POD01

Childhood-onset Systemic Lupus Erythematosus: Long-term Outcomes in a Large Multi-ethnic Ontario Cohort:

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Objectives: The long-term morbidity and mortality of childhood-onset SLE (cSLE) after transition to adult care is not well-documented. The present study aims to fill this knowledge gap by analyzing outcomes in a large province-wide cSLE cohort linked to multiple administrative healthcare databases. Our objectives were to 1) determine all-cause and cause-specific mortality rates, adverse renal event rates, cardiovascular event rates, and cancer rates in cSLE; and 2) determine baseline characteristics associated with higher rates of transition between 3 different states: event-free, adverse renal event, and death.

Methods: Clinical data were abstracted for cSLE patients diagnosed between January 1991 and March 2011 and followed for ≥1 year after contacting all pediatric and adult rheumatologists and nephrologists practicing in Ontario. Data and Ontario Health Insurance Plan (OHIP) numbers were securely transferred to the Institute for Clinical and Evaluative Sciences (ICES). OHIP numbers were transformed into an encrypted ICES key number used to link the cohort to multiple administrative datasets to determine the outcomes of interest. We examined descriptive summaries of major outcomes including death, adverse renal events (end-stage kidney disease [ESKD] requiring chronic dialysis and renal transplant), cardiovascular events (including angina, transient ischemic attack, endocarditis, myocardial infarction, pericarditis, stroke), and cancer. We used a multi-state Cox model to determine baseline characteristics associated with higher rates of transition from being event-free to experiencing an adverse renal event, from being event-free to experiencing death, and from experiencing an adverse renal event to death.

Results: There were 38 deaths in a cohort of 615 patients at a mean follow-up time of 14.4 years. The all-cause mortality rate was 3.36 per 1000 person-years. The rates for ESKD requiring chronic dialysis and renal transplant were 3.87 and 2.43 per 1000 person-years, respectively. The rates for any type of cardiovascular event and cancer were 6.49 and 3.47 per 1000 person-years, respectively. The multi-state Cox model indicated that the Black ethnic group (HR, 3.58; 95% CI, 1.6-8.0) and the presence of renal involvement at baseline (HR, 2.19; 95% CI, 1.2-4.1) were significantly associated with higher rates of transition from event-free to adverse renal event. Additionally, the Black ethnic group (HR, 5.45; 95% CI, 1.6-18.8) was significantly associated with higher rates of transition from event-free to death.

Conclusion: In this large multi-ethnic cSLE cohort, ethnicity was associated with adverse outcomes including renal events and death. Further analyses will help inform risk for adverse outcomes to improve clinical care for the highest-risk patients.

POD02

Personalizing Cardiovascular Risk Prediction for SLE Patients:

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Objectives: The risk of cardiovascular disease (CVD), including myocardial infarction (MI) and stroke, is increased in SLE patients and is underestimated by current generic prediction algorithms including the 10-year atherosclerotic cardiovascular disease (ASCVD) risk score. The purpose of this study was to develop an SLE-specific prediction tool to provide a more accurate estimate of CVD risk by including both traditional and SLE-related CVD risk factors.

Methods: We included SLE patients enrolled in the Brigham and Women's Hospital SLE Cohort and collected one-year baseline data on traditional CVD risk factors, and demographic and SLE clinical features from the electronic medical record at cohort enrollment. A up to ten-year follow-up period for CVD events began on day +1 at end of the baseline period (index date). The primary outcome was the first major adverse cardiovascular events (MACE, composite of first myocardial infarction, stroke, or cardiac death) in the follow-up period. These were identified by ICD-9/10 codes and adjudicated by medical record review by board-certified cardiologists as either definite or probable events. The secondary outcome was boarded to include the first event of: carotid artery occlusion or stenosis, transient ischaemic attack, atrial fibrillation/flutter, heart failure, peripheral vascular disease, or angina pectoris. Three Cox regression risk prediction models that categorized patients into low (<7.5%), moderate (7.5-20%), and high (>20%) risk over 10 years were derived: 1) primary outcome with definite/probable events, 2) combined model 1 and secondary outcomes, and 3) primary outcome with definite events only. We performed LASSO regression for variable selection and assessed model performance.

Results: We included 1243 patients; 93.0% female and mean age of 41.6 (SD 13.3) years. There were 90 definite/probable MACEs and 211 secondary events over the follow-up period. The variables selected were ASCVD risk score, disease activity, disease duration, creatinine level, presence of anti-dsDNA, anti-RNP, lupus anticoagulant, anti-Ro60/SSA, and low C4 [Table 1]. Model performance improved in comparing risk predicted by ASCVD risk score alone vs. ASCVD risk score combined with selected SLE variables by LASSO regression for models 1 and 2, particularly at year 1. For these models, the number of SLE patients who were classified as high risk (>20%) more than doubled when selected SLE variables were added to the ASCVD model compared to the ASCVD model alone.

Conclusion: Our novel SLE-specific CVD risk prediction scores enhanced the performance of the traditional risk algorithm and identified a greater number of SLE patients (at least two-fold) at high risk for CVD events over 10 years.

