UNIVERSITY OF SASKATCHEWAN

Program and Abstracts

Department of Medicine

Research Day

May 3, 2024

PROGRAM

10:00-10:05
Opening comments
Ozlem Sari

10:05-10:35
<u>Keynote address</u>:
Dr. Scott Napper
Professor, Department of Biochemistry, Microbiology & Immunology
Senior Scientist, Vaccine and Infectious Disease Organization (VIDO)

"***Research at USASK: Be What the World Needs***"

<u>Faculty Session</u>

10:40-10:53
Premature Loss of Life in a Cohort of Patients with COPD and Lung Cancer in Saskatchewan: A Retrospective Study
Erika Penz

10:54-11:07
Geospatial Mapping to Identify Primary Glomerulonephritis Hot Spots in Saskatchewan
Bhanu Prasad

11:08-11:21
Spontaneous Retropulsion in Autopsy Verified Progressive Supranuclear Palsy
Eric Noyes

11:22-11:35
Stroke Care and Neurological Emergency Response Simulation (SCaNERS): High Fidelity Acute Stroke Simulation and its Impact on Knowledge Retention
Bashir Daud Shah

11:36-11:49
Virtual Multidisciplinary Preoperative Assessment: a Pilot Study
Michael Prystajecky

11:50-12:03
ALS Health Care Provider Wellness
Kerri Schellenberg

12:04-12:50
Lunch and Conversation

Faculty Session

12:51-1:04
Intermittent Low Oxygen Breathing: a First Study in People with MS testing at Different Disease Stages
Stephanie Ballendine

1:05-1:18
Increased Survival in Contemporary Parkinson's Disease – a 47-year Autopsy Study
Alex Rajput

1:19-1:32
Time Since Pain Onset Influences Shoulder Motion in People with Rotator Cuff Disorders: a Study of Rural and Urban Saskatchewan
Angelica Lang

1:33-1:46
Multi-disciplinary Clinical Endocarditis Pathway (MENDO): Community as Cure
Ben Leis

1:47-2:00
Beyond Seizure Control: A Longitudinal Study of Cenobamate's Effect on Cognition in Patients with Drug-Resistant Epilepsy
Suganya Giri Ravindran

2:01-2:14
A Study of Patient- and Physician-assessed Quality of Care in a Newly Launched Seizure Investigation Unit at a Comprehensive Epilepsy Centre
Noman Ishaque

2:15-2:28
An Examination of Patient-Reported Outcomes in COPD Patients Utilizing a Novel Mobile Application
Brianne Philipenko

2:29-2:35
Closing comments
Rob Skomro

ABSTRACTS

Premature loss of life in a cohort of patients with COPD and Lung Cancer in Saskatchewan: A Retrospective study

Dana Saleh, Nianping Hu, Nedeene Hudema, Benjamin John Fenton, Darcy Marciniuk, Erika Penz

Rationale: Lung cancer (LC) is the leading cause of cancer death in Canada and chronic obstructive lung disease (COPD) is a major contributor to hospitalizations.[1,2,3] Individuals with concomitant COPD and LC are reported to have lower curative LC treatment rates and higher healthcare utilization.[3] Understanding disease burden in LC and COPD is important for informing healthcare policy on resource need and allocation. We aimed to describe years of life lost (YLL) and premature life years lost (PLYL) among individuals with COPD, LC, and combined COPD with LC.

Methods: This was a retrolective cohort study of Saskatchewan (SK) residents over age 35 with a diagnosis of COPD, LC, or both between January 1st, 2000 and December 31st, 2015. The SK cancer registry was linked with healthcare administrative databases to create three cohorts: COPD, LC, and COPD with LC. Stage of LC at diagnosis and date of death were reported. Statistics Canada age- and sex-standardized life tables were used to derive YLL and PLYL. Descriptive and inferential statistics were used.

