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(Note: Presenting authors are underlined)

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Experiences of Canadian pharmacists with dispensing mifepristone for medical abortion

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Background: Mifepristone, a medical abortion medication, became available on the Canadian market in 2017 and is now dispensed in community pharmacies. We aimed to assess the availability of mifepristone in community pharmacies, the frequency that prescriptions were received, and pharmacists' experiences with dispensing the medication.

Methods: We surveyed pharmacists from across Canada. We summarized categorical data using counts and proportions and used chi-square tests to determine the relationship between categorical variables.

Results: We collected survey results from 125 pharmacists. Of these, 56% have dispensed mifepristone in their pharmacy and 49.5% reported that their pharmacy routinely stocked mifepristone. The mean (SD) number of prescriptions filled in the previous 12 months was 25.58 (85.70). The overwhelming majority of participants (98.82%) reported that their communities reacted positively to the provision of mifepristone by their pharmacy. No differences were seen between urban and rural communities regarding these factors. Reported benefits of making mifepristone available in Canadian pharmacies were: increased accessibility for women and couples (118, 94.4%), reduced pressure on the healthcare system (107, 85.60%), increased accessibility in rural and remote areas (106, 84.80%) and increased interprofessional collaborations (49, 39.20%). Challenges for maintaining an adequate stock at the pharmacy included low demand (25, 20.00%); short expiry dating (20, 16.00%), cost of purchase (9, 7.20%), and drug shortage (8, 6.40%).

Conclusions: Most respondents believe that dispensing mifepristone in community pharmacies increases accessibility for patients in both urban and remote areas and that involving pharmacists enhances patient safety and reduces pressure on the healthcare system.

2

Polypharmacy among older Individuals with heart failure: trends between 2000 and 2017 in the province of Quebec, Canada

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Background: Pharmacological management of heart failure and comorbidities may result in polypharmacy, but there are few population-based studies that portray the use of medications over time. We aimed to describe the trends in polypharmacy and medication use in older adults with heart failure.

Methods: We performed a study including all adults >65 years with heart failure between 2000 and 2017 using administrative databases in Quebec, Canada. Medication use was ascertained by the presence of at least one claim in each year. We defined three levels of polypharmacy: ≥10, ≥15, and ≥20 different medications/year, and evaluated the use of guideline-recommended and potentially inappropriate medications. We calculated age- and sex-standardized proportions of users each year.

Results: The use of ≥10, ≥15, ≥20 medications increased from 62.2%, 30.6%, and 12.2% in 2000 to 71.9%, 43.9%, and 22.7% in 2017. The combination of β-blocker + angiotensin converting enzyme inhibitor (ACEI) /angiotensin II receptor blocker (ARB) was used by 30.4% of individuals in 2000 and 45.5% in 2017. ACEI/ARB users decreased from 65.8% in 2000 to 62.1% in 2017. Potentially inappropriate medications use decreased over time.

Conclusions: Polypharmacy is significant among older adults with heart failure. Implications of such medication burden should be investigated.

3

A survey of Canadian stakeholders on outcomes-based agreements, including data and infrastructure readiness, experience and willingness, and future plans

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[1]2021 Real-World Evidence and Outcomes-Based Agreements Working Group

Background: The mission of the Real-World Evidence (RWE) and Outcomes-Based Agreements (OBA) Working Group is to advance the opportunity for the use of OBAs in Canada, to the benefit of all stakeholders in the Canadian healthcare system. Since 2019, the Working Group has actively addressed OBA challenges and questions, while developing solutions to remove barriers to OBA implementation through demonstration projects and research. In 2021 the Working Group is conducting research on Canadian stakeholder experience with, and perceptions of, OBAs with the purpose of providing insights into the current state, and future challenges and opportunities, for OBAs in Canada.

Methods: A survey of key Canadian stakeholders is being conducted (closing August 31, 2021) to understand their experience with and perception of OBAs. Stakeholders include [1] Patient groups, [2] Public and private payers, [3] HTA, [4] pCPA, [5] Academics, [6] Clinicians. The survey is being conducted in 2 phases: [1] 20-minute online self-serve survey and, [2] 30-minute qualitative interviews with participants. The survey addresses 27 questions on OBAs within the following themes: [1] General OBA Knowledge, [2] OBA Readiness, [3] Data to Support OBAs, [4] Future of OBAs.