POD03

Adherence to Serum Urate Monitoring Guidelines Amongst Older Adults with Gout in Ontario, Canada: A Population-based Study:

Timothy Kwok (Division of Rheumatology, Department of Medicine, University of Toronto, Toronto); Bindee Kuriya (Sinai Health System, University of Toronto, Toronto); Gillian Hawker (University of Toronto, Toronto); Ping Li (ICES, Toronto); Gregory Choy (University of Toronto, Toronto); Jessica Widdifield (Sunnybrook Research Institute, ICES, University of

Toronto, Toronto)

Objectives: Serum uric acid (SUA) monitoring plays an important role in the treat-to-target recommendations of gout. Adherence to evidence-based SUA monitoring recommendations after initiation of urate-lowering therapy (ULT) is unknown. We assessed the proportion of older adults with gout undergoing SUA testing 6 months and 12 months after ULT initiation and associated patient and physician-level factors.

Methods: This population-based retrospective cohort study used Ontario health administrative databases. Patients aged ≥ 66 with a gout diagnosis and newly dispensed ULT between January 1, 2010 and March 31, 2019 were identified using the Ontario Drug Benefit and Ontario Health Insurance Plan (OHIP) databases. SUA tests were identified from the Ontario Laboratories Information System and OHIP databases. We characterized the proportion of patients that received SUA testing within 6 months and 12 months after ULT dispensation, overall and by prescriber specialty. Multi-level logistic regression clustered by ULT prescriber evaluated factors associated with SUA monitoring by 6 months including patient, prescriber characteristics, prescription information and healthcare usage factors.

Results: A total of 44,438 patients with mean (SD) age of 76.0±7.3 years and 64.4% males were included. Family physicians prescribed 79.1% of all ULTs. Overall, SUA testing was lowest in 2010 (56.4% at 6 months and 69.5% at 12 months), and rose significantly over time to 71.3% and 79.6%, respectively in 2019 ($p < 0.0001$). Compared with rheumatologists, family physicians (OR 0.26, 95% CI: 0.23–0.29), internists (OR 0.34, 95% CI: 0.29–0.39), nephrologists (OR 0.37, 95% CI: 0.30–0.45) and other specialties (OR 0.25, 95% CI: 0.21–0.29) were less likely to test SUA, as were male physicians (OR 0.87, 95% CI: 0.83–0.91). Crude trends stratified by prescriber specialty for SUA monitoring by 6-months is detailed in Figure 1. Patient factors associated with lower odds of SUA monitoring included: rural residence (OR 0.81, 95% CI: 0.77–0.86), lower socioeconomic status, as discerned based on patients' postal codes and census neighborhood income quintiles (OR 0.91, 95% CI: 0.85–0.97) and patient comorbidities. Correlates of SUA monitoring included: chronic kidney disease (OR 1.40, 95% CI: 1.32–1.49) hypertension (OR 1.11, 95% CI: 1.04–1.18), diabetes (OR 1.17, 95% CI: 1.12–1.22) and co-prescription of colchicine/oral corticosteroids (OR 1.31, 95% CI: 1.23–1.40).

Conclusion: SUA monitoring is suboptimal amongst older adults with gout-initiating ULT but is improving over time. ULT prescriber, patient and prescription characteristics affected SUA monitoring. These findings suggest variations in quality care and the need to mobilize quality improvement activities in chronic gout management, as optimal monitoring may be associated with improved clinical outcomes. Best Abstract on Clinical or Epidemiology Research by a Trainee - Phil Rosen Award.

POD04

Comparison of Survival on Treatment Among New Users of Biosimilar Vs. Originator Biologics in Inflammatory Arthritis: Population-based Evidence from a Natural Experiment Due to a Policy Change:

Diane Lacaille (Arthritis Research Canada, University of British Columbia, Vancouver); Antonio Avina-Zubieta (University of British Columbia Faculty of Medicine; Arthritis Research Canada, Vancouver); Yufei Zheng (Arthritis Research Canada, Vancouver); Na Lu (Arthritis Research Canada, Vancouver); Hui Xie (Arthritis Research Canada/Faculty of Health Sciences at Simon Fraser University, Vancouver)

Objectives: British Columbia (BC) health policy mandated that all new anti-TNF initiations after June 2017 use biosimilars when available, providing the context for a natural experiment.

