT recipients, lung recipients had the highest rate of NTM infection (77.1). HRU was greater post-NTM infection compared to pre-infection, attributable to increased number and duration of hospitalization count, higher number of visits to the emergency department, general practitioner and specialist visits, as well as costs paid by the Ontario Drug Benefit.

Conclusions: SOT recipients who developed NTM infection were predominantly lung transplant recipients and/or individuals with pre-transplant pulmonary comorbidities. Closer post-transplant follow-up of these patients is warranted to enable preventive strategies and earlier diagnosis for NTM disease.

The study was funded by the CIHR-NSERC Collaborative Health Research Projects, the Peterborough K.M. Hunter Charitable Foundation Graduate Award (AF), and the CLA and CIHR-ICRH Research Studentship (AF). Dr. Hantos is supported by Hungarian Scientific Research Fund Grant K128701. We thank all the patients, Chow Lab members, and Toronto General Pulmonary Function Lab for their contributions.

Abstract #23

Harnessing Lung-kidney Crosstalk: A Novel Ex Vivo Platform For Donor Lung Rehabilitation

Fei Yu Gao, Guillermo Garza, Gabriel Siebiger, Aizhou Wang, Marco Bosone, Nadav Furie, Juan Montagne, Francisco Novoa, Alberto Bruning Guimaraes, Paolo Oliveira Melo, Kenji Nakamura, Yu Zhang, Matheus Peti, Miguel Martinez Santos, Jenny Yune, Markus Selzner, Mingyao Liu, Shaf Keshavjee, Marcelo Cypel

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Introduction: Ex vivo Lung Perfusion (EVLP) is used to assess and repair donor lungs prior to transplantation. However, the current EVLP technique allows only 12 hours of stable perfusion, likely due to a lack of perfusate homeostasis control. For lung optimization therapies that require longer perfusion, an improved system is needed. We hypothesize that adding a kidney to EVLP provides better homeostatic control and has the potential to enable longer perfusion. This study explores the safety and feasibility of a novel ex vivo lung-kidney perfusion (EVLKP) technique and investigates potential organ crosstalk between kidney and lungs in isolated perfusion.

Methods: Donor porcine lungs (n=5/group) and kidneys were procured with minimal cold ischemia and placed on normothermic ex vivo perfusion with (EVLKP) or without a kidney (EVLP). The perfusate of both systems consisted of a low potassium dextran solution with albumin (LPD2a) and washed RBCs from the pig donor for a final 10-15% hematocrit. Lung function was evaluated over 12h of EVLP. Lung injury, edema and inflammation were analyzed post preservation.

Results: Lungs in both groups demonstrated stable perfusion for 12 hours. EVLKP lungs had improved static ($P=0.06$) and dynamic compliance ($P=0.06$), lower pulmonary vascular resistance ($P=0.08$) and peak inspiratory pressure ($P=0.13$). EVLKP perfusate had lower lactate ($P<0.0001$), higher glucose ($P=0.01$), and more physiologic pH compared to EVLP ($P=0.0009$). EVLKP lungs showed less edema ($P=0.06$). No difference in inflammatory profile was observed between groups. Untargeted proteomics reveal clear difference in perfusate proteome at 1h and 12h.

Conclusion: We demonstrate for the first time the feasibility and safety of a combined ex vivo system perfusing both lungs and kidney. Interestingly, EVLKP enhanced lung physiology as well as perfusate metabolic and acid-base homeostasis in isolated organ perfusion. Further studies using lung repair therapies harnessing the concept of the EVLKP system are being performed.

Canadian Institutes of Health Research, New Frontiers in Research Fund, Institute of Medical Science UofT

Abstract #24

Reduce, Recycle, Reimagine: The Analysis of a Novel Inhaler Recycling Program

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Introduction: Inhalers are essential for managing chronic respiratory diseases, yet contribute to healthcare-related greenhouse gas (GHG) emissions and material waste. Specifically, metered dose inhalers (MDIs) use hydrofluorocarbon propellants – potent GHGs that continue to seep from devices after disposal. In Canada, 70% of inhalers end up in landfills, making disposal practices a key target for carbon emission and waste reduction.
Objectives
In a project designed to implement the Canadian Thoracic Society's Choosing Wisely recommendation, we launched a specialized inhaler recycling program, evaluating feasibility, environmental benefits and MDI usage patterns.

Methods: We deployed 14 'GoZero' inhaler recycling boxes at four hospitals (specialty outpatient clinics, inpatient units and pulmonary function labs) and two family health clinics in Ontario, with appointment reminders to bring in inhalers for recycling, where feasible. We measured the number and types of devices collected, recovered plastic and metal weight, and recovered residual propellant. We calculated corresponding carbon dioxide equivalent (CO_2e) savings using CASCADES emissions data and the US waste reduction model. MDIs were classified as underused (>50% of doses remaining), used (>10 to ≤50%), empty (0 ±10%), or overused (>10% below 0).

Results: To date, we have collected 2054 inhalers (1044 MDIs; 813 dry-powder inhalers; 197 soft-mist inhalers), diverting 72kg of plastic and metal waste and saving 6.3 metric tonnes of CO_2e (equivalent to 29,888km travelled in a gas powered car). Specialty clinics and inpatient units demonstrated higher collection rates than community sites (averaging 52 vs 12 inhalers per month, respectively). Most MDIs were used suboptimally (26% overused; 33% underused).

Conclusions: Inhaler recycling is feasible in healthcare settings, with meaningful material waste and carbon diversion. Suboptimal MDI usage patterns suggest the need for better strategies for safe and efficient inhaler use.

Supported by: Godfrey S. Pettit Block Term Grant, Division of Respirology, University of Toronto; Carbon Reduction Fund, Sustainability Office, University of Toronto

Abstract #25

CT-Measured Pectoralis Muscle Loss is an Extrapulmonary Biomarker Associated with Longitudinal COPD Morbidity

Daniel Genkin [1], Mustansir Verdawala [2], Sophie É. Collins [3], Pei Z. Li 3, Wan C. Tan [4], Jean Bourbeau [3], Michael K. Stickland [5], Chung-Wai Chow [1], Dennis Jensen [3], and Miranda Kirby [2]

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Rationale: Sarcopenia is prevalent in smokers and people with chronic obstructive pulmonary disease (COPD). Computed tomography (CT)-derived pectoralis muscle volume (PMV) is cross-sectionally associated with spirometry, exercise capacity, and respiratory-related symptom burden in people at risk-for and with COPD. However, its association with longitudinal COPD morbidity remains unclear. Therefore, the objective of this study was to determine whether PMV loss is associated with emphysema progression, lung function decline, exercise capacity decline, and symptom burden worsening.

Methods: Data from ever-smokers without COPD and individuals with COPD (forced expiratory volume in 1-second-to-forced vital capacity ratio (FEV1/FVC)<0.70) from Canadian Cohort Obstructive Lung Disease (CanCOLD) study was analyzed. Changes to COPD morbidity were evaluated using annualized differences in volume-adjusted lung density (ΔV-LD15; g/L/year), FEV1 (ΔFEV1; mL/year), peak rate of oxygen consumption during cardiopulmonary exercise testing (ΔV'O2,peak; mL/kg/min/year), and St. George's respiratory questionnaire scores (ΔSGRQ; N/year) between follow-up and baseline. The PMV was automatically segmented from chest CT scans using a previously developed deep-learning model, and measured in cm3. Longitudinal PMV measurements were extracted by co-registering and cropping segmentations to a matched field-of-view (ΔPMV; cm3/year). Associations between baseline PMV and ΔPMV with changes in morbidity indices were evaluated using multivariable linear regression models.

Results: This study included 473 individuals (mean±SD age 65.7±9.5yrs, 190 (40.2%) female, 302 (63.8%) COPD). Smaller baseline PMV was not associated with ΔV-LD15, ΔFEV1, or ΔV'O2,peak ($p>0.05$), but was associated with greater symptom burden (ΔSGRQ: β (95% CI) = +0.027 (0, 0.053) per -10cm3; $p=0.047$). ΔPMV was not associated with ΔFEV1, ΔV'O2,peak, or ΔSGRQ ($p>0.05$), but was associated with lung density decrease (ΔV-LD15: β (95% CI) = -0.235g/L/year (-0.403, -0.067) per -10cm3/year; $p=0.006$).

Conclusions: CT-derived pectoralis muscle volume showed utility as an extrapulmonary imaging biomarker associated with accelerated longitudinal COPD-related morbidity.

We acknowledge the generous contributions of all participants and researchers involved in the Canadian Cohort Obstructive Lung Disease Study. D. Genkin acknowledges salary support from the Canadian Institutes of Health Research through the Canadian Postdoctoral Research Award (CPRA) and the University of Toronto, Division of Respirology through the Noe Zamel Fellowship. D. Jensen holds a Canada Research Chair in Clinical Exercise & Respiratory Physiology (Tier 2) from the Canadian Institutes of Health Research. M. Kirby acknowledges support from NSERC and the Canada Research Chair Program (Tier 2).

Figure for abstract 25.

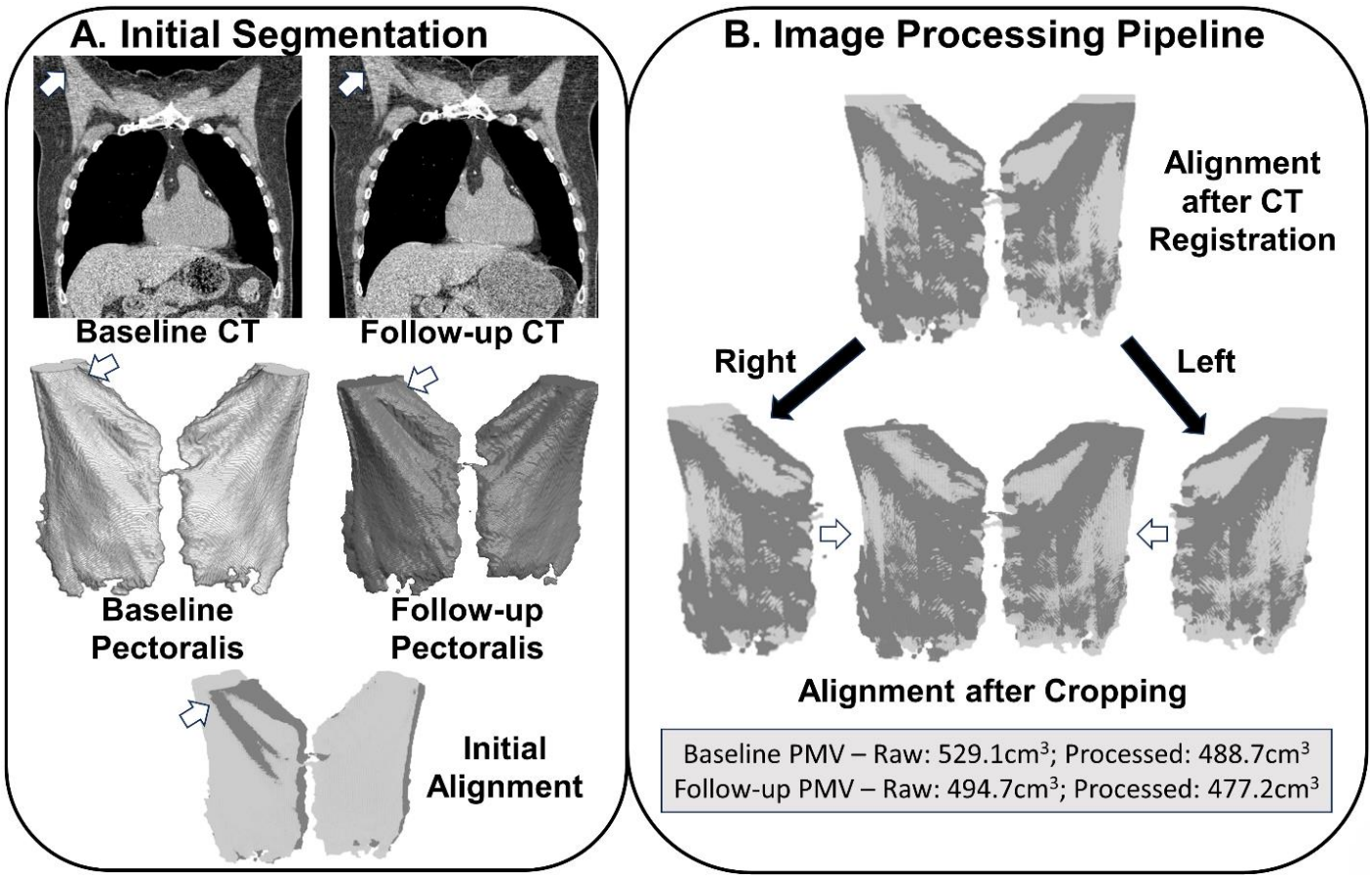

Figure 1. Image processing pipeline to align pectoralis muscle measurements between baseline and follow-up chest CT scans.

A. The pectoralis muscle was automatically segmented from both scans using a previously developed deep-learning model (10.1164/ajrccm.2025.211.Abstracts.A6890). Due to differences in superior field-of-view, the top of the baseline scan does not align with the follow-up scan (white arrows) exaggerating atrophy.

B. The segmentations were aligned by rigidly registering both CT scans. Then, the left and right side were independently cropped 5 slices below the top-most slice of the smaller pectoralis muscle to ensure alignment. Before the pipeline, muscle loss was 40.4cm^3, after registration and cropping the loss was 17.5cm^3.

Participant: age=75 years; V1 BMI=27.1kg/m²; V1 cigarette pack-years=25.5; V1 FEV_1=64.0%predicted; V1 FEV_1/FVC=0.53; time to V3: 2.88years; V3 BMI=26.8kg/m²; V3 FEV_1=60.4% predicted; V3 FEV_1/FVC = 0.52. The HU window of all CT scans is set to [-190,150] for visual clarity of the musculature.

Definition of Abbreviations: V: visit; BMI: body mass index; FEV_1: forced expiratory volume in-one-second; FVC: forced vital capacity; PMV: pectoralis muscle volume.

Abstract #26

Establishment of an in Vivo Lung Perfusion Model in Rats for Treatment of Colorectal Lung Metastases.

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Introduction & Objectives: Pulmonary metastases critically influence overall patient survival. While most histological types are associated with a 5 year survival rate of approximately 20%, colorectal cancer (CRC) pulmonary metastases may reach up to 40%. Experimental models are essential for investigating lung metastases. In vivo lung perfusion (IVLP) is a surgical technique that isolates the pulmonary circulation, allowing targeted delivery of therapeutic agents to the lung while minimizing systemic toxicity. A rat lung metastasis IVLP model was developed for testing of novel therapies.