Results: TBD – research is currently in progress; results will be completed summer 2021 and included in the poster. Conclusions: TBD – research is currently in progress; the conclusion will be completed summer 2021 and included in the poster.

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Cardiovascular disease hospitalization risk associated with influenza vaccines in seniors

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Withdrawn by author

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The use of prescription medications and non-prescription health products by breastfeeding mothers in a prospective cohort study

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Background: Post-partum medication use presents as a possible barrier to breastfeeding. In order to analyze the risk of infant exposure to drugs in breastmilk, the type and extent of medication use by lactating women requires investigation.

Methods: Data were collected from the CHILD Cohort Study which enrolled pregnant women across Canada between 2008-2012. Participants completed questionnaires regarding medications used and breastfeeding status at 3, 6 and 12 months postpartum. The most commonly used medications, frequency of medication use, and self-reported reasons for medication use, were compared between breastfeeding and non-breastfeeding women. Fisher's Exact test was used to analyze categorical differences in the usage patterns.

Results: A total of 3413 mother-infant dyads were recruited to the CHILD study, of which 2906, 2587 and 2593 participants indicated their breastfeeding status at 3, 6 and 12 months respectively (87.4%, 75.3%, 45.5% were breastfeeding at 3, 6 and 12 months respectively). Almost half of breastfeeding women (41.9%) used at least one prescription medication during the 3 months postpartum period. The most commonly used prescription medication by breastfeeding women was domperidone at 3 months (9.0%, n=229/2540) and 6 months (5.6%, n=109/1948), and norethisterone at 12 months (4.1%, n=48/1180). Breastfeeding women took the same number of prescription medications at 3, 6, and 12 months postpartum as non-breastfeeding women, however breastfeeding women took more non-prescription health product at each time point postpartum.

Conclusions: Almost half of breastfeeding women use prescription medications in the first 3 months postpartum, with a significant proportion for reasons related to lactation.

6

Medication use and healthcare costs among adults with migraine: a population-based study in Alberta, Canada

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Background: Understanding medication and healthcare utilization among patients with and without migraine may allow identification of care gaps.

Methods: A population-based cross-sectional study using administrative data from Alberta was performed. Adults with migraine were included (had ≥1 ICD-10-CA G43 or ICD-9-CM 346: All-Migraine); chronic migraine (CM) was identified by an algorithm and episodic migraine (EM) by exclusion, and propensity score matched 1:3 to controls. Medication use, and healthcare resource utilisation and costs ($CDN) were described over 1-year (between April 2015 and March 2018). Statistical significance was assessed using a two-tailed independent t-test for continuous variables, a chi-squared test for categorical variables, and multiple linear regression for healthcare costs.

Results: Only statically significant results reported. All-Migraine (n=73,749), CM (n=12,700), and EM (n=54,686) received significantly more acute and preventative migraine medication dispensations versus matched-controls. Between 2- and 3-times as many subjects in the migraine groups had an opioid dispensation versus matched-controls. The mean number of hospitalizations, emergency department visits, and physician visits were significantly higher among the migraine groups versus matched-controls. After adjusting for potential confounders, the estimated annual incremental cost of All-Migraine, CM, and EM was $1,029, $1,217, and $738, respectively.

Conclusions: The proportion of patients with migraine who received an opioid dispensation is concerning given that frequent use may lead to medication-overuse headache, progression of EM-to-CM, becoming refractory to other migraine medications, and misuse or abuse. Further, migraine imposes a significant health economic burden on payers due to increased use of healthcare resources compared to demographically similar controls without migraine.

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Uncovering the hidden costs of Take Home Cancer Drugs (THCDs)

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Cancer prevalence continues to grow as the Canadian population ages. Cancer patients face substantial anxiety and uncertainty. Timely and equitable access to reimbursement is critical for patient outcomes. Unfortunately, patients face important access barriers to take home cancer drugs (THCD) in some Canadian provinces. This analysis identified gaps in access to THCDs in Canada. A model was developed to characterize gaps in THCD coverage and examined financial burden, time to treatment, and differences in drug coverage. The model also explored effects on utilization between provincial public drug programs. With Alberta as a benchmark, PDCI compared differences in Ontario, Nova Scotia, and New Brunswick plan policy and utilization for specified oral oncology drugs against respective differences in access, utilization, and patient financial burden. The modeled gap in coverage was calculated for 2020. The incremental net cost of aligning publicly funded THCD programs to provide second dollar coverage to patients was estimated. The model accounted for financial effects from increased coverage and utilization of respective programs due to enhanced coverage and the associated improved utilization. This analysis developed quantitative (formulary, financial) and qualitative insights (patient experience) to advise payers and policy makers when aligning provincial cancer funding decisions and programs. The results highlight important utilization differences associated with inconsistent and often limited provincial cancer drug policies which may lead to suboptimal patient outcomes in the modeled regions.