Our study objective was to compare drug survival (as a surrogate marker of effectiveness and safety) after initiation of etanercept and infliximab for inflammatory arthritis in new users of biosimilars vs. originators, using historical controls pre-policy change.
Methods: Study Cohort: Using administrative health data, we identified all incident users of a new biologic (i.e., without prior prescriptions over 6 months) with rheumatoid arthritis (RA), psoriasis or psoriatic arthritis (Pso/PsA), or ankylosing spondylitis (AS). The biosimilar cohort includes incident users starting etanercept or infliximab between 07/01/2017 and 12/31/2019, followed until 12/31/2020 (post-policy period). Historical controls include all incident users of etanercept/infliximab originators between 01/01/2014 and 06/30/2016, followed until 06/30/2017 (pre-policy period). To control for potential temporal trends, we selected new users of adalimumab (no biosimilar available over the same time periods) as a comparison group. Outcome: Discontinuation was defined as no prescription renewal for at least 6 months. Statistical analyses: People were followed from anti-TNF initiation until discontinuation or censoring due to death, moving out-of-province, or end of follow-up, whichever occurred first. Discontinuation rates (per 100 person-year) were calculated. To deal with non-proportional hazards, we applied weighted Cox Proportional Hazard Models to estimate the adjusted hazard ratio (aHR) of discontinuing anti-TNFs, in people who started a biosimilar vs. the respective originator, after controlling for potential confounders [Table 1]. To control for temporal trend, we employed the difference-in-difference (DID) method, comparing drug survival among new users of biosimilar vs. originator etanercept/infliximab with new users of adalimumab post- vs. pre-policy change. The DID computes the difference between the aHRs logarithms for etanercept/infliximab and for adalimumab, reported as the ratio of the two aHRs in [Table 1C].
Results: Our sample includes 827 biosimilar etanercept users (RA:556, AS:178, Pso/PsA:93) and 299 infliximab users (RA:154, AS:67, Pso/PsA:78); 1308 etanercept and 259 infliximab originator users; and 2255 adalimumab originator users post- and 1786 pre-policy change periods. Discontinuation rates are described in [Table 1A]. After adjusting for baseline covariates [Table 1B], and after accounting for temporal trends [Table 1C], the likelihood of discontinuation was similar for biosimilar vs. originator etanercept and infliximab users.
Conclusion: Real-world population-based data in BC shows that biosimilar etanercept and infliximab have comparable duration of treatment to the originators in incident users for inflammatory arthritis. Supported by a CIORA grant.

POD05

Hospitalization with Infection in Offspring Exposed During Late Pregnancy to Tumor Necrosis Factor Inhibitors with High Versus Low Placental Transfer Ability:

Leah Flatman (McGill University; Research Institute of the McGill University Health Centre, Montreal); Yvan St. Pierre (McGill University Health Centre, Montreal); Isabelle Malhamé (McGill University Health Centre, Department of Medicine, Division of General Internal Medicine, Montreal); Olga Basso (McGill University, Montreal); Anick Bérard (Universite de Montreal, Montreal); Sasha Bernatsky (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal); Évelyne Vinet (Department of Medicine, Division of Rheumatology, McGill University Health Centre, McGill University, Montreal)

Objectives: During pregnancy, best practice guidelines suggest discontinuing tumor necrosis factor inhibitors (TNFi) with high placental transfer before or during the third trimester if the maternal disease is well controlled. This recommendation stems from concerns that TNFi, which can cross the placenta, could cause immunosuppression in the offspring, particularly in the third trimester, when the placental transfer of maternal IgG is highest. However, there is limited

evidence on the risk of serious infections by TNFi subtypes, particularly following TNFi administration during late pregnancy. We evaluated the risk of serious infections in offspring born to mothers with chronic inflammatory diseases who used TNFi with high versus low placental transfer during late pregnancy (i.e., within 12 weeks before delivery).
Methods: In this retrospective cohort study, we identified singleton offspring born alive between 2011 and 2019 to women with a prior diagnosis of rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, psoriasis, and/or inflammatory bowel disease (IBD) in MarketScan commercial data from the United States. TNFi exposure was defined as ≥1 filled prescription and/or infusion procedure code within 12 weeks prior to delivery. TNFi exposure was further categorized into high (i.e., infliximab, adalimumab, golimumab) and low (i.e., certolizumab, etanercept) placental transfer. Serious infections were ascertained based on ≥1 hospitalization with infection as the primary diagnosis in the offspring's first year. We performed multivariable Cox proportional hazards models, adjusting for maternal age at delivery, chronic inflammatory disease diagnosis, maternal comorbidities, pregnancy complications, and concomitant in-utero drug exposures to immunosuppressives/steroids.
Results: We identified 26,088 offspring, among whom 1,708 (6.5%) were exposed to TNFi within 12 weeks prior to delivery. Of the 1,708 with TNFi exposure, 1,325 (77.6%) and 383 (22.4%) had high and low placental transfer drugs, respectively. Serious infections occurred in 2.1% of offspring exposed to TNFi with high placental transfer versus 1.6% with low placental transfer. In multivariable analyses of TNFi exposures within 12 weeks of delivery, the adjusted hazard ratio for serious infections comparing high versus low placental transfer TNFi was 0.98 (95% CI 0.36, 2.61) (unadjusted 1.32; 95% CI 0.54, 3.18).
Conclusion: In this large population sample reflecting real-world TNFi use during late pregnancy, we were unable to identify a clear increased risk of serious infections in the first year of life in offspring exposed to high versus low placental transfer, although the confidence interval around our estimate was wide. This suggests the need for further research to improve the evidence base of guidelines in this regard. Best Abstract by a Post-Graduate Research Trainee Award.

