POD01

A Canadian Evaluation Framework for Quality Improvement in Childhood Arthritis: Key Performance Indicators of the Process of Care

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Objectives: To develop a set of key performance indicators (KPIs) of the process of care for Juvenile Idiopathic Arthritis (JIA) as part of a standardized evaluation framework for the Understanding Childhood Arthritis Network (UCAN) CURE Precision Decisions for Childhood Arthritis project and help build upon quality improvement efforts in Canada.

Methods: An initial list of 37 candidate KPIs identified from a systematic review were reviewed for inclusion by a working group of 3 pediatric rheumatologists. The final list of 14 KPIs were then assessed using a 3 round modified Delphi process based on the RAND/UCLA Appropriateness Method. Ten panelists across Canada were invited to participate based on their expertise in JIA, quality measurement or lived experience as a parent of a child with JIA. During Round 1 and 3, panelists rated each KPI on a 1-9 Likert scale on themes of importance, feasibility and priority. In Round 2, panelists participated in a moderated in-person discussion that resulted in minor modifications to some KPIs. In Round 3, panelists were asked to re-rate the KPIs. KPIs with median scores of ≥ 7 on all 3 questions without disagreement were included in the framework.

Results: All panelists completed Rounds 1 and 3. Ten KPIs met criteria for inclusion after Round 3. Five KPIs addressed routinely measuring important patient outcomes including pain assessment, joint counts, functional status, global assessment of disease activity, and measurement of the clinical Juvenile Arthritis Disease Activity Score. One KPI addressed wait times for consultation and another captured the proportion of JIA patients in the population seen by a pediatric rheumatologist within 1 year of diagnosis. Safety was addressed through KPIs on TB screening, laboratory monitoring, and clinical follow-up. While assessment of functional status using the Childhood Health Assessment Questionnaire and quality of life were deemed important, there were concerns about the availability of this information in usual clinical practice leading to the exclusion of 2 KPIs. Similar concerns led to the exclusion of measures related to uveitis and patient satisfaction.

Conclusion: The proposed KPIs build upon existing KPIs and address important elements of the process of care that should be measured to improve the quality of JIA care. The feasibility of capturing these measures will be tested in various data sources including the prospective data to be captured within the UCAN studies. Subsequent work should focus on development of

meaningful outcome KPIs to drive JIA quality improvement in Canada and beyond.

POD02

A Serum Proteomic Signature Defines Transition From the Preclinical State to Rheumatoid Arthritis

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Objectives: Anti-citrullinated protein antibodies (ACPA) are the primary biomarker for identifying individuals at increased risk for future RA development. However, we have recently shown in a prospective study that most unaffected ACPA+ individuals do not develop RA. We hypothesized that abnormalities in the serum may serve as additional biomarkers in the prediction risk for future disease. The aim of our study was to mine the serum proteome of individuals who ultimately developed RA to detect biomarkers that predict disease onset.

Methods: Using the SOMAscan (slow off-rate modified aptamer) array, we generated quantitative levels of 1307 proteins in serum samples from seventeen first-degree relatives (FDR) of Indigenous North American (INA) RA patients who developed inflammatory arthritis (IA) synovitis after having been followed prospectively for a mean of 3.2 years. All were ACPA+ at time of IA diagnosis. Each individual had two preclinical samples, one at the time of IA onset, and one at an earlier time point. We also analyzed samples from ACPA+ FDR (n=63) and ACPA- FDR (n=47) who did not develop inflammatory arthritis. We applied a machine learning lasso regression model to identify a minimum set of proteins that classified patients who transition into clinical arthritis.

Results: Differential expression of 669 proteins were identified between pre-Transition samples (TR-pre) and ACPA negative FDR. ITGA2B and HIST1H3A were the highest upregulated proteins in TR-pre samples, while protease inhibitors SERPINA5 and ITIH4 were highly downregulated in the TR-pre samples. Compared with ACPA- FDR, overlap between TR-pre baseline and non-baseline samples of highly upregulated proteins was 60%, suggesting alterations in the serum proteome occur years before the development of RA. A lasso regression model identified a 23-marker panel that classified TR-pre samples from the larger pool of FDR (ACPA+/-) serum samples. In a validation cohort (n = 34), the model correctly classified 31/34 samples (sensitivity=95.6%, specificity=85.7%, AUC=0.931). Transition scores extracted from the model were higher in ACPA+ FDR compared to ACPA- FDR ($p<0.001$). There were no differences in Transition score comparing TR-pre samples that were remote or close to IA onset.