Methods: 7 male Fischer rats (300–350 g) received IV injections of 2.5×10^6 RCN 9 colorectal cancer cells (Riken Cell Bank, Japan) suspended in RPMI medium. Cells were administered through the lateral tail vein. 7 days after the injection, animals underwent IVLP of the left lung with 5 mL of TorEx Lung Perfusate (Traferox, Canada). IVLP was performed via a left thoracotomy, with dissection and clamping of the hilar vessels. The pulmonary artery was cannu-lated, and perfusion was maintained for 20 minutes. 21 days after IVLP, animals were submitted to chest CT scan; euthanized, and both lungs and the liver were harvested; one ex vivo lung CT scan was obtained. Tumor burden was assessed on H&E histological sections and quantified us-ing HALO software. Tumoral area was expressed as a percentage of total lung tissue.

Results: Seven animals survived to the planned study endpoint. In six animals, CRC metastases were not identifiable by CT assessment, but they were confirmed by histology. These animals developed bilateral pulmonary metastatic nodules occupying a mean of 8% ±6,7% of the total lung tissue ar-ea. No liver metastases were identified.

Conclusions: The rat IVLP model constitutes a repro-ducible experimental platform and serve as a basis for future investigations evaluating novel ther-apies such as gene delivery strategies to treat colorectal cancer lung metastases.

Abstract #27

Towards Digital Twins of Ex Vivo Human Lungs for Restrictive and Obstructive Lung Diseases Using Machine Learning

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Introduction & Objectives: Lung transplantation remains the most effective therapy for end-stage obstructive and interstitial lung diseases, which comprise >80% of transplant waitlists. Therapies to slow or reverse disease progression are limited, partly because animal models poorly mimic human pathophysiology. We propose alternative preclinical models: machine learning-based digital twins (DTs) - virtual replicas simulating lungs with chronic obstructive pulmonary disease (COPD) and idiopathic pulmonary fibrosis (IPF) on ex vivo lung perfusion (EVLP). Our team previously developed DTs of disease-free donor lungs. Here, we extend this to COPD and IPF by generating synthetic emphysema, chronic bronchitis, and fibrosis cases and evaluating DT model performance on these cases.

Methods: High-resolution ventilator flow, pressure, and volume data were collected from 53 clinical EVLP procedures. The equation of motion and exponential decay models were fit to each breath to estimate the elastance (E), resistance (R), and expiratory time constant. Disease was simulated by adjusting E and R: increased R and decreased E for emphysema, increased R for chronic bronchitis, and increased E for IPF. Dynamic compliance, peak and mean airway pressures, and expiratory volume were computed per breath. Gated recurrent unit (GRU) models forecasted diseased lung behaviour at hours 2 and 3 of EVLP.

Results: Transformed ventilatory waveforms reflected disease characteristics. Increased E produced higher peak pressure and faster expiration; increased R led to higher peak pressure, slower expiration, and air trapping. Mean absolute percentage errors (MAPE) between observed parameters and GRU forecasts were (COPD, IPF): dynamic compliance (11.3%, 9.5%), peak pressure (5.4%, 6.0%), mean pressure (3.5%, 4.0%), expiratory volume (3.1%, 1.8%).

Conclusion: EVLP-based DTs capture the dynamic respiratory physiology of lungs with disease-like phenotypes. Future work includes model fine-tuning and prospective validation using lungs explanted from COPD and IPF patients. DTs are promising preclinical models to study disease mechanisms and accelerate therapeutic development.

This work is funded by a Project Grant (PJT 185944) from the Canadian Institutes of Health Research (CIHR), the J.P. Bickell Foundation, and the New Frontiers in Research Fund (NFRF).

Abstract #28

Agreement Between ChatGPT 5.4 Extended Thinking and Expert Review of Online Pulmonary Rehabilitation Websites

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Introduction & Objectives: Pulmonary rehabilitation (PR) improves dyspnea, physical function, and quality of life in chronic respiratory disease. As patients increasingly use online PR resources, evaluating the quality and completeness of website content is important, but expert review is time intensive. Large language models (LLMs) may offer a scalable alternative to identifying safer, guideline-concordant resources, however their performance on PR websites is unknown. We aimed to assess inter-rater agreement between ChatGPT-5.4 Thinking and expert-scored PR websites.

Methods: ChatGPT-5.4 Thinking was applied to 66 PR websites evaluated by expert human raters (Da Silva T, Chron Respir Dis 2023). To ensure temporal alignment, archived website snapshots from before December 3, 2022 were analyzed. The model reviewed primary website text and associated internal links. Websites were assessed using a seven-domain, 30-point PR content score, DISCERN (1-5), JAMA benchmark score (1-4), and the Global Quality Score (GQS; 1-4). Three independent assessments were completed per website in separate temporary chats using a standardized prompt and extended-thinking mode. Agreement between ChatGPT-5.4 Thinking and expert ratings was evaluated using Gwet's AC2. Analysis was conducted using R v4.6.0.

Results: Of 66 websites, 45 were analyzed and 21 were excluded because archived content was unavailable. ChatGPT-5.4 Thinking median content score was 18/30 (IQR 15-23), reflecting moderate completeness across seven domains (i.e. exercise training, education, etc). Median scores for DISCERN, JAMA, and GQS were 4/5 IQR (3-4), 2/4 (2-3), and 4/4 (3-4) respectively. Agreement between ChatGPT and expert ratings using Gwet's AC2 were 0.79 (95% CI 0.72-0.86) for content score, 0.92 (0.88-0.96) for DISCERN, 0.87 (0.74-0.99) for JAMA benchmark score and 0.85 (0.76-0.93) for GQS.

Conclusion: ChatGPT-5.4 Thinking shows good agreement with expert ratings of online PR websites using validated quality instruments. These findings support further evaluation of LLMs as scalable tools to assist in screening patient-facing online educational resources.

Acknowledgements: NSA Chair in Respiratory Rehabilitation Research at West Park (UHN).

Abstract #29

Beyond the lungs: shifting trends in complex and physical-mental multimorbidity among adults with asthma in Ontario

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Introduction and Objectives: Multimorbidity affects most adults with asthma and is associated with complex care plans, poor health outcomes, and excess mortality. The trends in its prevalence, however, remain poorly characterized, and even less is known about trends in complex multimorbidity. We examined trends in complex multimorbidity and physical-mental multimorbidity prevalence among adults with asthma over 11 years.

Methods: We conducted a population-based repeated cross-sectional study among adults living with asthma in Ontario from 2013 to 2023 using health administrative data at ICES. Using a list of 18 chronic conditions from previously published studies, we defined complex multimorbidity as ≥3 conditions affecting ≥3 body systems, and physical-mental multimorbidity as the co-occurrence of ≥1 physical and ≥1 mental condition, both definitions excluding asthma. Annual crude and age-standardized prevalence estimates were calculated overall and stratified by age group and sex. Trends were assessed using log-linear regression, with annual percent change before and during the pandemic/recovery periods.

Results: Among 2,222,263 adults with asthma, the crude prevalence of complex multimorbidity increased from 32.6% (95% CI 32.6–32.7) in 2013 to 33.9% (33.8–33.9) in 2018 then declined to 29.6% (29.6–29.7) in 2023. Although physical-mental multimorbidity prevalence decreased overall, it increased among older adults ≥65 years. In 2023, the prevalence of physical-mental multimorbidity was 70.3% (95% CI 70.1–70.5) among 65–74-year-olds and 68% (67.8–68.2) among adults ≥75 years. The prevalence of both complex multimorbidity and physical-mental multimorbidity was consistently higher in females than males throughout the study period.

Conclusion: Approximately 3 in 10 adults with asthma in Ontario have complex multimorbidity. Physical-mental multimorbidity is increasing among older adults – a vulnerable subgroup that may be particularly underserved by current single-disease care models. These findings underscore a clear need for integrated multidisciplinary care models including mental health services, particularly for older adults with asthma.

Supported by: Vanier Canada Graduate Scholarship, Connaught International Doctoral Award, Network for Healthy Populations Graduate Award, Artificial Intelligence for Public Health Scholarship, Data Sciences Institute Data Access Grant, and Canadian Institutes of Health Research Project Grant.

Abstract #30

Systematic Review Of Obstructive Sleep Apnea In 22q11.2 Deletion Syndrome And The Impact Of Prior Upper Airway Surgery

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Background: There is significant overlap between risk factors for obstructive sleep apnea (OSA) and characteristics of 22q11.2 deletion syndrome (22q11.2DS), including micrognathia, glossoptosis, congenital heart disease, obesity, and velopharyngeal insufficiency (VPI) requiring upper airway surgery. This systematic review aimed to evaluate the prevalence and severity of OSA in 22q11.2DS and the impact of VPI surgery on the presence or severity of OSA.

Methods: The protocol for this review was defined a priori and registered at PROSPERO (CRD420250650480). A librarian-led systematic search of MEDLINE, Embase, the Cochrane Database, and CENTRAL up to February 3, 2026 was performed. Primary research articles evaluating individuals with 22q11.2DS with OSA, with or without VPI surgery were included. Screening and data abstraction were performed in alignment with PRISMA guidelines. Quality assessment was undertaken using NIHBL risk-of-bias tools. Random-effects models were used to pool effect estimates.

Results: Seven studies with a total of 641 adult and pediatric patients met inclusion criteria. Among those tested, 53% (n=118/200) of patients with 22q11.2DS were diagnosed with OSA and 39% had moderate or severe disease (n=43/111). In those post-VPI surgery, although the pooled prevalence of OSA was 32% (95% CI: 3.5%, 72%), there was substantial heterogeneity (I^2 = 83%) between included studies suggesting they did not share a common underlying prevalence of OSA.

Conclusion: OSA is prevalent in individuals with 22q11.2DS and a significant proportion have moderate-to-severe disease. These findings support consideration of routine screening for OSA in patients with 22q11.2DS. Future studies may help better estimate the prevalence in those post-VPI surgery.

Abstract #31

Clinical and Prognostic Implications of Heart Rate Recovery After Six-Minute Walk Test in Chronic Lung Disease: A Systematic Review

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Introduction & Objectives: Heart rate recovery (HRR) after the six-minute walk test (6MWT) reflects autonomic function and has emerged as a potential prognostic marker of clinical outcomes in chronic lung disease. This systematic review aimed to evaluate the association between impaired HRR and all-cause mortality, exercise capacity, disease progression, exacerbations, hospitalizations, and the need for lung transplantation in chronic lung disease.

Methods: A comprehensive search of MEDLINE, EMBASE, Cochrane databases, and CINAHL was conducted from inception to February 2025. Studies included adults with chronic lung diseases reporting on HRR post 6MWT and their association with clinical outcomes. The primary outcome was all-cause mortality and secondary outcomes included exercise capacity (6MWD), disease progression, exacerbations, hospitalizations, and the need for lung transplantation.

Results: Eleven studies comprising 10,796 participants (46% female; mean age 44–73 years) were included, spanning COPD (n=4), idiopathic pulmonary fibrosis (IPF; n=3), pulmonary arterial hypertension (PAH; n=4), and lung transplant populations (n=1). Impaired HRR was associated with increased mortality in 4 of 8 studies with reported hazard ratios up to 4.5 (95% CI 1.6–15.7) in PAH and 4.5 (95% CI 1.5–13.7) in IPF, Table 1. Reduced HRR was associated with worse exercise capacity in 6 studies, with lower six-minute walk distance (range 6 to 108 m). In COPD populations, impaired HRR was associated with increased exacerbations and increased risk of events requiring emergency care or hospitalizations (HR 2.4, 95% CI 1.0–5.8). In PAH cohorts, impaired HRR was associated with shorter time to clinical worsening (6.7 vs 13 months, $p<0.001$) and decreased event-free survival (2.2 vs 4.8 years, $p<0.001$), with two additional studies reporting increased hospitalizations.

Conclusion: Impaired HRR following 6MWT in chronic lung disease is associated with increased mortality, reduced six-minute walk distance, increased respiratory exacerbations and hospitalizations. HRR may represents decreased physiological reserve, and is a potential non-invasive prognostic marker in chronic lung disease that requires further validation.

Supported by the NSA Chair in Respiratory Rehabilitation Research West Park (UHN).

Figure for abstract 31.

Table 1. Summary of Associations of Heart Rate Recovery with Clinical Outcomes

Outcome	No. of Studies (References)	Population	Summary of Findings
Mortality	4 (Chen 2023; Minai 2015; Swigris 2011; Swigris 2009)	PAH, IPF	• Impaired HRR associated with increased mortality across PAH and IPF cohorts.
Exacerbations	3 (Chen 2023; Macdonald 2022; Zhao 2021)	COPD	• Reduced HRR associated with increased exacerbations (frequency and severity), increased emergency visits and hospitalizations.
Clinical worsening	3 (Rezende 2022; Minai 2015; Minai 2012)	PH	• Impaired HRR prognostic of clinical worsening and shorter event-free survival.
Hospitalizations	3 (Martelli 2019; Minai 2015; Minai 2012)	PH, LTx candidates	• Reduced HRR associated with increased hospitalizations in PH. • In LTx populations, greater HRR related to shorter post-transplant hospital stay (attenuated after adjustment).

6MWT, six-minute walk test; COPD, chronic obstructive pulmonary disease; HRR, heart rate recovery; IPF, idiopathic pulmonary fibrosis; LTx, lung transplantation; PAH, pulmonary arterial hypertension; PH, pulmonary hypertension.

Abstract #32

MedGate-Fusion: Integrating First-Encounter Clinical Narratives and Physiological Biomarkers for Prospective Stroke Risk Stratification

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Introduction & Objectives: Stroke remains a leading cause of mortality and long-term disability, yet early risk detection in primary care is constrained by reliance on structured biomarkers that incompletely capture patient risk. Clinical narratives recorded during routine encounters may contain early signals of vascular deterioration, but they are rarely incorporated into predictive models. This study aimed to develop and evaluate a multimodal framework (MedGate-Fusion) that integrates first-encounter clinical narratives with physiological biomarkers to improve prospective stroke risk stratification.

Methods: A prospective cohort study was conducted using electronic medical records from the Canadian Primary Care Sentinel Surveillance Network. From 808,921 observations, a cohort of 102,736 patients with first-encounter data was constructed to ensure temporal validity. Unstructured clinical narratives were encoded with transformer-based models after removing stroke-related terms to mitigate target leakage. Ten routinely collected biomarkers were included. A gated fusion architecture dynamically combined semantic and numerical features. Model performance was evaluated using 5-fold cross-validation and compared with standard numerical baselines.