POD06

Immunogenecity of COVID-19 Vaccines in Immune-mediated Inflammatory Diseases (IMID): Preliminary Results from the First 1251 SUCCEED Patients:

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Quebec); Sophie Roux (Université de Sherbrooke , Sherbrooke); Jenna Benoit (McMaster University, Hamilton); Carol Hitchon (University of Manitoba, Winnipeg); Sasha Bernatsky (McGill University Health Centre, Department of Medicine, Division of Rheumatology, Montreal); SUCCEED Investigators Safety and immunogenicity of COVID-19 vaccines in systemic immune mediated inflammatory Diseases (Montreal)
Objectives: SUCCEED was funded by the Government of Canada's COVID Immunity Task Force (CITF) in 2021, to study COVID vaccination in IMID. We present early data, including antibody production post-vaccine, and time trends for serologic evidence of recent infection.
Methods: From Vancouver, Calgary, Winnipeg, Montreal, Quebec City, Sherbrooke, Toronto, and Hamilton clinics, baseline and follow-up questionnaires and dried blood spots (or sera) pre and post-COVID vaccination have been collected from consenting adult patients with rheumatoid arthritis (RA), inflammatory bowel disease (IBD), ankylosing spondylitis/spondyloarthritis (AS/SpA) and psoriasis/psoriatic arthritis (PsO/PsA). We measured SARS-CoV-2 antibody responses post-first and subsequent vaccine doses; assays evaluated for the presence of anti- SmT1/spike IgG (by electrochemiluminescence immunoassay) as an indicator of immune response to vaccine. Anti-nucleocapsid IgG was also measured, as an indicator of recent infection. Seropositivity in each case was defined as surpassing the 1% false reporting rate cutoff. We describe the first 1251 SUCCEED participants recruited from Vancouver, Calgary, Hamilton, Quebec City, Toronto, and Sherbrooke. We present serology for the first 986 samples processed.
Results: Two-thirds of SUCCEED participants were female, and 80% were white. At recruitment, mean age was 53.8 (median 55.2, interquartile range 42.2-65.9) years and median IMID duration was 12.9 years. Pfizer vaccine accounted for 75% of first and second doses, and 66% of third doses. Moderna accounted for 18% of first, 22% of second, and 33% of third doses. Fourth doses were equally distributed between Pfizer and Moderna vaccines. Astra-Zeneca vaccines represented 7% of first and 2% of second vaccinations; other vaccine types were negligible. Serology for SmT1/spike IgG was positive in 97.1 percent (95% CI 94.8, 98.4) of samples post-second-dose vaccine, 97.7 percent (95% CI 95.8, 99.0) of samples post-third dose, and 100% of samples post-fourth dose. Results were similar across IMIDs, with trends for highest positivity in IBD (Figure 1). Prior to emergence of the Omicron variant, anti-N positivity (indicating recent infection) was as low as 3% (95% CI 2, 6%) across all IMID, and post-Omicron as high as 11% (95% CI 5, 21%).
Conclusion: The vast majority of SUCCEED participants demonstrated anti- SmT1/spike IgG post-second dose, and after additional doses. Evaluation of cellular immunity (also funded by CITF) will complement these results, as will additional analyses of IgG decay over time, and of how medications and other factors affect results. These data are the first to highlight calendar trends for recent COVID infections in a large, pan-Canadian IMID sample.

POD07

A Unique Glycan Polysialic Acid is Highly Expressed in Patients with Aggressive Systemic Sclerosis:

Lamia Khan (University of Alberta, Edmonton); Tahlia Derksen (University of Alberta, Edmonton); Desiree Redmond (University of Alberta, Edmonton); Jan Tervaert (University of Alberta, Edmonton); Mohamed Osman (University of Alberta, Edmonton); Lisa Willis (University of Alberta, Edmonton)
Objectives: Systemic sclerosis (SSc) is a rare but deadly disease characterized by progressive fibrosis, immune dysregulation and vasculopathy. Among all rheumatic diseases, SSc continues

to have the highest level of disease-associated morbidity and mortality. Early in the disease, SSc patients develop severe rapidly progressive early diffuse (edSSc) or less progressive early limited SSc (elSSc). The primary cells promoting fibrosis in SSc are human dermal fibroblasts (HDFs) which develop a myofibroblast phenotype associated with cancer-like resistance to apoptosis and increased invasive properties. In cancer, the glycan polysialic acid (polySia) is preferentially expressed in and secreted from highly metastatic cells, and its expression is associated with a poor prognosis. Therefore, we hypothesized that HDF from patients with SSc (particularly edSSc) have a dysregulation in polySia expression, and polySia levels are elevated in their serum.

Methods: All our SSc patients met the inclusion criteria of 2013 ACR/EULAR. Primary HDF from healthy controls (HC), elSSc, or edSSc was generated using 4mm skin punch biopsy. Low passage (<P5) cultured HDFs were used for the subsequent experiments. PolySia levels were measured in each group using immunofluorescence microscopy and immunoblotting. Additionally, mRNA expression of the enzymes regulating polySia biosynthesis (ST8Sia2 & 4) were measured via qRT-PCR. To determine the association between polySia and fibrotic signals, HDFs from HC was treated with the profibrotic cytokine TGF-beta, then the expression level of polySia, ST8Sia2 & 4 were measured. Finally, serum polySia was measured using a novel ELISA assay.

Results: We found that baseline polySia expression was markedly increased in HDF and dermal sections from patients with severe edSSc compared to elSSc and HC. This was associated with increased mRNA expression of ST8Sia2 & 4 enzymes. Exogenous TGF-beta treatment increased the expression of polySia and associated enzymes in HDFs from HC. Interestingly, edSSc patients also had higher levels of polySia in their serum – suggesting a potential role for polySia as a novel biomarker in SSc.