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The importance of the disease-free survival endpoint to survivors of lung cancer

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Background: Lung cancer is the most frequent cancer diagnosis and leading cause of cancer death in Canada. In lung cancer clinical trials, overall survival (OS) is a widely used endpoint; however, disease-free survival (DFS) – the time to cancer recurrence or death from any cause – may be a better indicator of transformative patient outcomes. While the use of DFS is growing, patient perceptions of its validity have not been established. This study sought to understand the importance of DFS from the perspective of Canadian lung cancer survivors.

Methods: Survivors of stage Ib to IIIa lung cancer participated in semi-structured qualitative interviews in early 2021. Participants described their experience of cancer diagnosis and treatment and provided their perspectives on DFS and OS, including how well each endpoint aligned with their treatment priorities. Thematic analysis was used to explore patterns in responses.

Results: Of 18 participants, the mean age was 64 years, 17% were male, 89% had surgery and 56% received chemotherapy. Most participants viewed DFS as intrinsically relevant to their treatment priorities. One individual's interest in DFS was limited to its potential surrogacy with OS. All participants emphasized that new treatments should be approved based on DFS when OS data are not yet available; an issue that was often viewed in the context of promoting patient agency in treatment decision-making.

Conclusions: These findings validate DFS as a meaningful endpoint from the perspective of lung cancer survivors and highlight patients' desire for rapid approval of treatments that have been demonstrated to improve DFS.

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Marginal structural models with latent class growth modeling of time-varying treatment

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Background: Latent class growth models (LCGM) are increasingly proposed as a solution to summarize time-varying treatment in a few distinct groups. When combined with standard approaches like Cox proportional hazards models, LCGM can fail to control time-dependent confounding bias. The objective of this work was to propose a valid approach that make use of LCGM for estimating the effect of treatment trajectories (statin adherence patterns) on an outcome (first cardiovascular event).

Methods: We propose to use LCGM to classify individuals into a few latent classes based on their medication adherence pattern, then choose a working marginal structural model that relates the outcome to these groups. Our approach allows to estimate the parameters of interest using the inverse probability of treatment weighting (IPTW), and conservative inferences can be obtained using a standard robust variance estimator. We performed simulation studies to illustrate our approach and compare it with current practice**.**

Results: For all explored scenarios, we found that our proposed approach yield estimators with little or no bias. As expected, when using stabilized IPTW, all confidence interval coverages were close to 95% (between 90% and 98%). Opposingly, regardless of the number of follow-up times and number of trajectory classes, alternative LCGM analyses were highly biased with low coverage of their confidence interval (between 2% and 67%).

Conclusions: The combination of LCGM with marginal structural model is a convenient way to describe treatment adherence and can effectively control time-dependent confounding. Moreover, it can be implemented using standard software such as SAS or R.

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Impact of COVID 19 on Patient Support Programs

Serena N, Julseth H

In an effort to better understand the impact of COVID-19 on Patient Support Programs (PSPs), Waldron & Associates conducted a multi-phase survey series throughout the COVID-19 pandemic. The Phase One survey was successfully piloted in April 2020, just weeks after the initial COVID-19 outbreak in Canada. An accompanying Phase Two survey was conducted in June 2020, to better understand the evolving impact of COVID-19 on PSPs. Finally, the Phase Three survey was rolled out in September 2020. The September 2020 survey received 28 responses, with respondents belonging to more than 20 different companies, largely Pharmaceutical Manufacturers or PSP Program Suppliers/ Providers. The majority of respondents (79%) were Pharmaceutical Manufacturers. The respondents each had programs located in Canada and varied in size, running anywhere between a single program to over 10+ programs. Key findings of the September 2020 survey highlighted that, even six months following the initial COVID-19 outbreak, PSPs have continued to play a key role for the Pharmaceutical Industry. Specifically, PSPs have acted as an essential tool for navigating ongoing patient care and support during challenging times. This shift in focus has therefore helped to establish PSPs as a fundamental aspect of patient access and care throughout the COVID-19 pandemic, resulting in innovative changes that will continue to have lasting impacts on the future of the Pharmaceutical Industry.