Results: The MedGate-Fusion model achieved superior predictive performance, with an AUROC of 0.859 and an AUPRC of 0.339, compared with logistic regression (AUROC 0.740; AUPRC 0.098) and gradient-boosted models (AUROC 0.720; AUPRC 0.088). Clinical narratives alone demonstrated strong discriminative ability, underscoring their high information density. Fusion of modalities yielded the most robust predictions, improving identification of high-risk patients in a class-imbalanced setting.

Conclusion: Integrating unstructured clinical narratives with routine biomarkers significantly improves prospective stroke risk prediction. These findings support using multimodal electronic medical record data to identify high-risk individuals earlier. This approach offers a scalable pathway to point-of-care decision support and more effective stroke prevention strategies in primary care.

The authors acknowledge the support of the Health Informatics, Visualization, and Equity (HIVE) Lab, Dalla Lana School of Public Health, University of Toronto, for providing an interdisciplinary research environment focused on AI, data science, and health informatics.

Abstract #33

Personalized Marketing in Online Gambling: A Scoping Review of Behaviour, Harm, and Commercial Determinants of Health

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Introduction & Objectives: Online gambling environments increasingly rely on personalised marketing strategies, including targeted promotions, direct messaging, and algorithmic user profiling. While these practices are intended to increase engagement, their implications for behaviour and harm remain fragmented across disciplines. This scoping review aimed to map the existing literature on personalised marketing in online gambling, focusing on behavioural outcomes, harm pathways, and the broader commercial determinants of health.

Methods: A structured scoping review methodology was used. A three-block search strategy was developed to capture studies on (1) online gambling contexts, (2) personalised and commercial marketing mechanisms, and (3) behavioural or harm-related outcomes. Searches were conducted across five databases (Web of Science, Scopus, PsycINFO, PubMed, IEEE Xplore) for studies published between 2010 and 2026. Inclusion criteria required studies involving human participants exposed to targeted or personalised marketing in online gambling settings, with reported behavioural, psychological, or harm-related outcomes. A quasi-gold standard set of studies was used to validate search sensitivity.

Results: A total of 8,573 records were identified, leaving 4,257 unique studies after deduplication. The literature indicates that personalised marketing commonly involves inducements such as bonus bets, cashback offers, and push notifications, often delivered via data-driven systems. Evidence suggests associations between these strategies and increased gambling expenditure, frequency, and persistence. Several studies also link these strategies to harm indicators, including loss of control, impulsivity, and cognitive biases. However, the evidence base is heterogeneous, with variation in study design and outcome measurement.

Conclusion: Personalised marketing in online gambling appears to influence behavioural engagement and may contribute to harm, particularly for vulnerable users. The findings underscore the need for more consistent outcome reporting and stronger integration of public health frameworks when evaluating the commercial determinants of health in digital gambling environments.

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Abstract #34

Multimodal Pleural Effusion Classification by Combining Chest X-Rays, Radiology Reports, and Clinical Metadata

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Introduction & Objectives: Pleural effusion is among the most frequent abnormalities on chest radiographs, affecting approximately one million patients annually in the United States, and delayed detection is associated with increased ICU burden and mortality. In clinical practice, radiologists interpret chest X-rays alongside radiology report narratives and patient metadata simultaneously, yet most AI models rely on a single modality. This methodological gap limits the real-world utility and deployability of existing diagnostic models. The objective of this study was to determine whether combining chest X-ray images, radiology report text, and structured tabular metadata improves pleural effusion classification and probability quality compared to unimodal models, and to systematically evaluate how and when modality fusion adds clinical value.

Methods: We developed a fully reproducible multimodal pipeline using CheXpert-v1.0-small for imaging (DenseNet121 encoder), CheXpert Plus for radiology impression text (BioClinicalBERT encoder) and tabular metadata (35-feature MLP), and CheXbert-derived binary labels. After filtering uncertain labels, the working dataset comprised 35,097 studies from 16,972 unique patients. A strict patient-level 70/15/15 split prevented data leakage across all experiments. We compared unimodal baselines (image-only, text-only, tabular-only) with multimodal configurations across four fusion strategies (concatenation, gated, late, hybrid) and eight CNN backbones. Evaluation included AUROC, AUPRC, bootstrap confidence intervals, calibration curves, Grad-CAM saliency maps, and SHAP feature attribution.

Results: The image-only DenseNet121 model achieved AUROC 0.921 and AUPRC 0.960. Adding tabular metadata (Image + Tabular) maintained comparable performance (AUROC 0.921) without risk of label leakage and showed robustness across all fusion strategies and backbones. The full multimodal model incorporating report text yielded AUROC 0.976; however, this gain reflects circular label-report leakage, as CheXbert labels are derived from the same report text used as model input. Image + Tabular is therefore the primary, publication-ready finding.

Conclusion: Multimodal fusion combining chest X-rays and structured clinical metadata achieves strong, reproducible pleural effusion classification without label leakage risk. Radiology report text inflates apparent performance and should be treated cautiously when labels are text-derived. This framework offers a practical, interpretable foundation for clinically deployable diagnostic AI in respirology.

Supported by: Institute of Health Policy, Management and Evaluation (IHPME), University of Toronto.

Abstract #35

The Role of Biological Sex on Opioid-induced Respiratory Depression

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Introduction: Opioids, a vital therapeutic in the treatment of pain, poses various risks, most notably, opioid-induced respiratory depression (OIRD). With the rising use of opioids both clinically and recreationally, it is important to understand the mechanisms underlying OIRD. Despite OIRD being one of the most dangerous risks of opioids, females experiencing a decreased antinociceptive effect of opioids and exhibiting sexual dimorphism in respiration, subjects have been historically excluded from OIRD studies. This study aimed to characterize the differences in OIRD following treatment of fentanyl between biological males and females.

Methods: Warm-water tail flick analysis (52°C) was used to validate the differential analgesic effects of opioids in male and female C57BL/6 background mice (IP, fentanyl 0.15 mg/kg; morphine 3, 6 and 12 mg/kg). Respiratory depression was assessed using whole-body plethysmography in freely behaving male and female C57BL/6 mice following fentanyl administration (IP, 0.6 mg/kg), during which locomotor activity was also measured.

Results: While fentanyl and morphine induced an anticociceptive effect in both male and female mice given the increased latency to tail flick, females experienced a lower anti-nociceptive effect compared to males. Both male and female mice experience respiratory depression. However, while females recover to baseline measures across all parameters faster while male mice continue to exhibit respiratory depression up to 90 minutes post-injection.

Conclusion: Our results demonstrates that a considerable degree of difference exists in the response to opioids between male and female mice, both in anti-nociceptive and respiratory depressive effect. While both sexes experience the anti-nociceptive and respiratory effects of opioids, females experience a less pronounced, as well as a shorter duration of it.

Abstract #36

Impact of Cognitive Function, Disease Severity and Affect on Dual Tasking in COPD and Healthy Adults.

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Background: Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) can place ventilatory and neurocognitive loads impacting physical function and ability to perform two simultaneous tasks (dual-tasking, DT). The aim was to compare DT decrements in gait speed among AECOPD, stable COPD and age-sex matched healthy adults. Further, to examine the association of cognitive function, COPD severity and affect on DT gait speed among the three groups.

Methods: 12 AECOPD, 17 stable COPD and 13 healthy adults completed spirometry, Medical Research Council (MRC) Dyspnea, Depression Anxiety Stress Scale-21 (DASS-21), London Chest Activities of Daily Living (LCADL), and TestMyBrain (TMB) assessments, a neurocognitive battery evaluating Choice reaction time (CRT), Trail A and B tests. Gait speed was evaluated during a 20-meter single task (ST) walk and during DT combined with an auditory Stroop task. AECOPD and stable COPD participants were matched based on disease severity (FEV1% predicted). One-way ANOVA or Kruskal Wallis followed by a post hoc (Holm Bonferroni) test assessed group differences. Multivariable linear regression assessed determinants of DT gait speed.

Results: Of the 42 participants, mean age was 66±7 years with 57% females. AECOPD DT gait speed (0.80 ± 0.23 m/sec) was ~12% lower compared to stable COPD (0.94 ± 0.19 m/sec). AECOPD participants had greater MRC dyspnea, DASS-21, greater limitations indicated by LCADL and slower CRT reaction compared to healthy adults, with increased DASS-21 in AECOPD compared to other two groups (Table 1). The associations of cognitive function (CRT Reaction), MRC dyspnea, and affect (DASS-21 scores) with DT gait speed demonstrated that MRC dyspnea was the only independent predictor ($p=0.03$).

Conclusion: Ventilatory and cognitive loads imposed by AECOPD were associated with reduced DT gait speed. AECOPD was associated with greater negative affect and difficulty with daily activities required for self care, disease management and social activities.

This study was funded by Canadian Institute of Health Research (CIHR) (PJT 183640; PJM 179846), Department of Physical Therapy, University of Toronto, DR is supported by National Sanitarium Association Chair in Respiratory Rehabilitation Research at West Park Healthcare Centre (University Health Network).

Figure for abstract 36.

Table 1: Functional Outcomes among AECOPD, stable COPD and healthy adults.

Outcome Measure	**AECOPD (n=12)**	**Stable COPD (n=17)**	**Healthy (n=13)**	**p-value**
ST gait speed (m/sec)	0.82 ± 0.24	1.0 ± 0.20	1.07 ± 0.24	0.505
DT gait speed (m/sec)	0.80 ± 0.23	0.94 ± 0.19	0.93 ± 0.19	0.913
MRC Dyspnea	3.0 ± 0.95	2.88 ± 1.11	1.1 ± 0.28*	**<0.001**
DASS-21	48 ± 32	22 ± 25	11 ± 10*	**<0.001**
LCADL	38.75 ± 13.73	28.88 ± 10.62	14.85 ± 0.90*	**<0.001**
CRT Reaction time (msec)	1451.88 ± 522.64	1234.66 ± 293.90	1096.43 ± 569.58*	**0.038**
TMTA Total time (sec)	42.97 ± 22.54	48.22 ± 28.54	36.90 ± 15.09	0.663
TMTB Total time (sec)	100.55 ± 86.19	78.90 ± 46.83	56.88 ± 32.57	0.333
Total time TMTA – TMTB (sec)	57.58 ± 87.74	30.68 ± 47.16	19.98 ± 21.72	0.901

Values are presented as Mean ± SD. Higher LCADL values represent greater impact of dyspnea on activities of daily living.

* different from AECOPD group.

TMTA- Trail Making Test A; TMTB- Trail Making Test B.

Abstract #37

Factors Influencing The Successful Design and Implementation of A Clinical Decision Support System (CDSS) Intervention for Asthma Management In Community Pharmacies

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Introduction & Objectives: Computerized decision support systems (CDSSs) can enable community pharmacies to support guideline-directed management of asthma and other chronic diseases. While guidance for CDSS optimization exists through the GUIDES checklist, there is limited research identifying determinants of success ("success factors") for pharmacy CDSSs interventions. We sought to: (1) Identify success factors for an asthma management CDSS in community pharmacies; and (2) compare these factors with those within the GUIDES checklist.

Methods: We conducted six focus groups (n=28 Ontario pharmacy team members) for co-development of an asthma management CDSS for community pharmacies. De-identified transcripts were analyzed inductively. Preliminary themes and corresponding representative quotes were first identified. Keywords extracted from each representative quote were then grouped into initial codes. Three coders independently reviewed each transcript, marking quotes with code labels and creating new codes as needed. Resulting codes were organized into broader themes reflecting CDSS intervention success factors. These factors were then mapped to the GUIDES checklist.

Results: Most success factors aligned with the 4 main GUIDES checklist categories. CDSS context success factors: Data input accuracy; Stakeholder acceptance; Integration with existing workflows and systems. CDSS content success factors: Fulfillment of information needs. CDSS system success factors: User freedom to supplement or override CDSS recommendations. CDSS implementation success factors: Communication about the CDSS to stakeholders; Tangible/intangible benefits of CDSS use (more important than costs). Success factors not included in the GUIDES checklist that our analysis identified: Shareability of CDSS recommendations with prescribers; Accessibility for diverse populations.

Conclusion: The GUIDES checklist is highly applicable to the development of a community pharmacy CDSS intervention for asthma. Shareability of CDSS recommendations with prescribers and CDSS accessibility are additional design considerations specific to this setting. As pharmacy scope-of-practice expands, these findings can inform the future design of pharmacy CDSS interventions for other chronic diseases.

Abstract #38

LOST & FOUND COPD: Undiagnosed COPD Among Ontario Lung Screening Program Participants

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Introduction & Objectives: Low-dose CT (LDCT) lung cancer screening often reveals emphysema, a marker associated with COPD, yet many individuals at high risk for lung cancer have unrecognized chronic respiratory disease. We aimed to assess the prevalence of CT-detected emphysema and factors associated with the absence of a prior COPD diagnosis among participants in the Ontario Lung Screening Program (OLSP).

Methods: We conducted a retrospective analysis of OLSP participants undergoing baseline LDCT from January 2020 to December 2024. All participants were current or former smokers aged 55–74 with an elevated lung cancer risk (PLCOm2012 ≥2%). Visually identified emphysema was extracted from structured radiology reports, and quantitative emphysema was assessed using low-attenuation area thresholds. Prior COPD diagnosis was defined by self-report. Multivariable logistic regression was used to identify factors associated with no known COPD.

Results: Among 3,169 participants (mean age 63.9 years; 62.7% male), 26.5% reported a prior COPD diagnosis. CT evidence of emphysema was present in 82.8% of participants. Among those without known COPD, 80.4% demonstrated emphysema on imaging. In adjusted analyses, greater quantitative emphysema burden and higher cumulative smoking exposure were associated with lower odds of no known COPD, whereas male sex and current smoking were associated with higher odds of remaining undiagnosed. Quit attempts showed a modest association with prior COPD diagnosis.

Conclusions: Most OLSP participants without a prior COPD diagnosis demonstrate emphysema on CT. Diagnostic under-recognition appears patterned by sex and smoking behavior. Integrating standardized emphysema reporting with prompts for spirometric assessment may facilitate COPD diagnosis in lung cancer screening populations.

Abstract #39

Ketone-based Energy Supplementation Extends The Limits Of Donor Lung Preservation

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Introduction and Objectives: The organ transplant field is transitioning to hypothermic 10°C preservation, where we have shown that lungs utilize β-oxidation as the main catabolic process. We hypothesize that lipid-enriched solutions can optimize donor lung preservation at 10°C.