Conclusion: Patients with edSSc have increased levels of polySia and its synthetic enzymes ST8Sia2 & 4. This novel polySia signature may correlate with the fibrotic pathway and the progression of aggressive SSc in patients. Further studies are needed to explore the functional role of polySia such as resistance to apoptosis and immune dysregulation in the pathogenesis of SSc. Our findings may suggest a role for polySia as a future biomarker and therapeutic target for patients with SSc. Funding: Dutch kidney foundation, Arthritis Society, Scleroderma Canada, GlycoNET.

POD08

The Association Between Systemic Lupus Erythematosus (SLE) and Bone Mineral Density (BMD) Polygenic Risk Scores with Lumbar Spine BMD Z-score in Childhood-onset SLE Patients: A Retrospective Cohort Study:

Vrati Mehra (Division of Rheumatology, The Hospital for Sick Children; Division of Genetics, SickKids Research Institute; Faculty of Medicine, University of Toronto, Toronto); Daniela Dominguez (The Hospital For Sick Children, Toronto); Nicholas Gold (The Hospital for Sick Children, Toronto); Andrea Knight (The Hospital for Sick Children/University of Toronto, Toronto); Deborah Levy (Division of Rheumatology, SickKids Hospital; Faculty of Medicine, University of Toronto, Toronto); Fangming Liao (The Hospital for Sick Children, Toronto); Eleanor Pullenayegum (University of Toronto, Toronto); Amer Shammas (The Hospital for Sick Children, Toronto); Etienne Sochett (The Hospital for Sick Children, Toronto); Reza Vali (The Hospital for Sick Children, Toronto); Declan Webber (University of Toronto, Toronto); Earl Silverman (Division of Rheumatology, The Hospital for Sick Children; Faculty of Medicine, University of Toronto, Toronto); Linda Hiraki (Division of Rheumatology, The Hospital for Sick

Children; Division of Genetics, SickKids Research Institute; Faculty of Medicine, University of Toronto, Toronto)
Objectives: Systemic lupus erythematosus (SLE) is a chronic autoimmune disease. Genetics play a role in SLE susceptibility, with >100 risk single nucleotide polymorphisms (SNPs) from genome wide association studies (GWAS). Childhood-onset SLE patients <18 years (cSLE) are at risk for reduced bone mineral density (BMD) due to disease activity and chronic glucocorticoid exposure. Our aim was to assess the genetic contribution to bone mineral density among a multi-ethnic cSLE cohort.
Methods: All patients were diagnosed and followed at the SickKids Lupus Clinic. Patients were genotyped on the Multiethnic Genotyping Array or the Infinium Global Screening Array. Those with baseline Lumbar Spine (LS) BMD dual-energy X-ray absorptiometry (DXA) scan were included in analysis. Baseline was defined as 1 month prior, or up to one year after cSLE diagnosis. Patients with bony abnormalities or with DXAs due to medical conditions other than SLE were excluded. We extracted demographics, clinical features, and medication use from the Lupus database. The main outcome of interest was LS (L1-L4) BMD z scores.
[ES1] [VM2] Two weighted polygenic risk scores (PRSs) were calculated. 1) BMD PRS was calculated using alleles associated with low LS from the largest LS BMD meta-GWAS of BMD to date 2) SLE PRS was also calculated using largest SLE GWAS conducted to date. We regressed BMD and SLE PRSs with baseline BMD z-scores in linear models adjusted for sex, ancestry, glucocorticoid exposure, height percentile, and an indicator for lupus nephritis and/or neuropsychiatric lupus.
Results: Our study included 284 patients, 82% female, 29% of European and 28% of East Asian ancestry. The median age of cSLE diagnosis was 13.5 years [IQR 11.1, 15.3]. In univariate and multivariate adjusted models, a higher BMD PRS was significantly associated with low BMD z-score (β: -0.75; 95%CI: -1.32, -0.18; P = 0.01, multivariable model). There was no association between SLE PRS and LS BMD z-score. Using steroids prior to DXA was significantly associated with low BMD at a univariate level but was not significant in the adjusted model. Height percentile [ES3] was significantly associated with BMD z-score (β: 0.01; 95% CI: 0.01, 0.02; P= 2.39e-10), yet the presence of LN and/or NPSLE was not (β: 0.04; 95%CI: -0.22, 0.31; P=0.76[ES4]).
Conclusion: Conclusions: We found that a high BMD PRS was significantly associated with lower LS BMD z-score in cSLE patients at baseline. BMD PRS may be used to stratify patients with cSLE who are at greatest risk of reduced BMD.