Conclusion: Compared to at-risk individuals who did not develop IA, clear and reproducible differences in the serum proteome are demonstrable in the serum samples of individuals who ultimately developed IA, even several years before the onset of clinically evident disease. Our findings suggest that a small serum biomarker panel can serve to accurately classify at-risk individuals who have a high likelihood of progressing to develop IA.

POD03

Axial Spondyloarthritis: Knowledge, Screening and Referral Practices Amongst Primary Care Providers

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Objectives: Early recognition is crucial in improving outcomes in patients with axial spondyloarthritis (axSpA); however, there exists long delay between symptom onset and rheumatology diagnosis. Furthermore, there is uncertainty regarding axSpA screening and referral practices amongst primary care providers. The purpose of this study was to examine the knowledge, screening and referral practices for suspected axSpA within primary care.
Methods: Primary care physicians (MDs), physiotherapists (PTs), chiropractors (DCs) and nurse practitioners (NPs), licensed/registered with an Ontario regulatory college or professional association, were sent an electronic questionnaire via their respective professional institution. The questionnaire was developed based on our results from a qualitative study of primary care axSpA screening and referral practices conducted in 2016 and was piloted by 10 primary care practitioners to strengthen validity. The questionnaire addressed: i) knowledge of clinical and investigative features of axSpA; ii) awareness of axSpA screening tools and iii) referral practices of suspected axSpA. Univariate statistics were used to address the above objectives.
Results: There were 276 respondents: MDs (44.5%), DCs (34%), PTs (19%) and NPs (2.4%); 93.1% worked in urban settings; 61.8% indicated > 10 years of primary care experience. The following were considered "very important" when assessing suspected axSpA: morning stiffness > 30 minutes (81.9%); presence of HLA B27 (66.7%); evaluation of acute phase reactants (46.4%) and radiographs (spine and pelvis) (45.3%). Most respondents "never used" or "were not familiar" with axSpA screening tools (80%). The majority of MDs (90.9%) indicated they would "always" or "often" refer to rheumatology. PTs (90.5%) and DCs (88.0%) would "always" or "often" refer patients back to the MD for further investigation and/or referral, as they are not legislated to conduct these clinical tasks in the province of Ontario. Travel (28.8%) and prolonged wait times (53.2%) were identified as referral barriers. DCs and PTs indicated issues pertaining to scope of practice as barriers to assessing patients with suspected axSpA (82.2%, 50.0%, respectively).
Conclusion: The majority of primary care practitioners demonstrate reasonable knowledge of axSpA clinical features; however, there is little awareness of axSpA screening tools. Although most MDs refer their patients with suspected axSpA for rheumatology consultation, prolonged wait times were identified as a substantial barrier. PTs and DCs identified barriers to axSpA screening and referral related to scope of practice, that if mitigated, could allow for better early detection of axSpA. The results of this study may inform targeted education of primary care practitioners to improve early recognition of axSpA.
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POD04

Identification of Rare Genetic Variants in the Familial Forms of Dupuytren's Disease

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Objectives: Dupuytren's disease is the most common hereditary disorder of the connective

tissue. A hereditary component was identified, but the genetic mode of inheritance appears heterogeneous: most frequently autosomal dominant and rarely autosomal recessive or mitochondrial (maternal). Few genetic studies using the genomic DNA have been performed to date. This project aimed at identifying rare genetic variants in familial forms of Dupuytren's disease by whole exome sequencing.

Methods: Informative families with three or more affected participants of Dupuytren's disease were recruited. Salivary samples were collected, and DNA extraction was performed. The whole exome was captured in four to five individuals per family in three different families. The sequencing was performed with the technique «paired-end» on the Illumina HiSeq 2000 Sequencing System. The raw data were assembled and aligned, then filtered according to the minor allele frequency ≤ 0.03 and the in-silico prediction of damaging functional effects. The intra-familial segregation analysis of the variants of interest was further studied in 48 individuals, with or without Dupuytren's disease, coming from 28 extended families, by targeted sequencing in 77 genes identified by the whole exome analysis. Only the genetic variants validated by Sanger sequencing and perfectly segregating with the disease phenotype within the extended families were considered as potential genetic variants of Dupuytren's disease.