Methods: A lipid-supplemented preservation solution was prepared by adding a lipid emulsion (SMOF lipid; 10%) to the standard lung preservation solution, low-potassium dextran (LPD). As this emulsion contains esterified lipids, delayed bioavailability may limit its effectiveness during hypothermic preservation. Therefore, a ketone-supplemented solution was prepared by adding the ketone body 3-hydroxybutyrate (3-HB), which is rapidly taken up by cells and efficiently metabolized. Donor lungs from male Lewis rats (n = 5/group) were preserved for 24 h at 10°C using LPD alone (control), LPD+3-HB, or LPD+SMOF (Fig. 1A). After cold storage, lungs underwent 4 h of ex vivo lung perfusion (EVLP), followed by tissue collection for biological analyses.

Results: As expected, all lungs that were preserved with LPD alone demonstrated injury after 24h cold ischemic time (CIT) and met early termination criteria during EVLP assessment, with massive edema, high vascular resistance and loss of lung compliance (Fig.1B-D). In contrast, all lungs preserved with LPD+3-HB and LPD+SMOF completed the planned 4h-EVLP assessment, with ketone-supplemented lungs demonstrating markedly improved physiological and metabolic performance without evidence of edema (Fig.1E,F). The increase in tissue ketone and free fatty acids levels confirmed successful supplementation of energy substrates (Fig.1G). Importantly, lungs preserved with LPD+3-HB exhibited upregulation of markers reflecting mitochondrial quality control, including mito-fission (MFF, P=0.002; FIS1, P=0.009), mito-fusion (MFN1, P=0.001; MFN2, P=0.004), mitophagy (PINK1, P=0.01; PARK2, P=0.001) post-CIT.

Conclusions: These results suggest that ketone supplementation of LPD enabled cellular processes to improve graft quality during hypothermic preservation. Further validation in large animal models is warranted.

The authors acknowledge financial support from the Canadian Institutes of Health Research (CIHR) and the Toronto General Hospital Research Institute (TGHRI).

Figure for abstract 39.

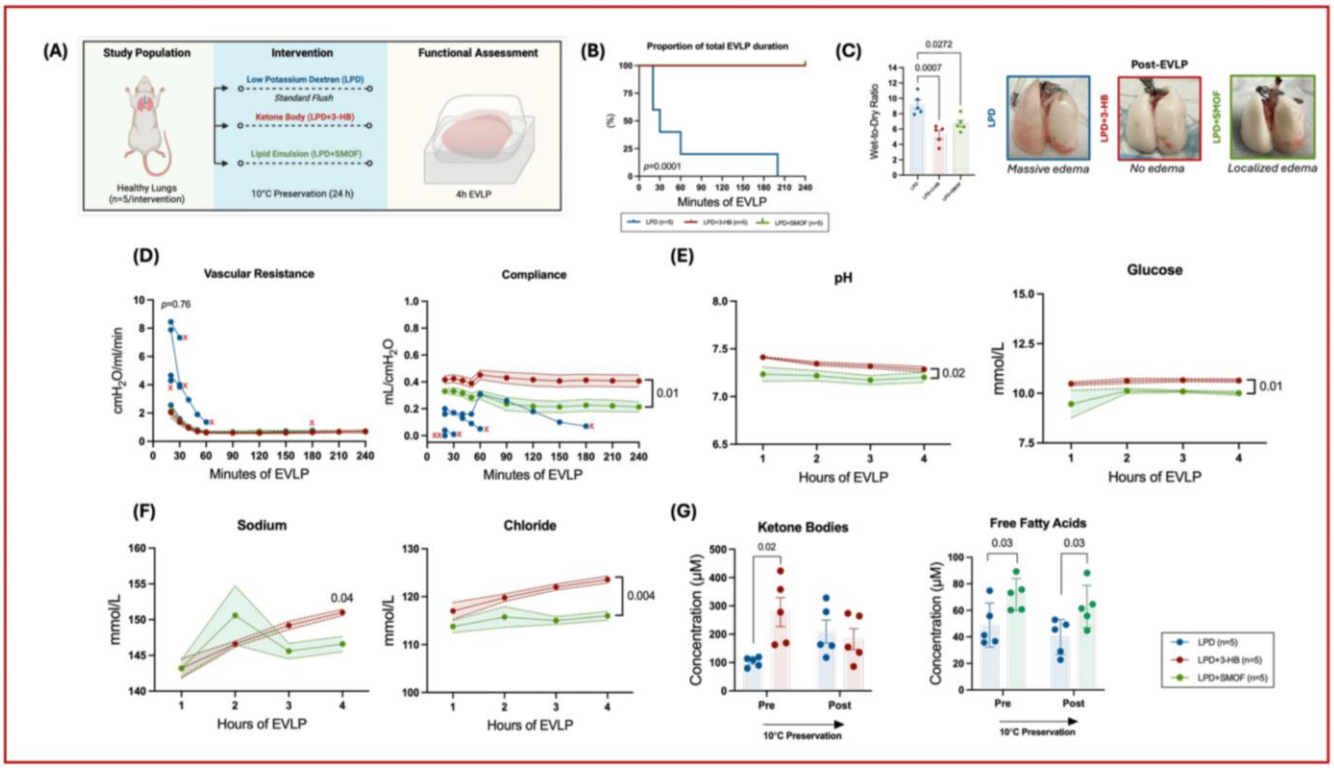

Figure1.Ketone enriched preservation solution allowed graft survival overextended CIT.(A)Validating the lipid-enriched preservation solutions using a rat EVLP model; Supplementing LPD solution withketoneenhanced10°C preservation and prevented severe lung injuries observed in lungs preserved in LPD alone which had(B)early termination (Total perfusion minutes-LPD: 68± 34vs.LPD+3-HB: 240 ± 0 min),(C)increased edema,(D)higher vascular resistance, and loss of lung compliance during EVLP assessment. While lungs preserved with LPD+SMOF completed EVLP assessment, LPD+3-HBpreserved lungs exhibited superior physiological preservation, with improved lung function and no evidence of edema.(E)Perfusate Hand glucose levels.(F)Perfusate sodium and chloride levels during 4 hours of normothermic perfusion.(G)Higher total tissue ketone (left) andfatty acids(right)levels pre-and post-CIT/preservation confirm successful supplementation. Early termination criteria of EVLP includes the inability to measure dynamic lung compliance, pulmonary arterial pressure exceeding 25 cmH_2O, or presence of perfusion solution in the trachea. Labels indicate the moment when individual cases from the LPD groupmet early termination criteria. Experimental results are expressed as mean±standard deviation of the mean.

Abstract #40

Non-invasive assessment of inspiratory effort predicts extubation failure across three spontaneous breathing trial modalities: a multicenter observational study

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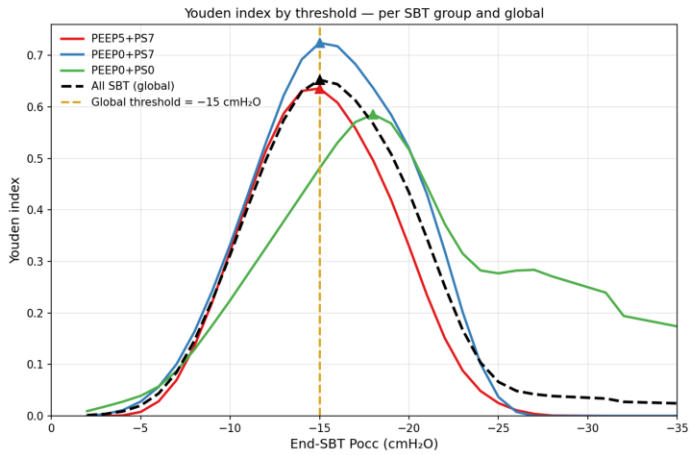
Introduction and Objective: Airway occlusion pressure (Pocc) measured at the end of a spontaneous breathing trial (SBT) is a promising predictor of extubation failure, but its predictive value has been demonstrated only during SBT performed with PEEP 5 cmH_2O and pressure support (PS) 7 cmH_2O [1]. Whether this relationship holds across other SBT modalities remains unknown. Therefore, we set up a multicenter observational study to assess the predictive accuracy of end-SBT Pocc across three SBT modalities.

Methods: Three prospective multicenter cohorts were analysed: PEEP 5+PS 7 cmH_2O (n = 238; published cohort [1]), PEEP 0+PS 7 cmH_2O (n = 208; Bari University Hospital, ethics committee approval 0019587), and PEEP 0+PS 0 (n = 69; ongoing multicenter study, NCT05857774). Pocc was measured at the end of the successful SBT before extubation. The primary endpoint was reintubation within 7 days. ROC analysis identified optimal thresholds using the Youden index.

Results: Among 515 patients, 100 (19.4%) required reintubation within 7 days after extubation. Pocc discriminated reintubation risk across all SBT modalities (AUC 0.908, 0.916, and 0.829 for PEEP5+PS7, PEEP0+PS7, and PEEP0+PS0, respectively; overall AUC 0.886; Figure 1). The median Youden-optimal threshold of Pocc across groups was −15 cmH_2O. At this cutoff, sensitivity/specificity were 80.4%/90.1% for PEEP5+PS7, 87.5%/89.3% for PEEP0+PS7, and 100.0%/45.5% for PEEP0+PS0. Notably, the odds ratio associated with progressively more negative Pocc values beyond −15 cmH_2O decreases as ventilatory support during SBT decreases: from 1.8 in PEEP5+PS7 to 1.6 in PEEP0+PS7 and 1.2 in PEEP0+PS0.

Conclusions: A threshold of −15 cmH_2O of Pocc measured at the end of the successful SBT before extubation predicts extubation failure across different SBT modalities.

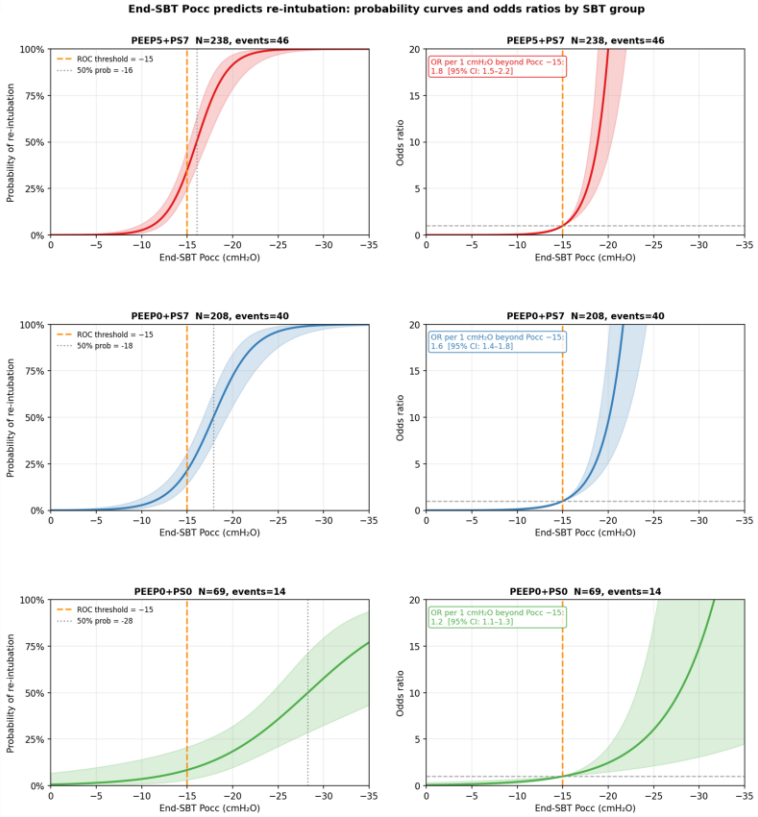
Figure for abstract 40.



End-SBT Pocc Threshold Validation — Sensitivity, Specificity, PPV, NPV and AUC by SBT Group

	Sensitivity			Specificity			PPV			NPV		
End-SBT Pocc (cmH₂O)	SBT 5/7	SBT 0/7	SBT 0/0	SBT 5/7	SBT 0/7	SBT 0/0	SBT 5/7	SBT 0/7	SBT 0/0	SBT 5/7	SBT 0/7	SBT 0/0
≤ −15	80.4%	87.5%	100.0%	90.1%	89.3%	45.5%	66.1%	66.0%	31.8%	95.1%	96.8%	100.0%
≤ −16	63.0%	85.0%	100.0%	96.9%	91.7%	54.5%	82.9%	70.8%	35.9%	91.6%	96.2%	100.0%
≤ −17	58.7%	75.0%	100.0%	98.4%	92.9%	58.2%	90.0%	71.4%	37.8%	90.9%	94.0%	100.0%
AUC (ROC)	0.908	0.916	0.829	0.908	0.916	0.829	0.908	0.916	0.829	0.908	0.916	0.829

Color coding: Green ≥85% | Orange 70–84% | Red <70% | AUC per subgroup (ROC, End-SBT Pocc ≥ threshold) | Global AUC = 0.886 | N = 515 (PEEP5+PS7 n=238, PEEP0+PS7 n=208, PEEP0+PS0 n=69)



Abstract #41

Trajectory of Respiratory Oscillometry and Lung Mechanics After Lung Transplantation

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Introduction & Objectives: The current gold standard for monitoring graft function after lung transplantation (LTx) is spirometry, which also reflects thoracic remodeling and physical recovery. Oscillometry, a different lung function test performed during tidal breathing, is highly sensitive to lung mechanics. Studies found oscillometry to capture graft dysfunction indiscernible by spirometry. The trajectory of oscillometry, timing of baseline oscillometry, and its relationship to chronic lung allograft dysfunction (CLAD) remain unclear. The objective of this study was to characterize longitudinal oscillometry trajectories, define the timing of baseline respiratory mechanics, and evaluate their association with CLAD.

Methods: We conducted a single-center prospective study of first-time bilateral LTx recipients (December 2017 to December 2021) with ≥ 3 paired oscillometry-spirometry measurements within three years post-LTx (n=436). Patients were classified as: alive and CLAD-free at three years, CLAD within three years, and CLAD-free but died within three years. Baseline oscillometry was defined analogously to baseline spirometry. Trajectories were visualized using locally estimated scatterplot smoothing (LOESS) and analyzed using linear mixed-effects models (LME) incorporating time-by-CLAD onset and time-by-outcome interactions, adjusted for biometrics.

Results: LOESS showed early post-LTx worsening in oscillometry. Baseline oscillometry occurred earlier than spirometry (49–60 vs 167.5 days). In LME, slopes accelerated after CLAD onset compared with pre-CLAD periods. During follow-up, 130 developed CLAD and 62 died before CLAD onset. Trajectories differed by outcomes; deterioration was steepest in patients who developed CLAD. Baseline reactance at 5 Hz and area under the reactance differed among outcome groups, with earlier timing and worse values in CLAD. Estimated marginal means at 90 days post LTx supported the early trajectory divergence observed in LOESS and baseline oscillometry.