Results: 117,952 individuals were included: 110,884 with COPD, 3,132 with LC, and 3,936 with combined COPD with LC. Individuals with LC alone had the highest PLYL in comparison to those with COPD and COPD with LC: 17.3 years vs 9.1, and 12.7, respectively. Women had higher mean PLYL in comparison to men: 9.6 vs 8.7 in COPD and 14.7 vs 11 in COPD with LC. Individuals with COPD and LC were more likely to have earlier stages of NSCLC and SCLC in comparison to individuals with LC but without COPD.

Conclusions: LC results in marked losses in YLL and PLYL and women are disproportionally affected. Individuals with COPD diagnosed with LC had earlier disease stage compared to those with LC. While this may be reasoned because of more frequent healthcare contact, further research is needed to better understand factors contributing to this pattern.

Financial support: Lung Saskatchewan

Geospatial Mapping to Identify Primary Glomerulonephritis Hot Spots in Saskatchewan

Bhanu Prasad, Aditi Sharma, Aarti Garg, Abdul Raouf, Matthew Patterson, Pouneh Dokouhaki

Background: Saskatchewan (SK), a province rich in oil, minerals, and agriculture, with 1.2M population, is principally served by its two urban renal centers in Regina and Saskatoon. There is a lack of comprehensive data on the association of histological GN subtypes with rural-urban divide, and geographic hotspots like mines and refineries.

Objective: Utilizing the kidney biopsy, our objective was to identify clusters of GN subtypes. Our secondary objective was to calculate yearly incidence rates, comparison between urban and rural areas, transition to dialysis, mortality rates, and distance and travel time to access care.

Methods: A centralized provincial kidney pathology database was used to capture all incident cases of biopsy-proven GN in the adult population from 2002 - 2018. Only patients with primary GN were included (n=1372). Demographic attributes (age, sex), 3-digit postal codes, lab parameters, the date of biopsy and definitive GN diagnosis, dialysis start date, and death data were collected and analyzed. To analyze the variation of GN across different regions in SK (Saskatchewan), we used SaTScan v10.1.3 software. The population data from Census 2016 was used as a reference, and age and sex were taken as covariates.

Results: Table 1 lists the postal codes with incidence rate ratios (IRR) >1 for different types of GN. We identified two rural and remote postal codes (S0J and S0M) that consistently showed higher incidence for most GN subtypes. AGBM and MN were predominant in rural postal codes, as shown in Figure 1. We identified a large cluster for Lupus (p – 0.00001), with a radius of 345.7 km, as highlighted in Figure 2. With a population density of 2.4 persons per km^2, this region has 60% of the Lupus cases.

Conclusion: We identified a geographic cluster for lupus nephropathy, encompassing both urban and rural areas. While there was a greater incidence of MN and AGBM in rural areas, we did not identify any geographic clusters for the same. The patients in rural and remote areas had higher dialysis rates. The mortality rates were relatively higher in urban areas. Addressing and understanding the multifaceted factors driving these disparities are essential steps towards easing the burden of GN on impacted communities.

Spontaneous retropulsion in autopsy verified Progressive Supranuclear Palsy

Jayden Das, Ali Rajput, Alex Rajput, MinYoung Kim, Eric Noyes

Background: Progressive Supranuclear Palsy (PSP) is a neurodegenerative disease classically presenting with parkinsonism, vertical gaze palsy, and cognitive decline. Definite diagnosis relies on autopsy. Postural instability is a common symptom of PSP. Retropulsion is one form of postural instability. Spontaneous retropulsion involves loss of balance without external provocation. Others have reported on retropulsion in the clinical setting while testing for postural instability but rates of spontaneous retropulsion in the community have not been described. This study examines the prevalence of spontaneous retropulsion in PSP.

Methods: A retrospective chart review examined 60 patients from the Saskatchewan Movement Disorders Program with clinical and pathology-confirmed diagnosis of PSP. Information regarding patient falls was collected at each clinic visit. We identified patients who endorsed spontaneous retropulsion. The data was analysed with univariate logistic regression.

Results: The study included 43 males and 17 females. Spontaneous retropulsion was reported in 18 (30%) patients. Among the variables, only sex showed a statistical significance ($p = 0.0184$) with females more likely to report spontaneous retropulsion (OR = 4.25). Other variables (PSP onset age, onset age of balance impairment, gait impairment, and disease duration) were not statistically significant.