Results: Among the seventy-seven salivary samples collected from participants of 28 different families, 48 samples were analysed in this project. The whole exome analysis was performed in fourteen participants coming from three distinct families, who displayed an autosomal dominant pattern of inheritance. Thirty-four, 27 and 39 rare and predicted damaging variants were identified in each family, respectively. Many of these variants of interest, involved in the function of muscular cells, in the synthesis of keratin or in the mitochondrial function, were found to be recurrent in other families when performing the targeted sequencing. The Sanger sequencing confirmed the intrafamilial segregation of two rare and damaging variants in a locus previously associated with Dupuytren’s disease in genome-wide association studies: the locus C8ORF34_SULF1.

Conclusion: The whole exome analysis in three familial forms of Dupuytren's disease has identified rare genetic variants of interest in the pathophysiology of this disorder. This study confirmed the feasibility of detecting rare genetic variants by whole exome sequencing in the familial forms of Dupuytren's disease. The functional impact of the rare genetic variants identified remains to be further evaluated by in vitro studies.

POD05

Mapping Real-World Psoriatic Arthritis Patients to Clinical Trial Eligibility Criteria

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Objectives: Results of real-world studies may be extrapolated to overall patient populations, whereas clinical trials present outcomes can be limited in generalizability due to stringent eligibility criteria. This analysis sought to assess the proportion of psoriatic arthritis (PsA) patients treated with golimumab in Canadian routine care qualifying for a pivotal randomized controlled trial (RCT) and explore potential differences in outcomes.

Methods: This is a post-hoc analysis of data from the BioTRAC registry. PsA patients initiating

treatment with subcutaneous golimumab, including both biologic-treatment naïve and experienced (<6 months), were categorized as “Eligible” or “Non-Eligible” based on inclusion/exclusion criteria of the GO-REVEAL RCT. Reasons for non-eligibility, and between-group differences in baseline characteristics, were assessed with univariate statistics. Impact of eligibility on achieving the following clinical outcomes at 6/12 months was assessed using logistic regression adjusting for respective baseline level/status: Minimal Disease Activity (MDA: 5/7 MDA criteria), Very Low Disease Activity (VLDA: 7/7 MDA criteria), PASI75, HAQ<0.5, and absence of enthesitis and dactylitis. Treatment retention was evaluated using Cox regression adjusting for disease duration and eligibility. Safety was evaluated through incidence of adverse events (AEs).

Results: 171 patients were included: 48 (28.1%) were considered Eligible and 123 (71.9%) were considered Non-Eligible for GO-REVEAL. Main reasons for ineligibility were unconfirmed active PsA at baseline (≥2 TJC28 and SJC28, BSA >0: n=103/123; 83.7%) and previous biologic use (n=40/123; 32.5%). Mean [SD] baseline disease parameters were significantly ($p<0.05$) higher in Eligible vs. Non-Eligible patients for MDGA 0-10 (6.6 [1.9] vs. 5.2 [2.0]), PtGA 0-100 (32.3 [31.6] vs. 15.3 [20.8]), TJC28 (12.0 [6.5] vs. 7.0 [6.6]), SJC28 (9.1 [4.5] vs. 4.0[4.4]), enthesitis (3.3 [4.4] vs. 1.8 [2.8] affected joints), PASI (4.7 [6.8] vs. 1.8 [2.4]) and HAQ (1.4 [0.6] vs. 1.0 [0.7]). Non-Eligible patients were significantly less likely to achieve PASI75 at month 6 and 12 (OR [95%CI]: 0.27 [0.11 -0.64], 0.25 [0.09 – 0.64], respectively] and HAQ<0.5 at month 6 (0.29 [0.10-0.84]) and remain on treatment (HR [95%CI] for discontinuation: 2.4 [1.4-4.2]). The incidence of AEs was comparable between groups (Eligible vs. Non-Eligible: 64.6% vs. 68.3%) without remarkable differences in the safety profile.

Conclusion: The majority of PsA patients treated with golimumab in routine care would not have been eligible for GO-REVEAL. Non-eligibility was driven primarily by an absence of active PsA confirmation, resulting in higher baseline disease activity in Eligible patients. Eligibility to GO-REVEAL was a significant positive predictor of PASI and HAQ improvement.