Conclusion: Oscillometry worsened early post-LTx and exhibited distinct trajectories associated with CLAD development, providing complementary information on allograft mechanics beyond spirometry. Oscillometry may enhance longitudinal graft monitoring and early risk stratification.

We thank the registered pulmonary technologists at Toronto General Hospital for their excellent contributions to this study. We also acknowledge the Toronto Lung Transplant Program database and the team for the clinical data included herein.

Abstract #42

Predicting Post-Transplant FEV1 and FVC Using Donor Lung Function Measured During EVLP with Machine Learning

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Introduction & Objectives: Clinical factors known at the time of transplant are associated with post-transplant lung function. Yet, predicting the actual post-transplant lung function (i.e., FEV1 and FVC) prior to transplant remains challenging due to the limited information available on the donor lung. Ex Vivo Lung Perfusion (EVLP) can be leveraged to address this gap by providing rich, high-resolution data on donor lungs. Here, we hypothesize that machine learning (ML) models that integrate continuously monitored, EVLP-derived measurements of donor lung function can predict post-transplant FEV1 and FVC.

Methods: Comprehensive breath-by-breath physiological profiles were continuously monitored for >1,000 breaths during 97 clinical EVLP procedures resulting in double lung transplants at our centre. The peak lung function within a year and lung function at one, three, six, nine, and twelve months after transplant were predicted from this data. The patient cohort was split into a training set (70%) and a held-out test set (30%). LightGBM, Random Forest, and XGBoost models were trained using nested cross-validation, aggregated via a voting regressor, and evaluated on the held-out test set using mean absolute error (MAE) and mean absolute percentage error (MAPE) metrics.

Results: The machine learning model predicted peak post-transplant FEV1 within 0.40 L (18%) and FVC within 0.50 L (16%) of observed lung function. Across all individual timepoints, FEV1 was predicted within 0.37 – 0.46 L (19 – 22%) and FVC within 0.49 – 0.54 L (17 – 20%) of observed lung function. Shapley analysis revealed that inspiratory volume, expiratory flow, and donor-predicted total lung capacity were important features influencing post-transplant lung function predictions. Additional contributors included EVLP-derived measures of peak inspiratory flow, expiratory time constant, and elastance.

Conclusion: This study demonstrates that ML models leveraging EVLP-derived donor lung data can accurately forecast post-transplant lung function, supporting a precision medicine approach to donor lung selection and post-transplant management. Future work will focus on prospective and external validation, as well as integrating recipient-centric features into the model.

Abstract #43

Ventilatory loading and CO2 induced prefrontal cortex activity monitored by time-domain near infrared spectroscopy (TD-NIRS)

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Introduction and Objectives: Inspiratory threshold loading (ITL) or CO2 inhalation induces distinct sensory and cortical responses reflected by prefrontal cortex (PFC) processing. This study aimed to examine PFC activation (by TD-NIRS) and perceptual responses to ITL, CO2 inhalation and combined ITL+CO2.

Methods: In a randomized crossover design, 14 healthy participants (26±6 years) underwent Rest and three 5-min tasks: ITL at 20 cmH2O, 5% CO2 inhalation, and combined ITL+CO2. Left dorsolateral (dlPFC) and medial medial PFC (mPFC) activity was quantified by oxygenated (O2Hb) and deoxygenated hemoglobin (HHb) levels measured by TD-NIRS (PIONIRS, Italy). EMG root mean square (RMS) and timing were evaluated over parasternal intercostals, sternocleidomastoid (SM), scalene and diaphragm. Ventilatory outcomes, Borg dyspnea, affective response (Self-Assessment Manikin [SAM]) were evaluated at rest and in response to the three tasks.

Results: Mouth pressure of -20 cmH2O was sustained during ITL and ITL+CO2 tasks and mean end-tidal CO2 was 10 mmHg higher during CO2 and ITL+CO2 tasks compared to ITL. All three tasks increased O2Hb and decreased HHb in the left dlPFC and mPFC. Greater responses were induced by ITL+CO2 and CO2 than ITL (Figure). EMG RMS during ITL+CO2 and ITL increased in all four muscles compared to Rest and CO2 ($p \leq .0125$). EMG onsets for parasternal, SCM and scalene were earlier during ITL+CO2 and ITL compared to CO2. Compared to Rest, dyspnea intensity (≤ 0.013) and SAM negative affective responses increased during all three tasks ($p \leq .013$) but did not differ among tasks.

Conclusion: CO_2 alone or combined ITL+CO2 induced larger PFC increases in O2Hb and reductions in HHb. Inspiratory loading induced significant activation of respiratory muscles reflected by EMG and NIRS outcomes. Smaller changes by ITL and minimal additive effects of the ITL+CO2 task (compared to CO2) on fNIRS outcomes may reflect saturation or alternatively, automaticity during sustained ITL.

NIRSBOX cerebral tissue oximeter was provided by PIONIRS, Milan Italy; Funding provided by Department of Physical Therapy.

Figure for abstract 43.

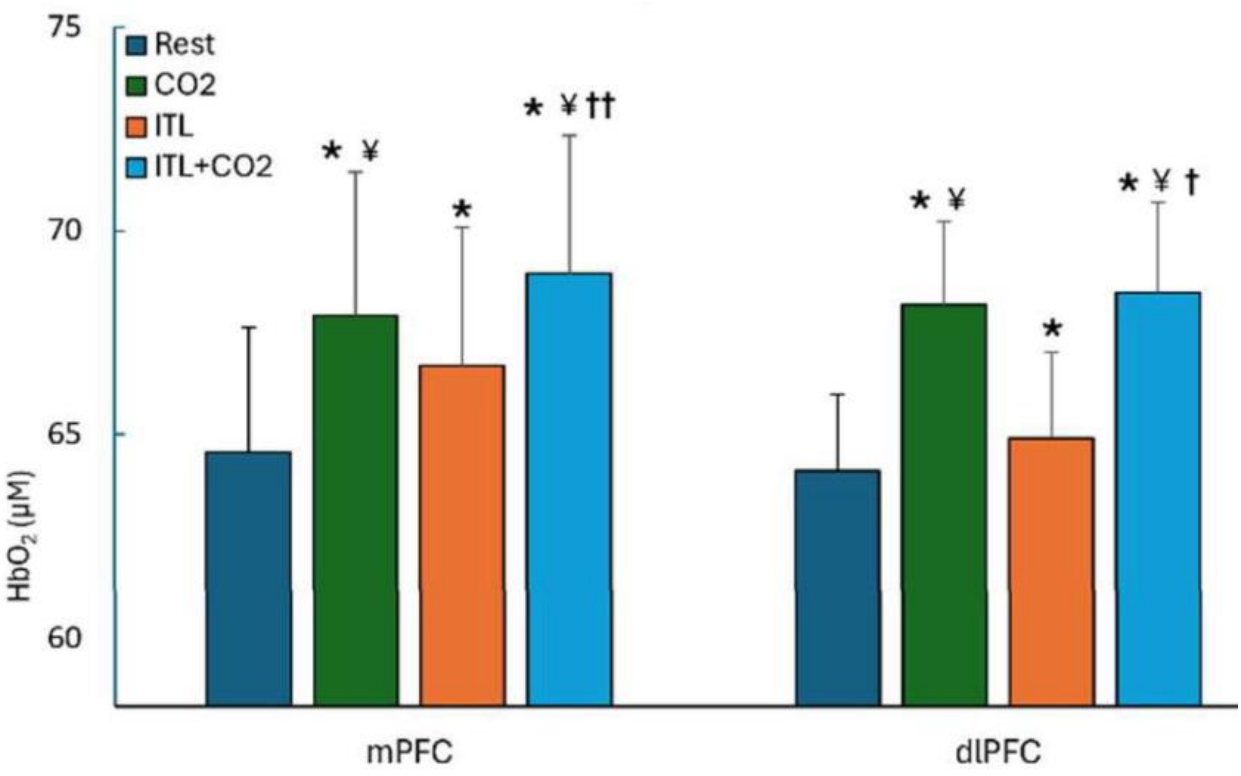

Figure. Bar plots O_2Hb in mPFC and dlPFC during the 5 min duration of Rest and three tasks – ITL, CO_2 and ITL+CO_2. * p<0.001 greater than Rest, ¥ p<0.001 greater than ITL, †† p<0.001 or † p=0.014 greater than CO_2 at. Differences tested by linear mixed model.

Abstract #44

A Machine Learning Algorithm to Quantify the Amount of Smoking Injury in Donor Lungs Assessed on Ex Vivo Lung Perfusion

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Introduction and Objectives: Lung transplantation is the best treatment for end-stage lung disease but is limited by donor lung shortage. While many donor lungs come from individuals with a smoking history, ideal donor criteria outline a <20 pack-year cutoff. Ex vivo lung perfusion (EVLP) provides a unique opportunity to better assess smoking-induced damage in donor lungs prior to transplantation. In this study, we examined a quantitative airway resistance threshold for smoking history and developed a machine learning algorithm, termed the 'Smoking Injury Index' (SII), to capture key features of smoking-induced lung injury using high-resolution ventilator traces and biochemical data generated during EVLP.

Methods: High-resolution flow and pressure data were recorded during n=139 (development n=86; validation n=53) clinical EVLP cases from our institution. Lung airway resistance was estimated via ridge regression using the equation of motion for the lung and high-resolution traces. The SII was developed in Python using an Extreme Gradient Boosting classifier to distinguish functional differences in donors with no confirmed smoking history from known active, heavy smokers (>20 pack-years).

Results: At a validated airway resistance threshold of 0.152 cmH2O·min/L, there was a specificity of 100% in identifying smokers. The SII achieved an area under the receiver operating characteristic curve of 90% in the development cohort and 87% in the validation cohort, respectively, in detecting heavy smoking injury in donor lungs. The most important EVLP-derived feature for detecting smoking injury was lung resistance, which was significantly higher in donors with a smoking history. Additional predictive features of the model included: expiratory tidal volumes, expiratory time constants, base excess perfusate levels, and perfusate pH.

Conclusion: This study presents a novel approach to analyzing high-resolution breath profiles from EVLP to accurately quantify structural damage in donor lungs due to cigarette smoke exposure. The SII provides a quantitative metric that can assist in selecting donor lungs for transplant.

Abstract #45

Pre-transplant Metabolic Phenotype Predicts Long-Term Survival After Lung Transplantation

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Background: Metabolic disturbances are common after lung transplantation and are associated with ad-verse outcomes. However, the prognostic relevance of pre-transplant metabolic phenotype and its temporal relationship with post-transplant survival remain incompletely understood.

Methods: We conducted a retrospective cohort study including 257 adult lung transplant recipients at a single tertiary center (2015–2024) with follow-up up to 10 years. Pre-transplant HbA1c and BMI were analyzed in relation to survival using Cox regression models adjusted for age, sex, diabetes status, transplant era, and underlying lung disease. Time-dependent predictive performance was assessed using ROC analysis at multiple time points.

Results: During follow-up, 81 deaths occurred, with a median survival of 8.5 years. In multivariable analysis, both HbA1c (HR 1.41, 95% CI 1.08–1.80, p = 0.011) and BMI (HR 1.07 per kg/m², 95% CI 1.01–1.14, p = 0.033) were independently associated with mortality. These associations persisted after adjustment for underlying lung disease, which showed no independent effect. Time-dependent ROC analysis demonstrated moderate predictive ability of HbA1c at 12 months (AUC 0.61) but substantially reduced performance at later time points (36 months: 0.53; 60 months: 0.52; 120 months: 0.46), indicating a decline in long-term predictive value. Tacrolimus-based immunosuppression was associated with improved survival compared to cyclosporine (HR 1.69, 95% CI 1.06–2.70, p = 0.029), despite less favorable metabolic pro-files, including higher HbA1c levels and greater weight gain.

Conclusions: Pre-transplant metabolic phenotype is an independent predictor of survival after lung trans-plantation, particularly in the early post-transplant period. The declining predictive value over time suggests that baseline metabolic risk reflects an initial vulnerability that is subsequently modified by post-transplant factors. These findings support the integration of metabolic risk assessment into pre-transplant evaluation and highlight the need for ongoing metabolic management after transplantation.

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Abstract #46

Experiences and Perceptions of In-person and Online Inhaler Technique Education Among Patients with COPD and Asthma: A Qualitative Descriptive Study

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Introduction and Objectives: Correct inhaler technique is essential for asthma and chronic obstructive pulmonary disease (COPD) management, however, nearly 70% of patients demonstrate critical technical errors. As healthcare increasingly shifts toward virtual delivery, online resources offer a potential supplemental instruction, but their integration into routine care remains unclear.

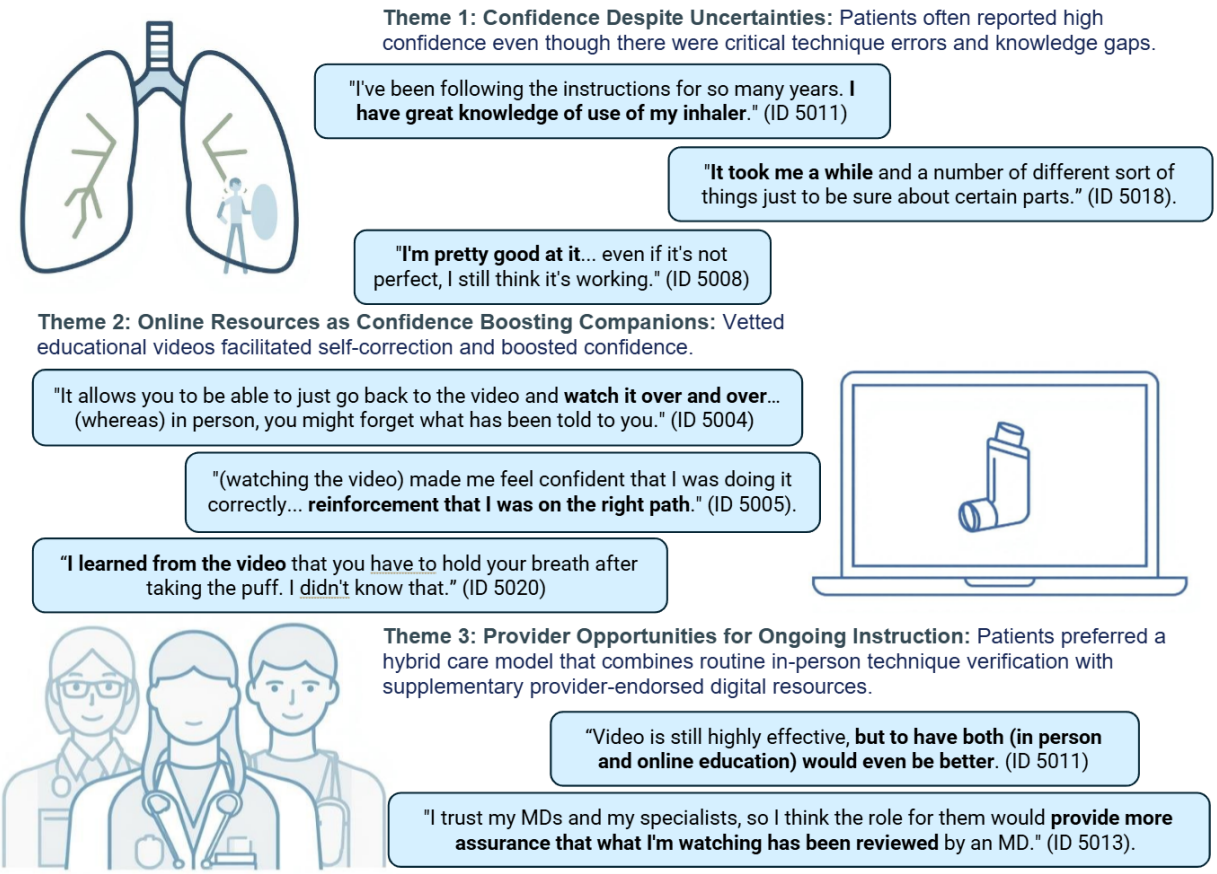
Methods: A qualitative descriptive study with adults prescribed maintenance inhalers for asthma or COPD. Semi-structured interviews explored patients' experiences, confidence, and knowledge regarding their inhaler technique, with a focus on exploring their preferences for traditional, in-person healthcare instruction versus supplementary online video resources.