Conclusions: Our data suggest that spontaneous retropulsion is common in PSP, with females being at a significantly higher risk than males. This is useful information when counselling patients on risk-avoidance behaviour to prevent falls. Future analysis will include examination of PSP subtypes in relation to rates of spontaneous retropulsion.

Stroke Care and Neurological Emergency Response Simulation (SCaNERS): High Fidelity Acute Stroke Simulation and its Impact on Knowledge Retention

Bashir Daud Shah, Brett Graham

Background: Stroke simulation-based training has been associated with improved stroke quality metrics. The purpose of this study was to assess whether high-fidelity acute stroke simulation participation led to better knowledge retention one month post simulation in off-service residents.

Methods: Off-service residents on the Acute Stroke Unit were provided with non-mandatory pre-simulation reading on acute stroke care. Immediately before the stroke simulation, they completed a questionnaire to test their knowledge on a set of 8 questions related to stroke and acute stroke care. Immediately post-stroke simulation, they were provided with a standard debrief session. After the debrief and one month later, they completed the same questionnaire again.

Results: There were a total of 16 off-service resident participants. Wilcoxon signed ranks test was performed. There was a significant difference between pre-simulation and immediate post-simulation scores on the knowledge retention questionnaire ($p = 0.008$). There was a significant difference between pre-simulation and one-month post-simulation on the knowledge retention questionnaire ($p = 0.007$). There was no difference between immediate post-simulation and one-month post-simulation on the knowledge retention questionnaire ($p = 0.77$).

Conclusions: Participants performed better on the questionnaire after the simulation, and this improved performance was retained at one month. This study supports the growing body of knowledge that participation in a high-fidelity acute stroke simulation leads to longer term knowledge retention in acute stroke care.

Virtual multidisciplinary preoperative assessment: a pilot study

Michael Prystajecky, Robin Manaloor, Erin Barbour-Tuck, Heather Dyck, Diana Ermel, Angela Baerwald, Maria Cruz, Jennifer M. O'Brien, Jonathan Gamble

Introduction: Virtual care has recently gained momentum yet remains underutilized for preoperative assessment. We previously applied implementation science methodology to develop a virtual preoperative assessment pathway. We piloted this pathway in two preadmission clinics and evaluated its impact on patients and healthcare providers.

Methods: Based on the results of our formative evaluation of virtual preoperative assessment, we utilized 12 strategies from Expert Recommendations for Implementing Change to deploy multidisciplinary virtual preoperative assessment in two preadmission clinics located in Saskatoon, SK. Preoperative assessments were completed using a web-based virtual care platform accessed using a personal computer, smartphone, or tablet device. We evaluated patient and provider satisfaction using adapted virtual care surveys. Follow-up surveys with patients and healthcare providers were conducted by telephone or a web-based survey platform. Medical records were reviewed using a standardized case report form to identify relevant complications. Data were analyzed by descriptive statistics.

Results: To date, 34 patients and 16 healthcare providers (anesthesiologist [n=6], internist [n=7], nurse [n=3]) have completed the follow-up surveys. None of the patients had a surgical delay or cancellation. Two patients had postoperative complications (sepsis [n=1] and DVT [n=1]). Virtual care visits were associated with substantial reductions in travel (mean 202 km/patient) and out of pocket expenses (mean $175 CDN/patient). Patients reported high levels of overall satisfaction with virtual appointments (median score 5, IQR 4-5), and provided high scores for items pertaining to scheduling, technology, provider, and personal satisfaction. Healthcare providers felt that virtual visits provide good patient care (median 3.5, IQR 3-5); however, the majority preferred to communicate with patients in person (median 4, IQR 3-4).

Conclusion: Our preliminary results indicate that virtual preoperative assessment is safe, associated with high levels of patient satisfaction, and results in significant cost and travel savings for patients.

ALS Health Care Provider Wellness

Gregory Hansen, Sarah Burton-MacLeod, Kerri Lynn Schellenberg

Background: Interest in health care provider (HCP) wellness and burnout is increasing; however, minimal literature explores HCP wellness in the context of Amyotrophic Lateral Sclerosis (ALS) care.