POD06

Development of an Affordable and Remotely-Accessible Tool in Joint Injection and Arthrocentesis

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Objectives: Design a three-dimensional printed knee model for under $150 CAD which could be used for landmarking, injection, and arthrocentesis by medical personnel. Performing joint injections and arthrocentesis is a required skill in medical training. Medical students must understand the implications of the procedures, as well as consenting, landmarking, injection technique, and post-injection care. The skill continues to be an integral part of residency training and practice in multiple specialty areas, particularly Emergency Medicine, Family Medicine, Orthopedic Surgery, and Internal Medicine, including General Internal Medicine and Rheumatology. Staff members in these areas are expected to perform injections and arthrocentesis within their scope of practice. Resident self-confidence and skill in performing knee injections and arthrocentesis have been shown to increase when educational interventions involving task trainers are employed (Wilcox et al., 2006). Amoako et al. describe similar results, where subjects showed increased self-reported confidence in performing knee injections

after being trained using simulators (2018). Anecdotally, much of the learning around injection and arthrocentesis technique happens in the clinical setting. Based on this experience, this team sought to create a three-dimensional printed knee model which would be more affordable than current commercial models. It would also be more accessible to learners, particularly in rural settings.
Methods: In the early stages of model creation a panel of three simulation experts was consulted to provide feedback on the implementation process and qualitative feedback on the design using the Consolidated Framework for Implementation Research questionnaire. Further changes to the working model were made based on qualitative feedback from stakeholders. The penultimate model was assessed using the Rapid Product Assessment - Knee Arthrocentesis questionnaire by staff physicians.
Results: The initial model was composed only of the internal bone anatomy of the knee. After assessing the utility of the structure and optimizing the knee angle based on feedback from two medical students, one resident, and three staff rheumatologists, the soft tissue structures to surround the bony landmarks were created. Minor updates occurred throughout the creation process and when the team was satisfied with the changes the model was reassessed with appropriate stakeholders. In total five staff rheumatologists and three orthopedic surgeons provided feedback on realism of injection and aspiration as well as the physical attributes of the model. Their feedback was incorporated to create the final model.
Conclusion: The current iteration can be used for both injection and arthrocentesis. It is cost effective and easily accessible. **Phil Rosen Award for the Best Abstract on Clinical or Epidemiology Research by a Trainee**

POD07

Effectiveness of the Making it Work™ Program at Improving Presenteeism and Work Cessation in Workers with Inflammatory Arthritis – Results of a Randomized Controlled Trial

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Objectives: Arthritis often leads to presenteeism (decreased at-work productivity) and permanent work disability, the worst occupational outcome of a disease, leading to reduced quality of life and cost to society. Yet, health services addressing employment needs of people with arthritis are lacking. We evaluated the effectiveness of the Making-it-Work™ (MIW), an online program developed to help people with inflammatory arthritis (IA) deal with employment issues.
Methods: A multi-center RCT evaluated the effectiveness of MIW at improving presenteeism

and work cessation (WC) over two years. Participants were recruited from rheumatologist practices, consumer organizations and arthritis programs, in three provinces. Eligibility criteria: diagnosis of IA, employed, age 18-59, and concerned about ability to work. Participants were randomized 1:1 to MIW or usual care plus printed material on workplace tips. MIW consists of five online self-learning modules and group meetings, and individual vocational counselling and ergonomic assessments. Questionnaires were administered every 6 months. Outcomes were presenteeism [Rheumatoid Arthritis Work Instability Scale (RA-WIS)], time to WC ≥6 months, and time to WC ≥2 months (secondary outcome). Baseline characteristics (age, gender, ethnicity, occupation, education, disease duration and self-employment) were collected. Intention-to-treat longitudinal analysis of RA-WIS using linear mixed effect regression models with 2-year comparison as primary endpoint and survival analysis for time to WC using Kaplan-Meier and Cox Proportional Hazard models were performed. Robustness analyses were conducted via missing values imputed using last observation carried forward and worse possible outcomes; square root transformation of RA-WIS outcome; and adjusting for baseline covariates. SAS version 9.4 was used.

Results: A total of 564 participants were recruited, with 529 (94%) completing 2-year follow-up. Baseline characteristics were similar between groups. Difference in means of RA-WIS scores was significantly lower in the intervention group from 6 months onwards, with the greatest difference observed at 2 years (-1.78, 95%CI: -2.7, -0.9, p<.0001), yielding a standardized effect size of 32%. Satisfactory robustness was observed. Work cessation occurred less often in intervention than control groups, but only reached statistical significance for WC ≥2 months (WC ≥6 months: 31 versus 44 events, aHR 0.70, 95%CI: 0.44, 1.11, p-value: 0.13; WC ≥2 months: 39 versus 61 events, aHR: 0.65, 95%CI: 0.43, 0.98, p-value: 0.04).