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Biosimilars in Canada: building momentum in the wake of recent switching policies

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Withdrawn by author

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The risk of urinary tract infections associated with the use of sodium-glucose cotransporter-2 inhibitors: A cohort study using real world data

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Objectives: To assess the association between sodium-glucose cotransporter-2 inhibitors (SGLT2-i) use and urinary tract infections (UTIs) among type 2 diabetes patients.

Methods: We conducted a population- based cohort study using primary care data from the UK's Clinical Practice Research Datalink (CPRD), and administrative healthcare data from Alberta (AB), Canada. In five comparator cohorts, we defined exposure as new use of SGLT2-i or an active comparator between 2013-2018, among new metformin users. These comparators were dipeptidyl peptidase-4 inhibitor (DPP4-i; primary cohort), sulfonylureas (SU), glucagon-like peptide-1 receptor agonists (GLP1-RA), thiazolidinediones (TZD), and insulin. We used hospital, emergency department (AB only), and physician visit records to define a composite UTI outcome. We adjusted for confounding using high-dimensional propensity score matching and estimated the hazard ratios (HR) using cox proportional hazards regression. We combined aggregate data across databases using used random-effects meta- analysis.

Results: In the primary cohort, we included 29,256 patients from CPRD and 20,417 patients from AB. Upon matching, there were 7,432 well-balanced pairs in CPRD (mean age [SD]=57.5 [11.1]; 42.3% females) and 7,407 in AB (56.6 [1.1]; 38.9%). SGLT2-i use was not associated with a higher risk of UTI compared to DPP4-i (pooled HR 0.99, 95% CI 0.77,1.28), SU (pooled HR 0.84, 95% CI 0.67,1.05), GLP1-RA (pooled HR 0.80, 95% CI 0.58, 1.11), or TZD (pooled HR 0.79, 95% CI 0.50, 1.24). The risk of UTI was lower compared to insulin (pooled HR 0.59, 95% CI 0.44, 0.79).

Conclusion: The use of SGLT2-i compared to other antidiabetic agents is not associated with an increased risk of UTIs.

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Building blocks for a national pharmacare: coverage of CDR-reviewed medicines in Canadian public and private drug plans

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Withdrawn by author

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Exploring associations between polypharmacy and COVID-19-related hospitalizations and deaths: a population-based study among community-dwelling older adults in Quebec

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Background: Older adults and those with chronic diseases were the most affected by the first waves of COVID-19. These people are often exposed to several concomitant medications (polypharmacy). The aim of this study was to study the association between polypharmacy and the risk of hospitalization and death in confirmed cases of COVID-19 in the community-dwelling population aged 66 and over in Quebec, Canada.

Methods: Using the Quebec Integrated Chronic Disease Surveillance System, we included all confirmed cases of COVID-19 whose diagnosis was made between 2020/02/23 and 2021/03/15, and who were aged 66 years and over, living in community, and covered by the public drug insurance plan. We counted the number of different medications claimed between 01/04/2019 and 31/03/2020. We used Robust Poisson regression to calculate relative risk of hospitalization and death, adjusting for age, sex, comorbidities, material and social deprivation index and living arrangements.

Results: Of the 32,476 COVID-19 cases included, 10,350 (32%) were hospitalized and 4,146 (13%) died. Compared with people using 0-4 medications, polypharmacy exposure was associated with increased hospitalizations, with relative risks ranging from 1.11 (95% CI:1.04-1.19) for those using 5-9 medications to 1.62 (1.51-1.75) for those using 20+. Similarly, the risk of death increased steadily with the number of medications, from 1.13 (0.99-1.30) [5-9] to 1.97 (1.70-2.27) [20+]. An increased risk was mainly observed in groups of younger individuals.

Conclusions: Polypharmacy may represent a significant marker of vulnerability to COVID-19 adverse events, either because of the iatrogenic risk it entails, or as an indicator of multimorbidity severity.