Results: Three major themes were identified after interviews with twenty participants (67 ± 14 years; 55% female). 1) Confidence Despite Uncertainties: High baseline confidence masked latent uncertainties. 2) Online Resources as Confidence-Boosting Companions: Prior engagement with online tools was low due to lack of awareness and mistrust of content not verified by their healthcare team. After viewing standardized videos, nearly half of participants identified a previously unrecognized error. 3) Provider Opportunities for Ongoing Instruction: Participants expressed a preference for a hybrid care model, with routine technique verified during clinical visits and emphasized that supplemental digital resources should be endorsed by providers.

Conclusions: Participants emphasized the value of routine technical checks paired with concise, provider-vetted digital resources. Future resources should aim to actively overcome false confidence, address critical educational gaps, and better support patient self-management in a hybrid-care environment.

Funding sources: This work was supported by a grant from the PSI Foundation (Grant R23-20). DR receives research support as the NSA Chair in Respiratory Rehabilitation Research at West Park Healthcare Centre (University Health Network) Conflicts of interest: Speaking honoraria has been accepted by LF (Boehringer Ingelheim, AstraZeneca, and Pfizer).

Figure for abstract 46.



Abstract #47

Online Resources as a Source of Information and Instruction for Caregivers of Individuals with Advanced Pulmonary Disease

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Introduction & Objectives: Informal caregivers of patients with advanced pulmonary disease fill critical healthcare gaps by assisting patients with medical and personal care. Caregivers often rely on online resources for guidance; however, these resources have not previously been evaluated for content or quality. We evaluated the content, quality, readability, and actionability of caregiver-facing respiratory websites and Google's Artificial Intelligence (AI) summaries to identify gaps that could affect caregiver and patient outcomes.

Methods: The Google search term "taking care of someone with lung disease" was used to evaluate the first 75 consecutive websites aimed at caregivers. Eligible websites (n=31) were scored with a purpose-developed and evidence-based 26-item content checklist and validated quality assessment tools: modified DISCERN, Global Quality Scale (GQS), Patient Education Materials Assessment Tools (PEMAT) understandability and actionability, Flesch-Kincaid Grade level, and Flesch Reading Ease Score. Google's automatic AI summaries of search results - a feature launched in 2024 called "Search Generative Experience" (SGE) - was also recorded for comparison.

Results: Median content score was 13/26 (IQR[10.5-16.0]). Websites strongly covered areas of disease education, symptom monitoring, and pulmonary rehabilitation, but had lowest coverage of finances/caregiver income support, advance care planning, and medication side-effects. Most websites were from industry or for-profit sources. Google's SGE amplified these patterns, emphasizing high-visibility sources (large health-media sites or for-profits) and missing less common but actionable topics (e.g., finances, advance care planning). PEMAT scores fell below the 70% usability threshold; understandability median 11/17 (~65%; IQR [10-11]) and actionability median 3/6 (50%; IQR[2-3]). Modified DISCERN median was 5/5 (IQR 4-5), and GQS median was 3/5 (IQR 2-3). Readability (Flesch) median was 54.8 (IQR[45.6-60.1]), approximating reading text of moderate difficulty (Flesch-Kincaid grade level: 10).

Conclusion: This study highlights a lack of practical, actionable guidance with online resources (including Google's AI), for caregivers of individuals with advanced pulmonary disease. The combination of information gaps, low actionability, and above-recommended reading levels risk leaving caregivers underprepared. Improving the actionability and readability of these resources may strengthen caregiver confidence and reduce burden, potentially improving patient outcomes.

This study was partly supported by Academic Health Science Centre Alternative Funding Plan Innovation Fund University Health Network (UHN)/Ministry of Health. Dmitry Rozenberg receives research support from the National Sanitarium Association Respiratory Rehabilitation Research Chair at West Park (UHN). Alina Sami received the University of Toronto 2025 CREMS (Comprehensive Research Experience for Medical Students) funding support.

Abstract #48

Opportunities for Waste Reduction in Thoracentesis: A National Physician Survey

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Rationale: Thoracentesis procedures generate waste and contribute to the healthcare system's carbon footprint.

Objective: This study aimed to evaluate the equipment used during thoracentesis procedures, the waste generated for these procedures, and assess physician attitudes towards waste generation in thoracentesis procedures.

Methods: A succinct survey characterizing variability in thoracentesis procedure equipment and waste generation along with perspectives of physicians was created by three practicing clinicians regularly performing thoracenteses. This survey was reviewed by five separate content experts for clinical sensibility testing and revised before distribution to physician members of the Canadian Thoracic Society procedural subgroup.

Results: A total of 26 respondents participated in the survey (34% response rate). Respondents included respirologists (65%) and interventional pulmonologists (35%), predominantly practicing in university-affiliated centres (92%). These are chest physicians who frequently perform thoracentesis, with 58% of respondents performing more than 50 thoracenteses per year. Half of the respondents report they are involved in procurement of materials. Most participants (64%) report using kits instead of individual components to perform thoracentesis. The majority of respondents routinely discard unused materials during a thoracentesis (94%). Many participants indicate that environmental sustainability is somewhat-to-very important to them (81%). Half (50%) of participants indicate that the knowledge of environmental impact of products would be very or extremely influential about choice of thoracentesis materials. Nearly a quarter of respondents report that they had no confidence in appropriate sorting of waste generated in a thoracentesis procedure.

Conclusions: Chest physicians who perform thoracentesis report heterogeneity in equipment use, with low confidence in appropriate waste sorting. The majority use kits with frequent waste of unused materials. Overall, participants indicated that environmental sustainability is important to their practice and knowing more about the carbon footprint of materials may impact their choice in product procurement for thoracentesis procedures.

Abstract #49

Baseline Oscillometry Associated With Baseline Lung Allograft Dysfunction (BLAD) In Lung Transplant Recipients

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Background: Baseline lung allograft dysfunction (BLAD), defined as the failure to achieve FEV1 and/or FVC ≥ LLN after lung transplant, is associated with impaired survival. Patients with underlying interstitial lung disease have an increased risk for BLAD. Lower reactance (Xrs) on oscillometry (Osc) is observed in BLAD compared with non-BLAD patients. The prevalence of concurrent airflow obstruction is not known. The current study investigated whether the baseline oscillometry and prevalence of airflow obstruction and restriction differs between BLAD and non-BLAD.

Methods: The cohort included 596 double lung transplant recipients recruited at the first outpatient visit from 2017 to 2024 with minimum follow-up of 2 years. Osc was conducted prior to spirometry±plethysmography. Statistical analysis was conducted using pairwise comparisons.

Results: BLAD (n=162) have lower baseline FEV1 (64±12% vs. 103±17%, p<0.001), lower FVC (66±12% vs. 98±11%, p<0.001), lower TLC (66±13% vs. 86±13%, p<0.001), and achieved baseline (i.e. highest) values earlier (159 [70, 317] days vs. 210 [93, 461,p<0.001] days) compared to non-BLAD (n=434). BLAD had greater prevalence of airflow obstruction (FEV1/FVC<LLN; 14% (n=22) vs 1.8% (n=8)), and restriction (TLC<LLN; 88% (n=119) vs. 34% (n=116)) compared to non-BLAD. Baseline Osc were worse in BLAD compared to non-BLAD, with lower X5 z-score (-1.16±1.48 vs. -0.01±1.02,p<0.001), higher R5-19 (0.38[0.17,0.70] vs. 0.19[0.01,0.40],p<0.001), and higher Ax (8.7[5.8,13.5] vs. 4.9[3.2,7.3],p<0.001). Baseline (i.e. best) Osc was achieved earlier than spirometry, approximately 3 months after transplant, with significant differences between the BLAD and non-BLAD group. In adjusted multivariable logistic regression, baseline R5, R5-19, X5, and Ax were each independently associated with BLAD (all $p < 0.05$).

Conclusions: Baseline oscillometry differs significantly between BLAD and non-BLAD. Spirometry showed higher prevalence of airflow obstruction in BLAD than non-BLAD, which was further supported by the higher baseline R5-19 and AX; and lower X5 in the BLAD group

Thank you to Dr. Chow, Anne Fu and everyone in Chow Lab for all your guidance and support with this project!

Abstract #50

Mitochondrial Transplantation For The Recovery Of Donor Lungs Subjected To Prolonged Warm Ischemia: A Novel Strategy To Expand The Donor Pool For Transplantation

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Introduction & Objectives: Lung utilization rates from uncontrolled donation after circulatory death (uDCD) remain exceedingly low due to concerns regarding severe injury resulting from prolonged warm ischemia (WI). Mitochondrial transplantation (MT) is an innovative strategy that involves the direct transfer of viable mitochondria into damaged cells, heralding a new era of regenerative medicine. This study evaluates the potential of MT therapy to recover WI-injured donor lungs in a porcine ex vivo lung perfusion (EVLP) model and explores potential mechanistic underpinnings.

Methods: During Efficacy phase (Phase 1), donor lungs (n=5/group) subjected to circulatory death, 3h of WI, and 12h of static preservation at 10ºC were randomized to receive intravascular MT (MT group) or vehicle solution (control) at 3 time points: at flushing during harvest, upon initiation of EVLP, and at 1h of EVLP (Fig. 1A/B). Lungs were assessed on EVLP for 6h, and perfusate and tissue biopsies were collected. High resolution respirometry (HRR) was performed on post-EVLP lung tissue samples to assess mitochondrial oxygen consumption rates. In the Mechanistic phase (Phase 2), mitochondrial aliquots were inactivated prior to administration (n=4, MTi group), aiming at informing whether mitochondrial viability is required for benefits on EVLP.

Results: MT in WI-injured lungs led to superior performance on EVLP (Fig. 1C), including higher delta PO2 ($P=0.04$), higher dynamic compliance ($P=0.01$), lower glucose consumption ($P=0.09$), lower total perfusate loss ($P<0.01$), and lower W/D ratios ($P<0.01$). HRR demonstrated higher maximal respiratory capacity in MT group compared to controls (Fig. 1D, $P=0.04$). Post-EVLP tissue samples in MT group showed lower levels of IL-6, TNF-α, and IL-8 ($P<0.05$). Mitochondrial inactivation prior to MT (MTi) abolished most functional benefits of MT (Fig. 2).

Conclusion: MT effectively promoted functional recovery of donor lungs subjected to WI, achieving similar parameters to those of organs normally accepted for transplant. Importantly, most treatment effects are specific to metabolically viable mitochondria.

CIHR; Mitochondrial Innovation Initiative (Mito2i)

Figure for abstract 50.

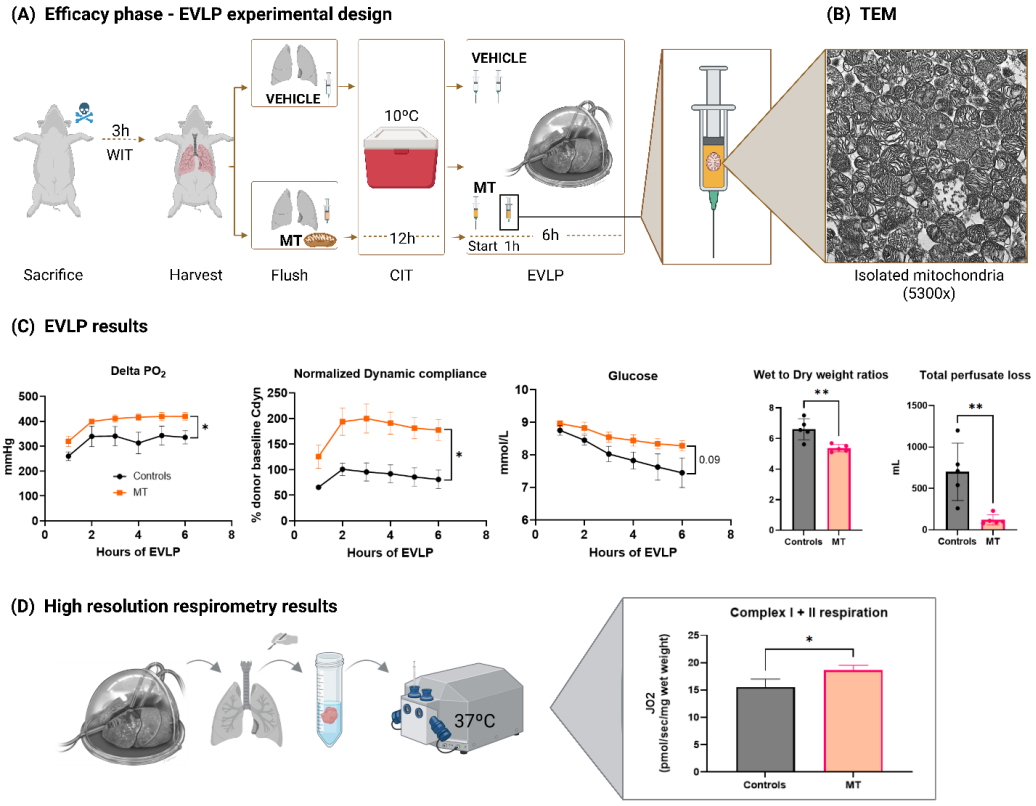

Fig. 1. Efficacy phase - Mitochondrial transplantation. (A) Ex Vivo Lung Perfusion (EVLP) experimental design. Researchers were blinded to the intervention. **(B) Transmission electron microscopy (TEM) of isolated mitochondria**. Heterologous mitochondria were isolated from porcine donor hearts as previsouly described (Cloer, JHLT, 2023), preserved frozen at -80ºC in a Trehalose-based buffer, and thawed immediately before application during flush or EVLP. TEM imaging indicated thawed mitochondria retained excellent membrane and cristae morphology. **(C) EVLP results.** MT-treated lungs demonstrated superior function on EVLP when compared to controls. **(D) High resolution respirometry (HRR) of post-EVLP lung tissue samples**. HRR was performed utilizing an Oroboros O2k device. In short, post-EVLP lung tissue was evaluated with regards to oxygen consumption rates in the presence of complex I and II oxidative phosphorylation substrates. Maximal coupled tissue oxygen consumption rate (complex I + II respiration) was significantly higher in MT group than in controls. *P < 0.05, **P < 0.01, two-way repeated measures ANOVA performed for all figures involving a time component, and unpaired T-test or Mann-Whitney test for comparison of two groups. Results are expressed as means ± SEM.