Conclusion: Results of the RCT reveal the program was effective at improving presenteeism and preventing short-term WC. Effectiveness at preventing long-term work disability will be assessed at 5 years. This program fills one of the most important unmet needs for people with inflammatory arthritis.

POD08

Pulmonary Hypertension is Not Increased in Limited Cutaneous Systemic Sclerosis Compared to Diffuse Cutaneous Subset When Adjusting for Survival

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Objectives: Pulmonary hypertension (PH) is a life-threatening complication of systemic sclerosis (SSc), thought to be more commonly found in limited cutaneous (lcSSc) compared to diffuse (dcSSc) subset. Since lcSSc has a better prognosis, it is unclear whether a higher occurrence of PH in lcSSc is due to survival bias, especially when longer disease and older age increase PH. The purpose of this study was to compare the frequency of PAH in SSc subsets after adjusting for only those at risk (survivors vs. deceased).

Methods: We assessed PH incidence and survival, after accounting for death as a competing event, in a large multi-center cohort of 1431 SSc patients (43% dcSSc, 57% lcSSc, mean age at SSc onset 48 ±13 years) from Canadian Scleroderma Research Group registry, and explored predictors of PH development and survival. Competing risk analysis was performed to compare cumulative incidence of PH between disease subsets. Survival was analyzed by Cox proportional hazards analysis with demographic, clinical, and laboratory characteristics as predictor variables.

Results: 157 patients had PH either confirmed by RHC or postmortem. They had longer disease and older age at SSc diagnosis in lcSSc and more severe Raynaud's, digital ulcers and gastrointestinal involvement in dcSSc. In incident PH cohort (n=44), 32% died over a follow-up of 4.7 years (range 1-14). Cumulative incidence of PH was comparable in dcSSc and lcSSc after adjustment for age, sex and SSc-related autoantibodies (HR=1.82, p=0.08). Survival from PH onset was similar in lcSSc and dcSSc. Male and anti-Scl70 were associated with earlier development of PH from SSc onset ($p<0.002$).
Conclusion: Cumulative incidence of PH, after accounting for death as competing event, and survival were comparable in SSc subsets.

POD09

Cannabis Use for Chronic Arthritis: Patient Utilization, Knowledge, and Attitudes

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Objectives: In light of cannabis legalization, it is reasonable to anticipate that some arthritis patients may request information on cannabis use or potentially experiment with treatments without physician guidance. There is therefore utility in gauging the level of interest and current use patterns of cannabis within this patient population.
Methods: In this mixed methods study, 101 diagnosed arthritis patients that attended the rheumatology outpatient clinics at Royal University Hospital were interviewed on their utilization, knowledge, and attitudes in regard to cannabis. Patterns in qualitative data were then assessed by thematic analysis. Frequencies and descriptive characteristics were identified in quantitative data.
Results: It was found that close to a quarter of the interviewed arthritis patients had a history of cannabis use for medical reasons. Half of these patients felt no improvement in their joint pain. Other reported beneficial effects included better sleep and increased relaxation. More than half of the patients felt that the level of evidence available for medicinal cannabis was unsatisfactory. Among these patients, there was a desire for more physician input, expert consensus, and long-term studies rather than anecdotal evidence. Major concerns about cannabis use, from most prevalent to least prevalent, included health effects, legal regulations, potential for impairment, and insufficient information.
Conclusion: These findings highlight the wide spectrum of patient experiences and concerns with cannabis. There are some patients that report a strong belief in the efficacy of cannabis and employ it as a supplemental therapy. Others are curious to explore potential benefit of cannabis. As many patients consider their health providers to be their primary resource for decision-making, physicians should be prepared to give a medical opinion on cannabis using the best evidence available. Future directions may involve completing controlled clinical trials to assess efficacy of cannabis in arthritis patients and to guide appropriate management, including standardized dosing and route of administration.

POD10

Arthritogenicity of Homocitrullinated Peptides in a Mouse Model of Rheumatoid Arthritis

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Objectives: Most rheumatoid arthritis (RA) patients express antibodies to post-translationally modified antigens, including citrullinated and homocitrullinated (carbamylated)

proteins/peptides. Homocitrulline and citrulline are structurally similar and immune responses to peptides containing either of these modifications are cross-reactive. It is unclear if immune responses to citrullinated, homocitrullinated or both peptides are pathogenic for RA. The aim of this study is to determine whether homocitrullinated peptides induce arthritis in a mouse model of RA.