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Measuring the impact of the Canadian Network for Observational Drug Effect Studies (CNODES): A case study using bibliometrics and altmetrics

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Background: Bibliometrics and alternative metrics (altmetrics) can be used to support impact narratives of research networks like CNODES. They provide a range of indicators based on citations and mentions in news, social media and policy documents that offer insight on research activities and performance. Using these three approaches, this case study measures the scientific and community impact of research performed by the Canadian Network for Observational Drug Effect Studies (CNODES), which studies the effects of marketed drugs in Canada and beyond.

Methods: Bibliometric data from 95 CNODES publications was collected from Microsoft Academic Graph to measure indicators like the citation score of a publication. Altmetrics, such as the number of mentions in blogs, policy documents, and social media, were measured using Altmetric.com, the visibility of CNODES members in the news was assessed with the Canadian Newsstream database.

Results: CNODES publications are cited approximately 2.75 times more than the field average, and 24% of CNODES publications are among the top 5% most cited in their field and year. Altmetrics show that CNODES publications have above-average media visibility, particularly on social media and in policy documents. CNODES authors who have participated with the CNODES network were mentioned 2,799 times in Canadian news media.

Conclusions: Bibliometrics, media analysis, and altmetrics were applied to CNODES research to better understand the impact and type of attention this research receives. Researchers may use these tools further to identify core audiences and measure the impact of key messages from their research.

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Depression and anxiety-related healthcare costs associated with treatment patterns among patients with moderate-to-severe psoriasis: A retrospective cohort study in Quebec, Canada

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Introduction: Moderate-to-severe psoriasis is managed with conventional systemic agents (CSA) and/or Tumor necrosis factor inhibitors/ustekinumab (TNFi/UST) when CSA are ineffective. Failure of these treatments may trigger depression and depression in turn may exacerbate psoriasis. Depression-related costs associated with treatment patterns have not been previously assessed.

Methods: Using Quebec's provincial health administrative databases (2002-2015), we included patients with psoriasis who initiated on a CSA and followed them for two years. We divided the follow-up into 24-month intervals. Five treatment groups were assessed: 1 TNFi/UST+1 CSA, 1 TNFi/UST, 2 CSAs, 1 CSA or other. Sequence and Hierarchical cluster analyses were used to group patients with similar trajectories into clusters. Costs associated with depression including out-patient, inpatient and emergency department visits, and psychotropic agents' use were assessed from the healthcare system perspective. Two-part regression models were used to determine the mean cost difference between the different trajectories.

Results: This study included 1,284 patients and six treatment trajectories were identified. Compared to the CSA persistent trajectory, CSA discontinuation within the first year was associated with lower depression-related costs (mean cost difference -76.8%, $p<0.05$), while the trajectories switch to a TNFi/UST, receiving TNFi/UST or a second CSA as add-on, CSA discontinuation after one year and discontinuation-then-restart of CSA were associated with higher depression-related healthcare costs (mean cost difference: 572.5$, 340.2$, 335.6$ and 312.5$ respectively, $p<0.01$ each).

Conclusions: Depression-related healthcare costs were the highest among patients with moderate-to-severe psoriasis who had a 'switching' CSA treatment pattern compared to those with a 'persistent' pattern.

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Treatments for COVID-19: the pipeline and beyond
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Withdrawn by author

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Playing catch-up: where Canada stands three years into the pCPA–CGPA generics pricing initiative

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As generic medicines do not face the same level of price regulation as patented medicines in Canada, their prices have historically been much higher here than in international markets. Generic pricing policies, initially led by individual provinces and later negotiated collectively through the pan-Canadian Pharmaceutical Alliance (pCPA), have gradually reduced the prices of generic medicines in Canada since 2010, resulting in substantial cost savings for all Canadians. In 2018, a joint initiative between the pCPA and the Canadian Generic Pharmaceutical Association (CGPA) was launched, bringing the prices of 67 of the most commonly used generic medicines to 10%–18% of the price of their brand-name originators. Early analyses have indicated that this initiative succeeded in bring generic prices closely in line with international levels. This presentation assesses its impact to the end of 2020, in terms of both domestic public and private drug plan spending, and conducts a comparative international price analysis with foreign markets. Public plan data is taken from the NPDUIS Database at the Canadian Institute for Health Information (CIHI) and private plan data from the IQVIA Private Pay Direct Drug Plan Database. IQVIA MIDAS® data is used to analyze Canadian generic drug utilization and pricing, in comparison to the PMPRB's new basket of 11 comparator countries as well as the broader OECD. This presentation is intended to foster discussions on government–industry cooperation in Canada's healthcare sector by providing policy makers and other stakeholders with quantifiable assessments of the progress made in aligning Canadian generic prices with other countries.