POD09

Exploring Levels of Protein Biomarkers in Response to Treatment for Psoriasis and Psoriatic Arthritis:

Rachel Offenheim (Schroeder Arthritis Institute, Toronto); Darshini Ganatra (Krembil Research Institute, University Health Network, Toronto); Mitchell Sutton (Toronto Western Hospital, Toronto); Dafna Gladman (Krembil Research Institute, Toronto Western Hospital, Toronto)
Objectives: The objective of this study was to evaluate the levels of CXCL10, MMP3, S100A8, CCL2, and ACP5 in serum of psoriasis and PsA patients before and after treatment with biologic agents (TNFi and IL-17i).
Methods: PsA and PsC patients are followed prospectively at the Toronto Western Hospital psoriatic disease clinic. We identified 93 PsA patients on TNFi and 22 on IL-17 inhibitors (IL-17i) and retrieved serum samples before and after therapy. Samples from 30 patients with PsC treated with biologics were matched to 30 patients not treated with biologics were also retrieved

from the databank. Using the Luminex Discovery assay we measured CXCL10, MMP3, S-100A8, CCL2, and ACP5 levels. Statistical analysis was performed using Wilcoxon Signed-rank test.
Results: CXCL10 (P=0.0007), MMP3 (P<0.0001), S100A8 (P<0.0001), ACP5 (P<0.0001), and CCL2 (P=0.01) significantly decreased after TNFi treatment in PsA patients. CXCL10 (P=0.04) and ACP5 (P=0.02) significantly increased after IL-17i treatment in PsA patients. There were no significant differences between treated and untreated PsC patients.
Conclusion: CXCL10, MMP3, S100A8, ACP5, and CCL2 are potential biomarkers for response to TNFi in PsA patients. CXCL10 and ACP5 are potential biomarkers for response to IL-17i treatment in PsA patients.

POD10

Neutrophil Extracellular Traps as a Biomarker to Predict Outcomes in Lupus Nephritis:
Laura Whittall-Garcia (University Health Network, Toronto); Murray Urowitz (University of Toronto, Toronto); Farnoosh Naderinavi (University Health Network, Toronto); Dafna Gladman (Krembil Research Institute, Toronto Western Hospital, Toronto); Zahi Touma (Centre for Prognosis Studies, Division of Rheumatology, Toronto Western Hospital, University Health Network, Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto); Joan Wither (Division of Genetics and Development, Krembil Research Institute; Division of Rheumatology, University Health Network; Department of Immunology, University of Toronto, Toronto); Anna Konvalinka (University Health Network, Toronto)
Objectives: Determine if the amount of NET complexes (Elastase-DNA and HMGB1-DNA) in serum at the time of a LN flare predicts renal outcomes in the following 24 months.
Methods: The study had 2-stages. In an exploratory cohort composed of active SLE (clinical SLEDAI ≥ 1), inactive SLE and healthy controls (HC), we assessed the association between Elastase-DNA and HMGB1-DNA complexes and ALN. A separate LN cohort was then used to determine the utility of NET complexes to predict renal outcomes over the subsequent 24 months. All patients had ALN (24-hour urine protein >500mg with a subsequent modification in therapy by the treating physician), a baseline eGFR >30ml/min (3 months prior to the flare), stored serum sample ±3 months from the renal flare and 2-years follow-up. The following outcomes were ascertained: Complete response (CR) defined as proteinuria <500mg/day and a serum creatinine within 15% of the baseline; severe renal impairment (eGFR≤30ml/min) and the percentage decline in the eGFR over the 24 months after flare.
Results: 92 individuals were included in the exploratory cohort (49 active, 23 inactive SLE and 20 HC). NET complexes were significantly higher in SLE patients compared to HC (p=<.0001 for both complexes). Patients with ALN (36.7%) had significantly higher levels of NET complexes compared to active SLE without LN (p=0.03 and p=0.02, Elastase-DNA and HMGB1-DNA respectively). Furthermore, the NET complex levels were higher in proliferative LN vs non-proliferative LN (p=0.008 and p=0.001, Elastase-DNA and HMGB1-DNA respectively). The LN cohort included 109 ALN patients. The median age was 29years, 84% were women, 37.9% were Caucasian, 22.2% Black and 17.5% Asian, the baseline eGFR was 112 ml/min. 77.9% had a kidney biopsy at the time of the LN flare, of whom 55.9% had a proliferative or mixed class, 17.4% class V, and 4.5% class I or II. Patients with higher baseline levels of NET complexes had higher odds of not achieving CR and of having severe renal impairment after 24 months of the flare, outperforming conventional biomarkers [Table 1]. There was a linear relationship between the amount of baseline Elastase-DNA and HMGB1-DNA complexes and the decline in renal function in the subsequent 24 months (p=<.0001 and

p=0.002, Elastase-DNA and HMGB1-DNA respectively).
Conclusion: Elastase-DNA and HMGB1-DNA complexes predicted renal outcomes, including response to therapy and decline in kidney function at 2 years after the LN flare. Best Abstract on SLE Research by a Trainee - Ian Watson Award.