Methods: We used DR4-transgenic (DR4tg) mice that express human MHCII molecules containing the Shared Epitope and no murine MHCII. DR4tg and wild-type B6 mice were immunized with a synthetic homocitrullinated peptide (HomoCitJED) or PBS control. Some of these mice also received intra-articular (i.a.) HomoCitJED in one knee and PBS in the other knee. Immune responses in these mice were measured for serum antibody production by ELISA at days 10, 30, 50, 70 and 100 after HomoCitJED immunization to the following antigens: HomoCitJED, homocitrullinated fibrinogen, citrullinated fibrinogen, cyclic citrullinated protein/peptide 2 and a synthetic citrullinated peptide (CitJED) containing the same backbone as HomoCitJED. We also measured cytokine/chemokine levels by multiplex at days 10 and 70. Discriminant analysis was performed to determine if the cytokine/chemokine profile of the mice could be differentiated by sex and strain. Arthritis was assessed by measuring joint swelling with calipers and by histopathology.

Results: HomoCitJED was found to bind more strongly to the Shared Epitope than CitJED by in silico molecular modelling. DR4tg mice immunized with HomoCitJED expressed IgG antibodies more frequently to homocitrullinated than citrullinated antigens (N=8-29 at each time point). B6 mice also responded to homocitrullinated antigens, but not citrullinated antigens. Antibody levels were similar in male and female mice. However, sex differences were detected in the serum cytokine/chemokine profiles with females having a higher ratio of IL-1alpha to IL-5, suggesting imbalances in immune regulation. Significant joint swelling was observed in the knees of DR4tg mice that received HomoCitJED i.a. (N=14) compared to the contralateral PBS injected knee (N=14) with no sex differences detected. Histopathologic findings of arthritis included synovial thickening and pannus, immune cell infiltration of the soft tissues, hypervascularity and cartilage destruction. PBS immunized mice did not have detectable immune responses or arthritis.

Conclusion: Mice expressing human Shared Epitope developed immune responses to homocitrullinated and citrullinated antigens and an RA-like arthritis when homocitrullinated antigens were present in the joint. These findings support an arthritogenic role for homocitrullinated antigens in RA.

POD11

Parent-reported Medication Side Effects of Commonly Used Medications in Children With Juvenile Idiopathic Arthritis: Results From the CAPRI Registry

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Objectives: To quantify the impact of parent-reported medication side effects (SEs) on quality of life in children with juvenile idiopathic arthritis (JIA) and to describe the frequency and severity of SEs associated with commonly used medications.

Methods: We used data from newly-diagnosed patients enrolled in the Canadian Alliance of Pediatric Rheumatology Investigators (CAPRI) JIA Registry from February 2017-May 2019. Children are enrolled within 3 months of diagnosis and information about disease activity, medications, SEs and outcomes is collected prospectively at every clinic visit. The SE frequency

and mean SE severity (0=no problem at all, 10=very severe) with common monotherapy and combination drug treatments were calculated. Mixed effect models were used to assess the impact of SE severity on the parent global assessment (PG, 0=child is doing very well, 10=child is doing very poor) and the patient-reported Quality of My Life (QoML, 0=my life is the worst, 10=my life is the best), after controlling for pain intensity and active joint count.
Results: 249 patients were included (median age 7.9 years, 60% female). Most patients had oligoarthritis (44%), RF-negative polyarthritis (19%) or enthesitis-related arthritis (16%). One or more SE were reported at 371 of 884 clinic visits (42%, CI 39-45) with a mean SE severity of 3.3 (SD 2.2). The most common SEs were abdominal pain (13% of visits), loss of appetite (12%), mood changes (12%) and nausea (10%). A one unit increase in SE severity corresponded to a 0.185 units worsening in PG (CI 0.125-0.245, $p < 0.001$) and a 0.087 units worsening in QoML (CI 0.010-0.164, $p=0.03$), after controlling for pain and active joint count. SEs were reported in 35% of visits with NSAID monotherapy (mean severity 3.1, n=314), 59% with methotrexate (MTX) monotherapy (mean severity 2.7, n=98), 54% with NSAID+MTX (mean severity 3.2, n=147) and 68% with combined treatments including prednisone (mean severity 3.8, n=64). The SE frequency related to NSAID+oral MTX combined therapy was 49% of 82 visits (mean severity 3.0), and to NSAID+subcutaneous-MTX was 60% of 65 visits (mean severity 3.4) ($p=0.175$ by chi square).
Conclusion: Parent-reported SE had a statistically significant impact on PG and QoML assessments. NSAID+subcutaneous MTX treatment did not have fewer SE than NSAID+oral MTX treatment. Parent-reported SE frequency and severity tended to increase as treatment intensified.