Objectives: We sought to determine rates of burnout and resiliency, as well as challenges and rewards in the provision of ALS care.

Methods: A survey link was sent to physicians at all Canadian ALS centers for distribution to ALS HCPs in their network. The survey included demographics questions, and validated measures for resiliency and burnout; the Brief Resilient Coping Scale (BRCS) and the Single Item Burnout Score (SIBS). Participants were asked to describe challenges and rewards of ALS care, impact of COVID-19 pandemic, and how their workplace could better support them.

Results: There were 85 respondents across multiple disciplines. The rate of burnout was 47%. Burnout for female respondents was significantly higher (p = 0.007), but not for age, role, or years in ALS clinic. Most participants were medium resilient copers n = 48 (56.5%), but resiliency was not related to burnout. Challenges included feeling helpless while patients relentlessly progressed to death, and emotionally charged interactions. Participants found fulfillment in providing care, and through relationships with patients and colleagues. There was a strongly expressed desire for increased resources, team building/debriefing, and formal training in emotional exhaustion and burnout.

Conclusions: The high rate of burnout and challenges of ALS care highlight the need for additional resources, team-building, and formal education around wellness.

Intermittent low oxygen breathing: a first study in people with MS testing at different disease stages

Stephanie Ballendine, Olivia LaFrance, Nataliya Tokarska, Michael Levin, Ilia Poliakov, Valerie Verge, Sarah J Donkers, Katherine B. Knox

Background: Acute Intermittent Hypoxia (AIH) involves alternating episodes of breathing normal air (ambient oxygen concentration of 21%) with short periods of hypoxia. Our team's work in the experimental autoimmune encephalomyelitis mouse model of Multiple Sclerosis (MS) has demonstrated that AIH promotes nerve repair, axon protection and recovery. Case reports and observational study protocols in people with MS with EDSS ≤6.5 without recent relapses also support the potential of AIH as a non-invasive treatment.

Objectives: This preliminary study will evaluate the safety, tolerability, and feasibility of AIH treatment in three different sub-groups of people with MS: 1) people with advanced MS disability (EDSS >6.5 and <9), 2) people within 4 weeks of an acute disabling MS relapse and 3) people with non-active progressive MS and EDSS <=6.5.

Methods: We aim to enroll 2-3 participants per group who will all receive 6 AIH treatment sessions over the course of 3-4 weeks. Hypoxia (9% O2) will be administered via a specialized face mask attached to an oxygen generator device (HYP-123, Hypoxico Inc.). Each session will involve 15 cycles of hypoxia, each lasting up to 90 seconds, interspersed with 60 second cycles of normoxia. Safety outcomes include the number of episodes of SpO2 <78%, heart rate <50 or > 160bpm and symptom development. Exit questionnaires and interviews will assess patient reported tolerability and feasibility. One baseline and 2 post-treatment assessments will evaluate exploratory outcomes including the MS Functional Composite, Modified Fatigue Impact Scale and Transcranial Magnetic Stimulation.

Results: Pending at time of submission.

Conclusions: This observational study will test the safety, tolerability and feasibility of AIH in sub-groups of people with MS which, to our knowledge, have not yet been tested. These data may provide results that could inform the and design of a larger study.

Increased Survival in Contemporary Parkinson's Disease – a 47 year autopsy study

Eric Noyes, Ali H. Rajput, Minyoung Kim, Alex Rajput

Introduction: Parkinson's disease (PD) is the second most common neurodegenerative disorder. The cardinal motor features of PD are bradykinesia, rigidity and resting tremor. These features may be seen in other neurodegenerative disorders such as progressive supranuclear palsy (PSP) and multiple system atrophy (MSA). All disorders which share similar motor features are collectively known as parkinsonism or Parkinson syndrome (PS). Confirmatory diagnosis of PD is only possible with brain autopsy.

There is no known cause or cure for PD. Since its discovery in the 1960s, levodopa (LD) remains the best and most widely used medication in PD.