POD11

"If You Didn't Chart It, You Didn't Do It:" Developing a Template to Address Quality Indicators in Patients with Childhood Onset Systemic Lupus Erythematosus (cSLE) Transitioning from Pediatric to Adult Care:

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Objectives: Transition from pediatric to adult care is a period of high risk for patient attrition, poor adherence, and disease flare. We established a dedicated Young Adult SLE (YASLE) clinic with a goal of optimizing care for these complex patients, including addressing established SLE quality metrics. We noted that these metrics were infrequently documented, and thus assumed unaddressed. Here we assess the impact of the implementation of a semi-structure clinical note template in addressing quality metrics more consistently.
Methods: Retrospective chart review was conducted for all cSLE graduates who transitioned from The Hospital for Sick Children to Mount Sinai Hospital for adult care since YASLE clinic inception in August 2016 until Dec 2021. At baseline (August 2016 – November 2018), clinical notes were untemplated. The 1st template iteration, incorporating prompts about some quality indicators, was utilized from December 2018 – June 2019, with further iterations (2nd: July 2019 – February 2021; 3rd: March 2021 – December 2021) incorporating further quality indicators. Each visit was analyzed for address (yes/no/no data/not applicable) of medication adherence, health maintenance and monitoring strategies (vaccinations, antimalarial-associated ocular health, sun hygiene, bone health, medication adherence), and psychosocial parameters (sexual health, contraception, mood, supports, habits). Descriptive statistics were used to analyze proportion of visits in which discussion surrounding each of these indicators was documented, grouped by date of visit/template iteration.
Results: There was significant increase in proportion of clinical notes which documented the selected quality indicators as they were incorporated into the template. By 3rd iteration, 97% (316/326) of applicable 3rd iteration visits documented patient-reported medication adherence, compared to 36% (32/88) at baseline ($p<0.0001$). Ninety-seven percent (308/316) of applicable visits documented antimalarial-related ocular screening, 95% (314/330) sun hygiene, and 84% (278/330) influenza vaccination, compared to 31% (26/83), 11% (10/89), and 34% (n=30/89) at baseline, respectively ($p<0.0001$ each). Similarly, documentation of bone density testing increased from 12% (11/89) to 95% (315/330) ($p<0.0001$). The only metric for which documentation did not significantly increase from baseline was blood pressure reading in clinic, as baseline documentation was 100%.
Conclusion: There was significantly increased frequency of documenting quality indicators since implementing a semi-structured clinical template in the YASLE clinic. This increased documentation reflects a critical first step in their consistent address which, in turn, can translate to improved quality of care delivered. The success of this template could serve as a proof-of-concept, and be implemented by other clinics, adapted to suit the needs of their patients. Best Abstract on Quality Care Initiatives in Rheumatology Award.

POD12

Treatment Patterns of Scleroderma Renal Crisis in the International Scleroderma Renal Crisis Survey II:

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Objectives: Scleroderma renal crisis (SRC) is a life-threatening complication of systemic sclerosis characterized by acute kidney injury, hypertension and microangiopathic hemolytic anemia. Prompt control of blood pressure remains the mainstay of therapy in SRC. Due to the rarity of SRC, there is limited information regarding the treatment patterns of SCR in real-world settings. We are conducting an international study to develop classification criteria for SRC. In this setting, we collected data on treatment of new onset SRC. Here, we propose to describe real-world treatment patterns of new onset SRC.

Methods: In January 2020, the Scleroderma Clinical Trials Consortium (SCTC) Scleroderma Renal Crisis Working Group launched a two-year rolling, web-based survey among 114 collaborators in 28 countries. Collaborators who identified new SRC cases were sent a detailed questionnaire to collect standardized clinical data. Information collected on the treatment of SCR included: anti-hypertensive medications, adjuvant therapy, and time required to control blood pressure.

Results: Of the 96 SRC cases identified during the study period, angiotensin-converting enzyme inhibitors (ACEi) were used to treat SRC in 96% (92/96), calcium channel blockers in 78% (75/96) and angiotensin II receptor blockers in 10% (10/96) of cases, [Table 1]. At the time of SRC onset, 10 patients were already on ACEi and either had their ACEi dosage increased (4/10), changed to a different ACEi (3/10) or continued the same (3/10). Other antihypertensives included iloprost (12/96), diuretics (11/96), bosentan (10/96), alpha-1 blockers (10/96), alpha-2/imidazoline receptor agonists (8/96), beta-blockers (7/96) and others (6/96). The number of patients requiring one, two, three, or four or more classes of antihypertensive to control blood pressure were 14 (15%), 42 (44%), 20 (21%) and 19 (20%), respectively. Adjuvant therapies included eculizumab (3/96), mycophenolate (2/96), plasmapheresis (1/96), IVIg (1/96), cyclophosphamide (1/96) and prednisone (1/96). The median time to control blood pressure was 6 (IQR 7) days. A total of 42 (43.8%) patients required dialysis.

Conclusion: This is the first description of SRC real-world treatment patterns using prospectively collected data from an international cohort. We found that the majority of SRC patients required 2 or more anti-hypertensive medications to control blood pressure, with calcium channel blockers being the most commonly used second-line class of anti-hypertensive, and that time to control blood pressure was sub-optimal.