POD12

Geographic Variation in the Prevalence of Rheumatoid Arthritis in Alberta: A Spatial Analysis

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Objectives: Rheumatoid arthritis (RA) is a chronic autoimmune disease affecting approximately 1% of the Canadian population, and a leading cause of work disability. Rheumatologists are primarily located in large urban centers, creating potential differences in access to RA care. There is a lack of evidence for health planners to determine local needs for RA health services. This research assesses the geographic variation in RA prevalence in Alberta across the rural-urban continuum, and by local geographic areas (LGA) using spatial analysis. Our findings help to inform the targeted dissemination of evidence-based interventions.
Methods: We used Alberta Health administrative databases to identify RA cases between April 1 2015 and March 31 2016 using a validated case definition: ≥16 years at diagnosis, residing in Alberta, 1 hospitalization or 2 claims (at least 8 weeks apart) within 2 years, with International Classifications of Disease (ICD)-9-CM codes 714.x, or ICD-10-CA codes M05.X and M06.X. Age-sex standardized prevalence rates per 1,000 population were calculated with direct standardization. Standardized rate ratios (SRR) were calculated to compare the RA prevalence rate of each rural-urban area to the rest of Alberta. We applied global Moran's I, a spatial autocorrelation index, to assess whether RA prevalence in a LGA is similar to surrounding

LGAs, and hotspot analysis to identify LGAs having significantly higher RA prevalence compared to the provincial average and being surrounded by other LGAs with high RA prevalence.
Results: There were 38,350 RA cases (female 68%, n=26,236). The age-sex standardized RA prevalence rate was 11.81 cases per 1,000 population (95%CI: 11.80-11.81). Approximately 70% of RA cases resided in Metro (e.g. Calgary and Edmonton) and Urban areas (e.g. Medicine Hat and Lethbridge). The highest age-sex standardized rate was observed in Rural (14.46, 95%CI: 14.45-14.47, SRR=1.28), compared to the lowest in Metro areas (10.69, 95%CI: 10.68-10.69, SRR=0.82). The RA prevalence by LGA ranged from 4.7 to 30.6 cases. The global Moran's I index was 0.37 with a Z score of 4.67 based on a spatial weight matrix defined by a fixed distance (40km). We identified seven hotspots (LGAs) with an average prevalence rate of 27.7 cases (ranging from 24.1 to 30.6), among which six were located in the Rural and one in the Rural Remote areas.
Conclusion: The findings highlight notable Rural-Urban variation in RA prevalence in Alberta with some local areas having significantly higher RA prevalence. Our findings can inform strategies aimed at reducing geographic disparities by targeting areas with high healthcare needs. **Supported by a CIORA grant.**