The incidence of PD rises with advancing age. In the last six decades, life expectancy in the general population has increased resulting in a larger pool of at-risk persons. Onset age of PD is the most reliable indicator of PD survival, as older onset cases have shorter survival.

Material and methods: The Saskatchewan Movement Disorders Program (SMDP) has operated uninterrupted since 1968. All PS cases followed by the SMDP during 47 years (1968-2015) that came to autopsy were considered. Those with autopsy-confirmed PD and onset <70 years were included in this study and compared with pre-LD cases of similar onset age.

Results: 392 PS cases seen in our clinic between 1968-2015 had brain autopsy; 314 (80%) of those had PD. 128 (41%) of the PD cases had onset <70 years and were included in this study. Their median survival was 18 years.

Discussion/Conclusion: Prior to widespread use of LD, nearly all PD cases had onset <70 years and mean survival was 9.4 years. Longer survival in our study is attributed primarily to modern treatment. Increased survival has resulted in a larger number of older, chronically treated, higher comorbidity, and complicated PD patients. These changes in PD epidemiology present new clinical and research challenges.

Time since pain onset influences shoulder motion in people with rotator cuff disorders: a study of rural and urban Saskatchewan

Angelica E. Lang, Lauryn Campbell, & Sophia Abiara

Abstract:
Upper limb pain is extremely common. The most frequent cause of pain and disability of the upper limb is injury to the rotator cuff muscles. Harmful movement strategies may be related to the progression of rotator cuff disorder but can be influenced by individual factors. The purpose of this study was to explore the effects of time since pain onset, age, and residence (urban vs rural) on shoulder kinematics in individuals with rotator cuff disorders. It is hypothesized that longer time since pain onset will be associated with more harmful movement patterns (increased scapular internal rotation, decreased scapular upward rotation). Sixty individuals with chronic rotator cuff- related pain were recruited for this cross-sectional study. Upper limb motion was measured during an overhead reach task, performed unilaterally with each arm. Robust linear regression models ($p<.05$) examined effects on scapular orientations (internal rotation, upward rotation, tilt) at 30° increments of humeral elevation. The three-way interaction of time since pain onset, current age, and place of residence significantly affected upward and internal rotation of the scapula. For upward rotation, younger participants (both urban and rural) both had negative relationships with time since pain onset, with the rural subset demonstrating a steeper curve ($r = -2.3$ vs $-.69$ at 60°). Conversely, the older urban group demonstrated an opposite positive linear relationship with time since injury ($r =+.51$ at 60°). A similar pattern was present for internal rotation. Our hypothesis was supported for younger participants; individuals with a shorter time since pain onset had scapular kinematics considered “protective,” and gradually changed to more harmful patterns over time. The opposing pattern for the older urban group may be due to differing upper limb demands in this subset. Time since pain onset and personal characteristics should be considered when researching and treating individuals with rotator cuff disorders.

Multi-disciplinary Clinical Endocarditis Pathway (MENDO): Community as Cure

Benjamin Leis, Beverly Wudel, Jason Orvold, Abbas Khani-Hanjani, Larissa Kiesman, Victoria Tian, Rabia Shahid, Mohan Teekasingh, Chantelle Wong, Cara Spence

Background: In Saskatchewan and across Canada, injection drug use-associated infective endocarditis (IDU-IE) admissions are rising steadily. After rigorous local chart audits and review of literature, there is considerable variability in the medical and surgical management of IDU-IE and accessibility of specialist and addictions services.

Methods: This pre-intervention/post-intervention cohort study measures the MENDO pathway's impact on patient outcomes between the retrospective and prospective MENDO cohorts. Enrollment began September 25th, 2023 and will continue for 18 months. Inclusion criteria: all adults (≥17 yrs. old) admitted to the Royal University Hospital with a probable or definite diagnosis of endocarditis (by Modified Duke Criteria) who were referred to the MENDO pathway. The pathway seeks to address identified gaps in care, including early treatment of substance use withdrawal, standardization of care, unbiased specialist consultation, and psychosocial support through dedicated social and peer worker involvement. The MENDO cohort aims to increase local surgical intervention rate by 25% and improve in-hospital and long-term survival rates, compared to the retrospective cohort. In addition to the inter-cohort comparison, the MENDO cohort was also evaluated over time for intracohort comparisons at enrolment, discharge, and 3-month follow-up.