POD13

Prediction of Psoriatic Arthritis Tool (PRESTO): Development and Performance of a New Scoring System for Psoriatic Arthritis Risk:

Lihi Eder (Women's College Research Institute, University of Toronto, Toronto); Ker-Ai Lee (University of Waterloo, Department of Statistics and Actuarial Science, Waterloo); Vinod Chandran (Krembil Research Institute, Toronto Western Hospital, Toronto); Jessica Widdifield (Sunnybrook Research Institute, ICES, University of Toronto, Toronto); Aaron Drucker (University of Toronto, Toronto); Christopher Ritchlin (University of Rochester, Rochester); Cheryl Rosen (Toronto Western Hospital and University of Toronto, Toronto); Richard Cook (University of Waterloo, Department of Statistics and Actuarial Science, Waterloo); Dafna

Gladman (Krembil Research Institute, Toronto Western Hospital, Toronto)
Objectives: Up to a third of patients with psoriasis develop psoriatic arthritis (PsA). A simple, scalable tool that identifies psoriasis patients at high risk for developing PsA could improve early detection and facilitate early intervention. Our overall objective is to develop an accurate risk prediction model for the development of PsA and to assess its performance among patients with psoriasis.
Methods: In this longitudinal cohort study we analyzed data from the International Psoriasis and Arthritis Team (IPART) study, a prospective cohort of psoriasis patients without PsA at the time of enrollment. The participants were followed prospectively from 2006 to 2020, and their PsA status was assessed annually by a rheumatologist. Information about their demographics, psoriasis characteristics, co-morbidities, medications and musculoskeletal symptoms was used to develop prediction models for PsA. Penalized binary regression models were used for variable selection while adjusting for psoriasis duration; the stacked LASSO with equal weights was adopted to deal with multiple imputed datasets for incomplete data. Risks of developing PsA over 1- and 5-year time horizons were estimated. Internal validity was assessed using 5-fold cross-validation. Model performance was assessed by the area under the curve (AUC), and calibration plots.
Results: A total of 635 psoriasis patients were analyzed (mean duration of follow up 7.7 years). 51 and 71 patients developed PsA during the 1-year and 5-year periods, respectively. The risk of developing PsA within 1 year was associated with younger age, male sex, family history of psoriasis, back stiffness, nail pitting, level of stiffness, use of biologic medications, global health and pain severity (AUC 72.3, 95% confidence interval (CI) 65.5, 79.1, Figure 1A). The risk of developing PsA within 5 years was associated with morning stiffness, psoriatic nail lesion, psoriasis severity (by PASI), fatigue severity (by FACIT-fatigue), pain severity and use of systemic non-biologic medication or phototherapy (AUC 74.9, 95% CI 69.3, 80.5, Figure 1B). Calibration plots showed reasonable agreement between predicted and observed probabilities. The sensitivity and specificity for a 2.5% probability of PsA onset within 1 year were 54.5% and 75%, respectively. The sensitivity and specificity for a 5% probability of PsA onset within 5 years period were 61.1% and 77%, respectively.
Conclusion: The development of PsA within clinically meaningful time frames can be predicted with reasonable accuracy for psoriasis patients. Additional work is underway to validate these models in external cohorts of psoriasis patients.

POD14

More than Half of Canadians with RA with a Lifetime History of Mood Disorders were Anxious or Depressed During the COVID-19 Pandemic:

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Objectives: Chronic stress and chronic disease are risk factors for anxiety and depression. In Canadians with RA, pandemic-related stress was exacerbated by delayed access to vaccines,

periodic lockdowns, and initial uncertainty about medication access. We compared trends in the prevalence of anxiety and depression prior to and during the first 22 months of the pandemic in RA patients with and without a lifetime history of these disorders.
Methods: The Canadian Early Arthritis Cohort (CATCH) is a prospective multi-center inception cohort of adults with RA across Canada. Prior to the pandemic, participants completed PROs and rheumatologists conducted assessments during in-person visits. After March 2020, ongoing PRO collection continued at in-person and remote visits. We estimated monthly trends in the prevalence of anxiety and depression (PROMIS Depression and Anxiety 4a score ≥55) from all visits between Mar 2019-Jan 2022 and compared rates for the year prior to (Mar 3/19-2/20) and first 23 months of the pandemic (3/20-1/22) stratified by lifetime history of mood disorders.
Results: 4148 visits were completed from 2/19 to 1/22 in 1,644 patients with a mean (SD) age of 60 (14) and disease duration of 6 (4) years; 73% were women, 84% white, 60% had post-secondary education, and 77% were in CDAI REM/LDA prior to the pandemic. 253 (15%) reported a history of depression and 217 (13%) of anxiety; 8% reported prior treatment. During the pandemic, as compared to those reporting no history, patients with a history had >2X the prevalence of depression [55% vs. 22%] and anxiety [59% vs. 28%]. A similar pattern was seen in the year prior to the pandemic [depression: 49% vs. 20%; anxiety 55% vs. 26%]. During the first 22 months of COVID-19, depression and anxiety increased in all groups. Proportions were highest during COVID waves, and in patients with a previous history (figure). Whereas depression peaked early in the pandemic, anxiety generally increased with each wave, peaking in Wave 3 (May-Jun 2021).
Conclusion: Anxiety and depression were common in CATCH participants before and during the pandemic. Participants reporting a lifetime history of mood disorders were more than twice as likely to report anxiety and depression; depression peaked early in the pandemic and anxiety grew with successive waves. The results demonstrate the importance of applying a lifetime perspective as previous episodes of anxiety and depression may be an important marker of increased vulnerability and recurrence in RA patients.