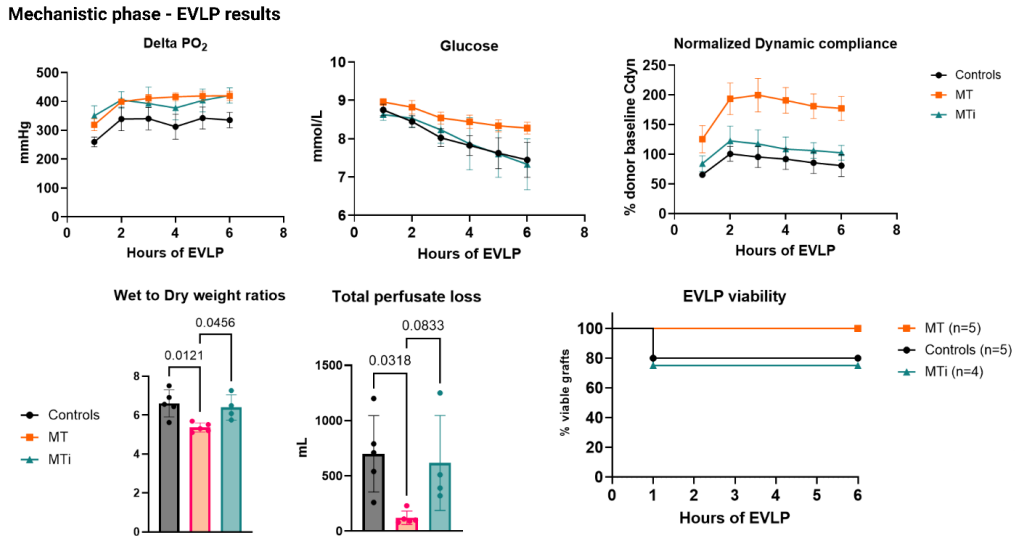

Fig. 2. Mechanistic phase - Mitochondrial inactivation prior to transplantation (MTi). Trehalose-preserved mitochondria were thawed and incubated with 5 uM Rotenone and 50 uM Antimycin A for 30 minutes on ice; after 3 washing cycles in buffer solution, mitochondrial aliquots were freeze-thawed in liquid nitrogen 5 times prior to MT. **MTi prevented all functional and physiological benefits of MT** except for similar delta PO2 (LA PO2 - PA PO2). Results are expressed as means ± SEM.

Abstract #51

Inspiratory Muscle Loading With Dyspnea Limits Simulated Driving Performance In Young Adults

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Introduction & Objectives: Dyspnea is a neurophysiological experience that imposes cognitive load by activating cortical areas responsible for attention, emotional regulation, and motor planning. Consequently, it may compromise multi-tasking activities like driving. This study investigated whether inspiratory threshold loading (ITL) and associated dyspnea impairs simulated driving performance in young healthy adults.

Methods: 28 healthy adults (mean age 24±1 years) completed the Depression Anxiety Stress Scale 21 (DASS-21), and performed maximal inspiratory pressures (MIP) and spirometry. Using a repeated measures design, they completed 3 tasks in randomized and counterbalanced order: single-task ITL against a 20 cmH_2O load (ITL), single-task Driving (Drv), and dual-task Drv+ITL. Simulated driving was performed using a computer-based software where preplanned routes of comparable length and difficulty were provided. Driving error, dyspnea intensity (Borg Dyspnea Scale), ventilatory outcomes and affect (Self-Assessment Manikin [SAM]), and qualitative dyspnea descriptors were assessed at baseline and immediately after each task.

Results: Two categories of driving error, vehicle control and signal infractions, were significantly higher during dual task Drv+ITL compared to single-task Drv ($p<0.048$). Tidal volume, respiratory rate and minute ventilation were more variable during Drv+ITL than ITL ($p<0.010$). SAM affective responses indicated significantly lower sense of control ($p=.018$) and greater chest pressure ($p=0.010$) during Drv+ITL versus single-task Drv. Greater MIP (inspiratory muscle strength) was correlated with lower Borg Dyspnea scores during Drv+ITL ($r=-0.336$, $p=0.040$).

Conclusion: Inspiratory muscle loading and associated dyspnea decreased sense of control and impaired simulated driving performance. Participants with higher inspiratory muscle strength experienced lower dyspnea intensity during dual task Drv+ITL.

This research was completed in partial fulfillment of the requirement for the Master of Science in Physical Therapy degree at the University of Toronto. The authors would like to acknowledge Ali Salman Al-Timimi for his contribution to this study. The study was financially supported by CIHR (PJT 183640) and Pettit Block Grant from the University of Toronto. Dmitry Rozenberg receives research support from NSA Chair in Respiratory Rehabilitation West Park Health Center (University Health Network).

Abstract #52

Lung Transplant and Cystic Fibrosis: Setting the Stage for Shared Care

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Background: Innovative treatments are improving quality and length of life for cystic fibrosis (CF) lung transplant recipients. Care from many specialists is needed due to the multisystem nature of CF, its significant polypharmacy and effects of immunosuppression. Excellent communication and information sharing prevents confusion, overlap, and gaps in care across these large teams. Our lung transplant program has embarked on a quality improvement initiative jointly with our CF partner programs to standardize handover, optimize communication, identify clinical issues, and streamline timely testing, treatments, and referrals.

Methods: We scheduled meetings between the lung transplant and CF teams to discuss mutual patients. Participants include respirologists, nurse practitioners, nurse coordinators, and allied health. A template was created based on the Cystic Fibrosis Foundation's post-lung transplant guidelines. Before meeting, each team fills out the shared template for selected patients. In the future, the file will be uploaded to the patient's chart and can be viewed by them.

Results: Since December 2024, we have reviewed twenty-five patients. Twenty-three patients are from our primary CF partner program and two are from a secondary partner program. We reviewed cancer screening (colon, breast, skin, gynecological), diabetes screening, and mental health. For 80% of patients, all categories were up-to-date or have a clear follow-up timeline. For three patients, a gap was identified and addressed. Two patients were not compliant with appointments. One patient became too unwell for clinic follow-up, and another passed away.

Conclusions: In developing and implementing standard shared care processes, we prioritize reviewing patients in a collaborative and proactive manner. This allows us to identify and address gaps in patient care for cystic fibrosis patients with complex and dynamic care needs.

Abstract #53

Grp78-directed Autoantibodies In BAL Are Associated With Future CLAD And Define A Clad-specific Phenotype Marked By The Unfolded Protein Response

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Purpose: Serum autoantibodies (AABs) have been linked to chronic lung allograft dysfunction (CLAD); however, bronchoalveolar lavage (BAL) AABs and their association with future CLAD has not been examined. It also remains unclear whether cell-surface antigens present on distinct cell subsets may be selectively targeted by an autoimmune response.

Methods: A multiplexed antigen microarray was used to profile 45 AABs in BAL at 3, 6, 12, 18, and 24-months (±14 days) post-LT from a case-control cohort of recipients who developed CLAD or remained CLAD-free by 5 years after transplant. Five-fold cross-validated backward selection identified the minimal antibody set most strongly associated with future CLAD. Explanted lungs from CLAD (n=12; 5 BOS, 7 RAS/mixed) or donor controls (CTRL, n = 6) were analyzed by flow cytometry (FC) and single-cell RNA sequencing (scRNA-seq). Five additional CLAD and CTRL samples were enriched for epithelial cells to validate phenotypes identified by scRNA-seq using FC.

Results: Feature selection identified a combinatorial BAL signature comprised of 6 AABs associated with future CLAD (average AUROC = 0.753), with IgG anti-GRP78 emerging as the top associative feature (Fig.1A). The presence of its cognate antigen, GRP78, was significantly elevated on the cell-surface (csGRP78) of CLAD epithelia, especially in RAS/mixed (Fig.1B). On a transcriptional level, scRNA-seq identified a CLAD-specific alveolar type II epithelial (AT2) subset (AT2-2, Fig.1C) with UPR pathway activation and HSPA5 upregulation (encoding GRP78, Fig.1D). FC of epithelia-enriched lung cells from additional samples validated the preferential csGRP78 expression on CLAD AT2 cells (Fig.1E).

Conclusion: BAL IgG anti-GRP78 was associated with future CLAD, with its cognate antigen marking an AT2 cell population characterized by UPR activation and csGRP78. This suggests that AT2-cell stress mediates csGRP78 expression, and that AT2-cell loss may both drive and result from local autoimmunity in CLAD.

Toronto Lung Transplant Program BioBank; CLAD Team; Canadian Institutes of Health Research CGS-D Award; CST Research Training Award 2025.

Figure for abstract 53.

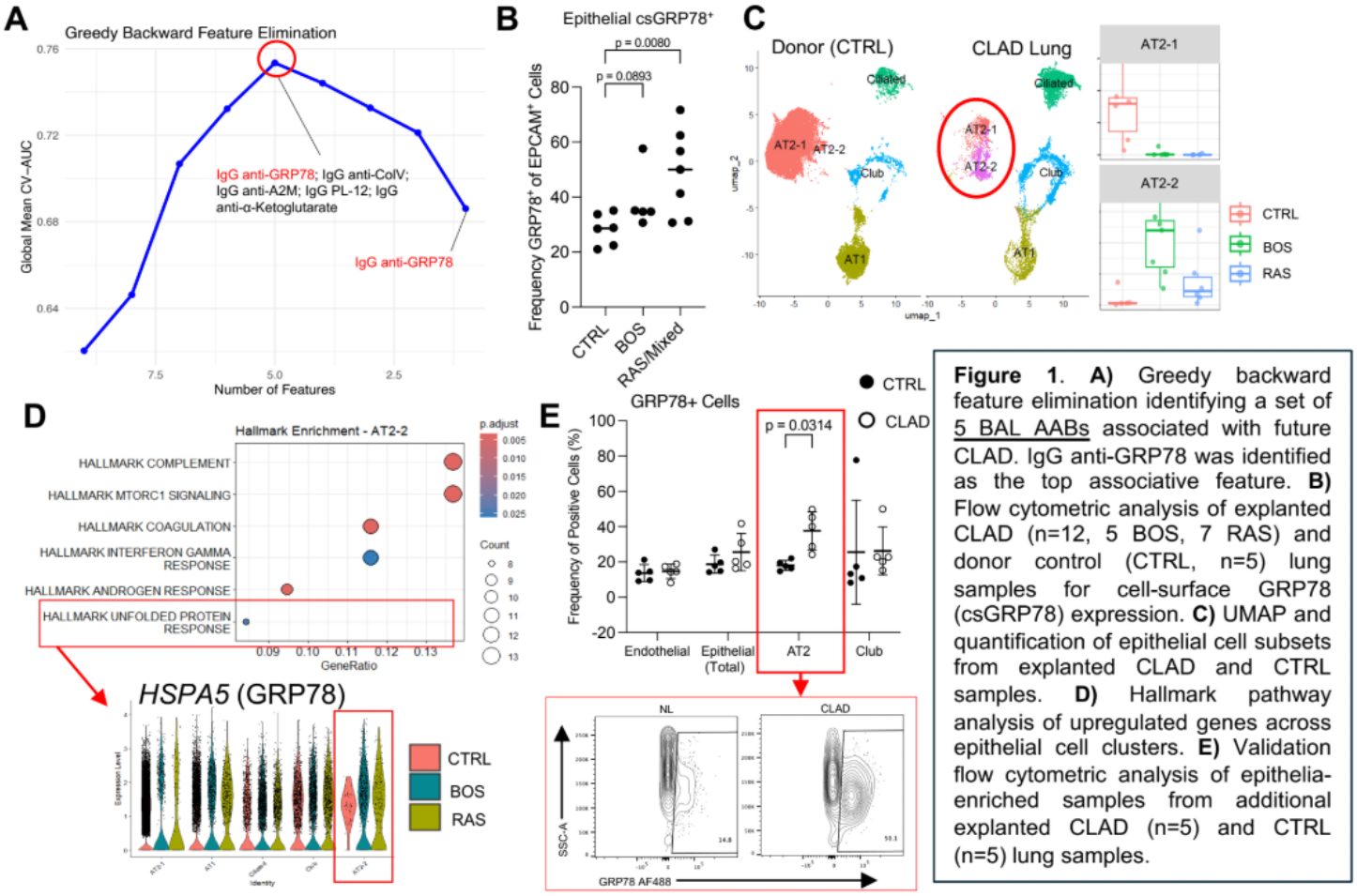

Figure 1. **A)** Greedy backward feature elimination identifying a set of 5 BAL AABs associated with future CLAD. IgG anti-GRP78 was identified as the top associative feature. **B)** Flow cytometric analysis of explanted CLAD (n=12, 5 BOS, 7 RAS) and donor control (CTRL, n=5) lung samples for cell-surface GRP78 (csGRP78) expression. **C)** UMAP and quantification of epithelial cell subsets from explanted CLAD and CTRL samples. **D)** Hallmark pathway analysis of upregulated genes across epithelial cell clusters. **E)** Validation flow cytometric analysis of epithelia-enriched samples from additional explanted CLAD (n=5) and CTRL (n=5) lung samples.

Abstract #54

Sex Differences In Trends In All-cause Healthcare Utilization In Younger Adults With COPD

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Introduction: COPD is a progressive lung disease that places a substantial burden on healthcare systems. Although commonly associated with older adults, previous research by our group demonstrated the prevalence of COPD among younger adults is rising, especially in females. Sex-specific trends in healthcare utilization rates, however, have yet to be examined.