Results: Our retrospective (n=77; 1-Jan-2022 to 31-May-2023) and MENDO (n=35; 25-Sep-2023 to 26-Mar-2024, the cutoff date for interim analysis) cohorts were compared. The surgical intervention rate was 22% higher (15.1% vs. 19.4%, p=ns) and the in-hospital mortality rate was 45% lower (14.3% vs. 26%, p=ns) among the MENDO cohort. At hospital discharge, MENDO patients had higher rates of all specialist consultations, including dentistry (8.5% vs. 35.5%, p=0.0115). Between MENDO enrolment and hospital discharge, we noted lower rates of homelessness (27% vs. 6.9%, p =0.059) achieved through dedicated social and peer worker support.

Conclusion: The MENDO pathway is demonstrating promise in addressing gaps in care for patients admitted to the Royal University Hospital with infective endocarditis. Further adjustments must be made to the pathway to improve adherence to treatment plans, acute care diversion to more supportive care environments, and further increasing surgical intervention rate.

Beyond Seizure Control: A Longitudinal Study of Cenobamate's Effect on Cognition in Patients with Drug-Resistant Epilepsy

Suganya Giri Ravindran, Noman Ishaque, Lisa Lejbak, Elissa Bravo, Cassie Fleury, Alexandra Carter

Objective: Preserving cognitive function amidst the treatment of drug-resistant epilepsy (DRE) poses a formidable challenge. Cenobamate (CNB) is recently approved as an adjunct treatment for DRE in Canada. Post-hoc analysis of clinical trials and small observational studies have shown that treatment with CNB results in lower rates of cognitive adverse events. Our study seeks to elucidate effect of CNB on cognition in a larger sample of patients with DRE during one-year follow-up period. We hypothesize that patients with DRE who are treated with CNB will have stable or improved cognitive function at one year.

Methodology: In this prospective observational study, we will enroll 60 patients aged 18-60 with DRE of focal onset. Patients will be enrolled through the epilepsy clinics run by the Saskatchewan Epilepsy program. The following variables will be collected: patient demographics, age at epilepsy onset, etiology of epilepsy, baseline seizure frequency, episodes of status epilepticus, dose of CNB, concomitant ASMs and their doses, other medications that might affect cognition, rate of reduction in seizure frequency by 50% and seizure freedom. Utilizing the EpiTrack scale, a validated cognitive assessment tool for attention and executive functioning in epilepsy, we will conduct cognitive evaluations at baseline (T_o) and subsequently at 6-month (T_1), and 1-year (T_2) intervals. The primary outcome will be change in cognition during follow-up, as assessed by EpiTrack score.

Results: This is an ongoing project awaiting REB approval. We anticipate that our results will show a favorable effect of CNB on cognition overall. We will aim to control for an anticipated reduction in both concomitant ASMs and seizure frequency to assess the effect on cognition attributable to CNB use only.

Conclusion: This study represents one of the pioneering investigations in Canada, aiming to delve into and elucidate the cognitive effects of Cenobamate in individuals with DRE.

A Study of Patient- and Physician-assessed Quality of Care in a Newly Launched Seizure Investigation Unit at a Comprehensive Epilepsy Centre

Noman Ishaque, Suganya Giri Ravindran, Elissa Bravo, Alexandra Carter, Cassie Fleury

Introduction: The opening of the Seizure investigation unit (SIU) at the Royal University Hospital (RUH) Saskatoon marks a milestone toward the goal of providing comprehensive care to people with epilepsy (PWE) in the province of Saskatchewan. The SIU or Epilepsy Monitoring Unit (EMU) is a specialized unit that provides continuous video EEG monitoring within the safety of a specialized unit staffed by an epileptologist, 24h nursing staff and EEG technologists. Our 4-bed SIU is unique in that it emulates a home-like environment with a monitored common area, allowing patients to come together to share their experiences and support each other. The indications for admission to SIU are pre-surgical evaluation of drug-resistant epilepsy; characterization of paroxysmal events; classification and quantification of seizures/seizure syndrome; and optimization of anti-seizure medications (ASMs). The objective of this quality improvement study, based on PDSA paradigm, is to explore the performance of SIU at RUH through patient interviews and by applying quality indicators for an EMU used by level 4 Epilepsy Centres.