POD13

Examining the Role of Dipeptidyl Peptidase-4 in Psoriatic Disease

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Objectives: Psoriatic arthritis (PsA) is an inflammatory arthritis that develops in up to 30% of patients with the skin disease psoriasis. PsA can lead to joint damage and disability and increased mortality risk. Studies suggest that the chemokine CXCL10 plays an important role in PsA. CXCL10 is regulated post-translationally by dipeptidyl peptidase-4 (DPPIV). We tried to determine if DPPIV plays a role in psoriatic disease by measuring DPPIV enzyme activity (EA) and DPPIV and CXCL10 levels in serum samples from patients and healthy controls (HC) and in synovial fluid from PsA and OA patients.
Methods: Serum samples were acquired from 80 treatment naïve patients with PsA, 80 patients with psoriasis without arthritis (PsC, treatment naive), and 40 HC. Additionally, 40 samples were collected from a subset of the PsA patients after 24 weeks of treatment with methotrexate (MTX). Synovial fluid (SF) and matched serum samples were collected from 15 PSA and OA patients (matched for age and sex). DPPIV(EA), serum DPPIV and CXCL10 were quantified by commercially available kits. Differences between groups were assessed using Mann-Whitney U test or Wilcoxon signed-rank test and correlations were tested by Spearman's correlation.
Results: PsA patients were 2/3 male, mean age 49.4(13.1) years and mean psoriasis area and severity index (PASI) score of 5.6(7.2). PsC patients were 2/3 male, age 49.6(13.0) years, PASI score 5.2(6.4). HC were 2/3 male, age 45.2(11.1). Treatment cohort were 50% male, age 48.2 (11.7) years, PASI score 5.8(8.0). DPPIV(EA), Serum DPPIV and CXCL10 levels were significantly different in all three cohorts, higher in PsA vs PS (p=0.02, FC1.1). DPPIV(EA) and serum DPPIV levels negatively correlated with serum CXCL10 levels in PsA patients (r=-0.353, p=0.01; r=-0.271, p=0.002 respectively). DPPIV(EA), Serum DPPIV and CXCL10 levels were significantly higher in PSA SF vs OA SF. DPPIV(EA) and DPPIV levels in SF had high positive

correlation with matched serum samples (r=0.857, p=0.01; r=0.919, p=0.0001 respectively). DPPIV(EA)and serum DPPIV levels significantly increased following treatment, while CXCL10 levels decreased significantly. Change in DPPIV levels negatively correlated with change in CXCL10 levels post treatment (r=- 0.455, p=0.05).
Conclusion: CXCL10 may be regulated post translationally by DPPIV as we observe a negative correlation in PsA patients. DPPIV synovial fluid levels may also be an important indicator of joint inflammation in PsA patients, due to its high positive correlation in synovial and serum levels. The increase in DPPIV may be a marker of response to MTX treatment in PsA patients.

POD14

An Initiative to Improve Timely Glucocorticoid Tapering in Vasculitis

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Objectives: Vasculitis guidelines recommend scheduled glucocorticoid (GC) tapering to avoid toxicity. In an audit of 130 consecutive new patients on GC assessed in our tertiary Vasculitis Clinic (July 2017-October 2018), 33 (25%) were taking prednisone >10mg above target dose, based on GC initiation date or last flare. Lack of confidence with GC tapering, concern for disease relapse, and referral wait times were identified as barriers to timely tapering. We aimed to increase the proportion of new patients taking appropriate GC doses to >90% by August 2019.
Methods: Interventions were (1) triaging patients on prednisone >20 mg to be seen in <2 months (2) “fax-back” tapering suggestions to referring physicians based on current ANCA-associated vasculitis (AAV) and large vessel vasculitis (LVV) recommendations. Initially, referring physicians’ offices were contacted 1-2 weeks following the “fax-back” to determine if physicians personally saw the suggestions, and modifications were made to “fax-back” format to increase physician receipt. The primary outcome was the proportion of patients taking “appropriate” GC (<=10 mg above target dose) at first visit, measured through interrupted time series analysis (July 2017-August 2019). Other measures included clinic wait times, the proportion of patients starting to taper GC, and disease flares during tapering.
Results: Following physician triaging (December 2018-August 2019), mean wait times for new patients on GC decreased from 82 days (95% CI 71-92) in the preceding 6 months to 64 days (95% CI 57-70). Physician receipt of the “fax-back” GC tapering suggestions increased from 29% (January/February 2019) to 68% (April/May 2019). Among patients referred for AAV/LVV, comparing pre-intervention (July 2017-January 2019) to post-intervention (February-August 2019) periods, mean prednisone dose at first visit decreased from 30 mg (95%CI 27-33) to 22 mg (95%CI 18-27), and the proportion of patients who had started to taper GC by their first visit increased from 84/118 (71% [95%CI 62-79]) to 40/43 (93% [95%CI 81-89]). However, the proportion ultimately taking “appropriate” GC doses, overall and among the AAV/LVV subset, did not significantly increase by the end of the measurement period. Potential/definite disease flares during tapering were similar in the 6 months before and after interventions (18% vs 19%).
Conclusion: In this novel “GC stewardship” initiative to limit avoidable harm in vasculitis, we decreased wait times among GC-users. "Fax-back" tapering suggestions were associated with increased tapering and lower GC doses at first visit. However, resources required for this intervention may limit sustainability, necessitating alternative educational strategies to improve timely GC tapering in vasculitis. **Best Abstract on Quality Care Initiatives in Rheumatology Award.**