Objective: To examine sex- specific trends in all-cause healthcare utilization, including hospitalizations and emergency department (ED) visits, among younger adults with COPD.

Methods: We conducted a population-based open cohort study using Ontario health administrative data from April 1, 2006, to March 31, 2023. Age groups were categorized as younger (35–54 years), middle-aged (55–64 years), and older (>65 years). Individuals aged ≥35 years were classified as having COPD using a validated case definition. Annual standardized rates and rate ratios of hospitalization and ED visits in people with COPD compared with those without COPD were calculated by sex and age group.

Results: Younger adults with COPD had higher rate ratios of hospitalizations and ED visits compared to middle-aged and older adults. Younger females showed the greatest rate ratios overall and compared to younger men (3.06 in females versus 2.71 in younger men). Younger females with COPD also had higher ratios of ED visits relative to individuals without COPD (rate ratio 1.77). Trends indicate increasing rates of excess health services utilization among younger adults, particularly in females.

Conclusions: Younger females with COPD experience disproportionately high and a rising burden of healthcare utilization compared to patients without COPD and to younger men. These findings highlight the need for targeted interventions and resource planning to address the growing healthcare burden in this group.

Abstract #55

Evidence-based Oscillometry Interpretation Algorithm For Resolution Into Lung Function Patterns: A Step To Clinical Implementation

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Background: Respiratory oscillometry, a pulmonary function test (PFT) performed during tidal breathing, is more sensitive to lung mechanics than standard PFTs, i.e. spirometry and plethysmography. Lung function patterns classified by standard PFTs are key for diagnosis of lung disease. Evidence-based interpretation guidelines for oscillometry do not exist.

Aim: To develop an algorithm to resolve oscillometry into normal, obstructive and restrictive patterns.

Methods: The model was developed with paired oscillometry-standard PFT data from 1,115 patients with a broad range of respiratory physiology disturbances recruited from a tertiary academic centre and 2 community sites. Lung function patterns were based on spirometry and plethysmography, interpreted using 2022 ERS/ATS guidelines; these served as grounds-truth labels. Receiver operating characteristic (ROC) curves were used to identify oscillometry metrics that distinguish the different lung function patterns. ROC-derived cut-off vs empiric z-scores of +/-1.64 were compared. The models were validated in 871 patients who were not included in the development cohort.

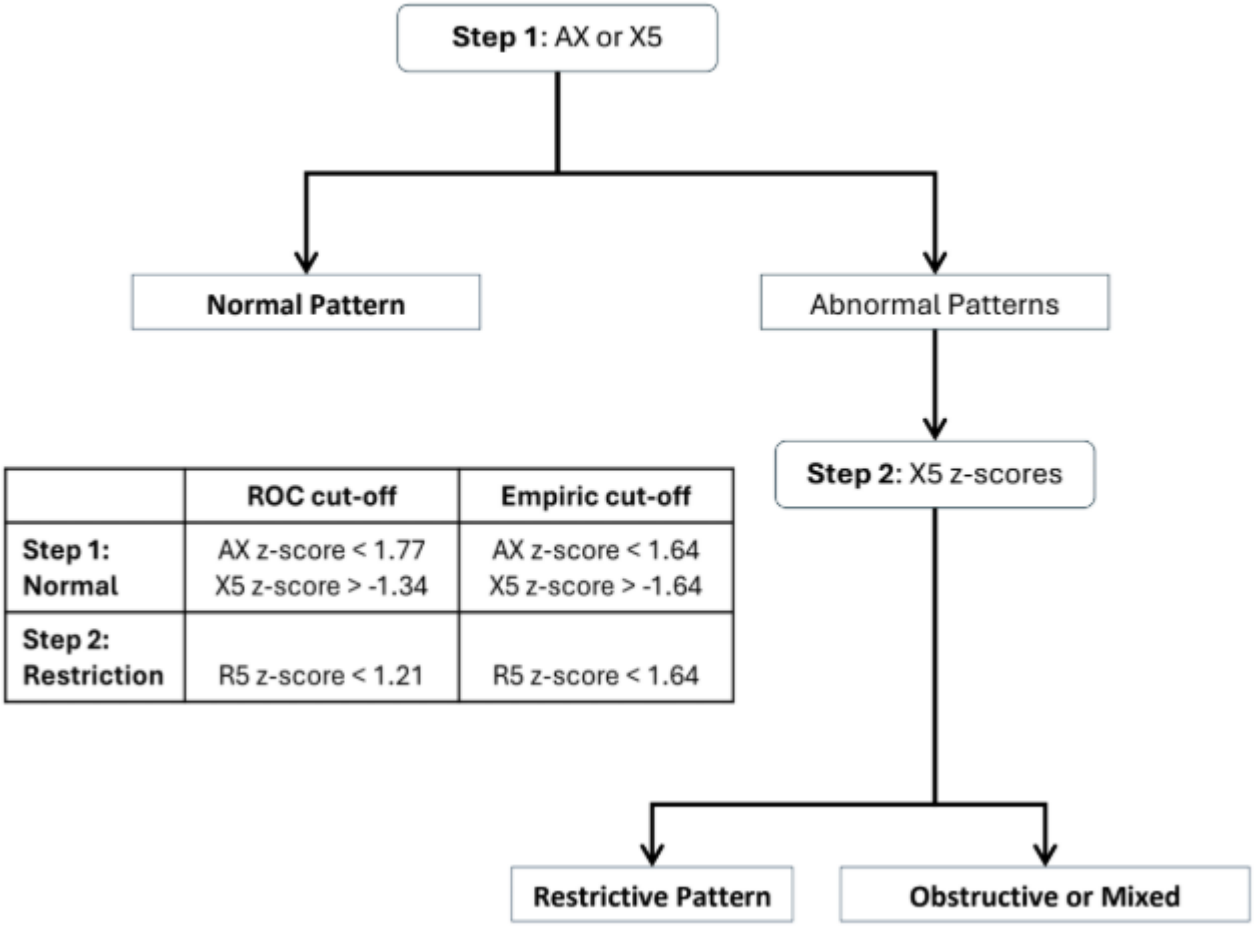
Results: ROC analysis identified AX (area of reactance) and X5 (reactance at 5 Hz) z-score to distinguish normal vs abnormal, and R5 (resistance at 5 Hz) z-score for restrictive vs obstructive/mixed patterns (AUC≥0.7). We developed a 2-step decision tree using AX or X5 to distinguish normal vs abnormal, followed by R5 to resolve abnormal into restrictive vs obstructive/mixed patterns (Figure 1). The best model used AX z-score of 1.77 or X5 z-score of -1.34 to distinguish normal from abnormal with 79% sensitivity, and R5 z-score of 1.21 to identify restrictive from obstructive/mixed patterns with 78% specificity.

Conclusions: Our 2-step decision tree model is the 1st evidence-based strategy to interpret oscillometry in the context of classic lung function patterns with high sensitivity to detect normal, and within the abnormal patterns, high specificity for restriction.

CIHR, NSERC, Canadian Lung Association, Derrick Rossi Innovation Fund, SUMO AFP Innovation Fund, Audrey's Place Foundation.

Figure for abstract 55.

Figure 1



	ROC cut-off	Empiric cut-off
Step 1: Normal	AX z-score < 1.77 X5 z-score > -1.34	AX z-score < 1.64 X5 z-score > -1.64
Step 2: Restriction	R5 z-score < 1.21	R5 z-score < 1.64

Abstract #56

Assessment of Online Educational Materials for Air Travel with Chronic Lung Disease

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Introduction & Objectives: Air travel is currently the safest and fastest mode of transportation. With the increasing prevalence of individuals with chronic lung disease (CLD) and their heightened susceptibility to respiratory symptoms, it is crucial for prospective flyers to be informed of flight safety practices. Online websites are easily accessible resources that these individuals may utilize. This study aims to assess the content and quality of online websites pertaining to air travel safety for individuals with CLD.

Methods: A Google search on “flying with lung disease” was conducted, capturing the first 200 websites discussing air travel with CLD. Website content was evaluated using international air travel guidelines, readability using the Flesch-Kincaid Grade Level (FKGL), and quality using established scoring metrics: Modified DISCERN, Global Quality Scale (GQS), and the Patient Education Materials Assessment Tool (PEMAT) understandability and actionability assessments. Irrelevant, unavailable, and duplicate websites were excluded.

Results: Of the 151 websites identified, 32 websites met the inclusion criteria with a mean±SD content score of 13±5 out of 26. The most frequently addressed recommendations were consulting the airline (94%) and discussing plans with a healthcare provider (91%). However, several clinically important topics were infrequently addressed, such as speaking to an in-flight attendant (9%) and minimizing heavy packing (12%) (Table 1). Median DISCERN and GQS scores (out of 5) were 4 [IQR 3-4] and 3 [IQR 2-4], respectively. Websites reached the mean±SD PEMAT threshold (>70%) for understandability (71%±13%) but not for actionability (65%±19%). Websites had suboptimal readability with a FKGL of 11±3.

Conclusion: There was significant variability in clinically relevant air travel topics among websites with moderate-good quality, with most recommending consulting a healthcare provider and contacting the airline. Websites should increase representation of air travel recommendations and simplify the reading level to contribute towards more informed air travel practices for CLD.

Research supported by the Chair in Respiratory Rehabilitation Research at West Park (UHN).

Figure for abstract 56.

Table 1. Content Topics and Frequency of Reporting among Websites

Category	Criteria	Frequency of Reporting (%)
Definition and Concept	Flight Elevation/Altitude	63
	Hypoxemia	66
	In-Flight Oxygen	69
General Considerations for Flying	Symptom Monitoring	44
	Contraindications	44
	Comorbidities	16
	Reducing Infection Risk	50
	Seeking Resources	56
Pre-flight Recommendations	Discussing with Healthcare Provider	91
	Pre-flight Assessment Test	59
	Destination Environment	50
	Destination Health Care	66
	Emergency Planning	63
	Accessibility Services	72
	Seat Selection	31
	Contacting Airlines	94
Packing for the Flight	Packing Supplemental Oxygen	72
	Packing Medication	84
	Medical Documentation	84
	Compression Stockings	9
	Minimizing Burden	13
In-flight Recommendations	In-Flight Attendant	9
	Hydration	41
	Avoiding Substances	28
	Keeping Active/Mobile	31
Post-flight Recommendations	Arrangements for Daily Living	31

Abstract #57

Developing a Safe and Effective Lipid Nanoparticle for Endothelial Gene Delivery During EVLP

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Introduction & Objectives: Non-viral lipid nanoparticle (LNP) technology offers a promising strategy for delivering genetic payloads during ex vivo lung perfusion (EVLP), enabling targeted modification of donor organs prior to transplantation. We have previously reported an LNP that demonstrated effective trans-vascular gene delivery in EVLP but was associated with acute toxicity, highlighting a key barrier to clinical translation. We hypothesized that a carefully designed LNP could achieve higher endothelial-specific transfection without side effects. Objectives are: 1. Refine LNP composition to mitigate acute toxicity during EVLP and 2. Increase transfection efficiency to achieve broad endothelial coverage.

Methods: P3S-DOPE/DOTAP, an LNP formulated to balance lung targeting properties and safety profile based on prior screening, was evaluated in a rat EVLP model. Donor heart-lung blocks from Lewis rats (280-300g) were perfused for 4 hours with the LNP loaded with a reporter mRNA encoding mCherry protein delivered via perfusate (n=3/group; 4 groups: one control and three escalating LNP doses). Lung physiology and inflammatory cytokines were assessed for safety. Precision-cut lung slices (PCLS) were generated from the treated lung and cultured up to 4 days to quantify transgene expression using flow cytometry.

Results: We observed a high endothelial-specific transfection rate of 65.3% ± 3.01 at 3 μg mCherry mRNA/mL of LNP. The rat lungs showed stable lung physiology (lung compliance, vascular resistance and oxygenation) after LNP administration for all doses, comparable to control. No differences were observed in the perfusate cytokine levels of IL-1β, IL-6, and CXCL1 (rat orthologue of human IL-8), markers of acute lung inflammation during EVLP.

Conclusions: Herein we report a safe and efficient LNP-based delivery of genetic payload to donor lungs during EVLP. These data establish the proof-of-concept for targeted endothelial gene therapy with an LNP approach. Translational validation using large animal model and human donor lungs is warranted and ongoing.

Supported by Canadian Institutes of Health Research, New Frontiers in Research Fund, and the Ontario Graduate Scholarship.

Abstract #58

Routine Long-term Use Of Proton Pump Inhibitors Is Widespread With Unknown Benefit In Clinical Outcomes After Lung Transplantation

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Introduction: Gastroesophageal reflux disease (GERD) is a risk factor for chronic lung allograft dysfunction (CLAD). Lung transplant recipients (LTR) are often routinely treated with proton pump inhibitors (PPI) in the absence of GERD or another indication, despite lack of evidence to support this practice. We evaluated the prevalence of routine PPI use in the first-year post-transplant and its association with percent-predicted FEV1 (ppFEV1), CLAD, baseline lung allograft dysfunction (BLAD), and acute rejection.

Methods: We conducted a retrospective chart review of all adult first-time LTR in 2023 who survived ≥1-year post-transplant and completed 24-hour reflux testing, which is routinely performed post-transplant at our institution. Long-term PPI use was defined as >8 continuous weeks after reflux testing. Objective GERD was defined by >80 reflux episodes and/or acid exposure time >4% on therapy or >6% off therapy, as per Lyon consensus 2.0. CLAD was defined as per ISHLT 2019 consensus. BLAD was defined as failure to achieve a baseline ppFEV1 ≥80% in the first year. A-score was defined as the average of acute cellular rejection A-grades across transbronchial biopsies.

Results: 144 (99%) of 145 included LTR were prescribed long-term PPI. 45 (31%) had objective GERD. 16 (11%) had non-GERD indications for PPI. 90 (62%) had no clear indication and were considered on routine PPI (Fig A). ppFEV1 at 1 year (Fig B) and time to CLAD (Fig C) were comparable between LTR on indicated vs routine PPI, as were the prevalence of BLAD (54% vs 42%, p=0.18) and mean A-score (0.15 vs 0.14, p=0.74) at 1 year.

Conclusion: Clinical outcomes were similar in patients on routine vs indication-based PPI treatment. The majority of LTR in the first-year post-transplant were on routine long-term PPI without a clear indication. This practice warrants re-evaluation as PPI deprescribing can reduce pill burden, adverse effects, and healthcare costs.

The authors would like to acknowledge all the team members who were involved in data collection and maintenance of the Toronto Lung Transplant Program Database. Tereza Martinu holds a Di Poce Scholar Award in Transplantation and has received funding from the University Health Network Foundation.

Figure for abstract 58.