Methods: This will be an observational study of all patients aged 18 years or older who were admitted to SIU since it became operational in September 2023. There will be two arms of this study. One in which patients or their caregivers will be interviewed on their experiences during admission in SIU and the other in which a physician member of the Saskatchewan Epilepsy program will fill a form based on quality indicators of EMU (Figure 1). The patients will be interviewed using the Hospital-Consumer Assessment if Healthcare Providers and Systems (H-CAHPS) questionnaire. The results will be descriptive.

Results: This study is at the stage of planning.

Conclusion: This study will help improve the quality of care at SIU by exploring experiences of patients as well as evaluating the care based on EMU quality indicators.

An Examination of Patient-Reported Outcomes in COPD Patients Utilizing a Novel Mobile Application

Brianne Philipenko, Troy Appleton, Nathaniel Osgood, Justin Pointer, Darcy Marciniuk, Joshua Lawson, Brandie Walker, Erika Penz

Chronic Obstructive Pulmonary Disease (COPD) is a disease characterized by respiratory symptoms including cough, breathlessness, and exercise intolerance. Patient reported outcome (PRO) measures are useful to evaluate disease experience and monitor for response to interventions. Most clinical trials record these outcomes at pre-specified intervals with paper diaries. We have utilized a novel smartphone application to collect real-time PRO data to assess variation in respiratory symptoms and quality of life between exacerbations.

This was a prospective observational multi-center cohort study involving COPD patients with a history of exacerbations within the prior six months. Using the Ethica mobile app, patients completed daily surveys regarding respiratory symptoms using the modified medical research council (mMRC) score and COPD Assessment Test (CAT); anxiety symptoms using the Anxiety Inventory Response (AIR); quality of life using the EuroQol 5 Dimension (EQ-5D-3L) and healthcare utilization over a 12-month period. Step counts were also recorded.

69 patients were approached for enrollment in the study, of whom 16 (23.2%) were recruited. Of recruited patients, average age was 70.6 years (62.5% female). Patients were followed for an average of 4.4 months (0.1, 10.7), with an average survey completion rate of 58%. There was a strong positive correlation noted between CAT and AIR scores (0.69), and a strong negative correlation between CAT and EQ5D utility scores (-0.64). Principal component analysis, a machine learning technique, was performed and identified three principal components explaining over 83% of variability in individual scores over time. Across all enrolled individuals, current steps were not found to drive future step counts or PRO scores. The inverse was also true with PRO scores not driving future step counts.

Beyond measuring health status in COPD patients, deterioration in CAT score is correlated with an increase in anxiety and worse quality of life. Using this information alongside principal component analysis may shed light on which questionnaires will be most useful in a machine learning algorithm to predict important clinical outcomes in COPD patients.

Health Sciences Building

A-WING | B-WING | C-WING | D-WING

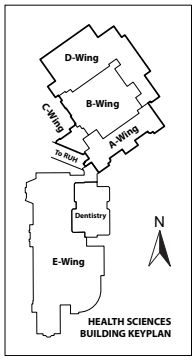
FIRST FLOOR

Directory

First Floor

1A03	Meeting Room
1A04	Meeting Room
1A10.2	Meeting Room
1A60	Classroom
1B05	Meeting Room
1B06	Meeting Room
1B37	Meeting Room
1B03	Classroom
B104	Student Lab
B109A	Student Lab
1B11	Classroom
1B21	Lounge
1C01	Student Lounge

- e Elevator
- Meeting Rooms
- 'A' Wing
- 'B' Wing
- 'C' Wing
- 'D' Wing



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