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Expensive drugs for rare diseases: insights into a vital and rapidly growing market segment

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Withdrawn by author

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Patterns of antipsychotic dispensation to residents of long-term care facilities in Nova Scotia, Canada including after a fall-related hospitalization

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Background: Antipsychotic medications are commonly prescribed to long-term care facility (LTCF) residents despite risk of adverse events. Study objectives included describing antipsychotic medication dispensing patterns and assessing predictors of antipsychotic continuation after a fall-related hospitalization in LTCF residents.

Methods: This was a retrospective cohort study of Nova Scotia Seniors Pharmacare Program (NSSP) beneficiaries aged 66 years and older residing in a LTCF who were dispensed an antipsychotic between April 1, 2009 and March 31, 2017. The NSSP Database and Canadian Institute of Health Information Discharge Abstract Database were linked identifying antipsychotic dispensations and fall-related hospitalizations. Dispensations were reported as counts and proportions. Predictors for continuing an antipsychotic after a fall-related hospitalization (sex, length of stay, days supplied, age, year of admission, rural/urban) were analyzed with logistic regression. Analysis was completed with SAS version 9.3.

Results: Over the study period 19,164 NSSP beneficiaries were dispensed at least one antipsychotic medication. Residents of LTCF comprised 90% of those dispensed an antipsychotic (N=17,201). In each year approximately 40% of NSSP beneficiaries (mean N=2,637) residing in LTCF received at least one dispensation of an antipsychotic. Quetiapine (39.3%) and risperidone (35.7%) were dispensed most frequently. Women were dispensed significantly more antipsychotics at all ages.

Of the identified 544 fall-related hospitalization survivors, 439 (80.7%) continued an antipsychotic after discharge. Decreased age was associated with continuing an antipsychotic after a fall-related hospitalization (OR 0.941, 95%CI [0.910-0.973]).

Conclusions: Antipsychotic dispensation to LTCF residents and continued dispensation after a fall-related hospitalization in Nova Scotia is an area requiring intervention.

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Utilization of COVID-19 related funding modifications for systemic cancer therapies in Ontario, Canada

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Background: Ontario Health (Cancer Care Ontario)'s New Drug Funding Program (NDFP) is the primary funding program covering injectable cancer therapies administered in outpatient hospital clinics. To qualify for funding under NDFP, patients must satisfy explicit clinical criteria. A series of interim funding modifications were introduced beginning March 2020 due to COVID-19 to allow clinicians to adapt treatment plans in light of capacity constraints and infection risks. Using NDFP data, we assessed utilization of COVID-19 related funding modifications between March 2020-March 2021.

Methods: For most types of NDFP funding modifications, hospitals were required to submit a patient-specific "prior approval" request via the program's online adjudication system. Prior Approvals referencing "COVID" or "pandemic" were identified in NDFP data and categorized by type of modification. The Prior Approval request submission date was used to identify new patients and capture subsequent treatment claims by drug and indication.

Results: During the study window, COVID-19-related modifications were requested for 1116 patients receiving 63 unique drug-indications funded through NDFP. The number of treatment claims following COVID-19 related modifications was <3% of all treatment claims in the NDFP per month. The most common funding modification was to extend dosing intervals for immunotherapies to reduce clinic visits.

Conclusions: The interim funding modifications for NDFP implemented during the pandemic have helped support the continued delivery of cancer care within Ontario across a range of treatment settings and cancer types. Future evaluations leveraging these data are planned to assess clinical outcomes and inform future practice.

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Hydrochlorothiazide use and risk of non-melanoma skin cancer (NMSC)

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Background: Hydrochlorothiazide increases skin sensitivity to sunlight and potentially can increment skin cancer risk. We compared the risk of NMSC associated with hydrochlorothiazide versus angiotensin-converting enzyme inhibitors (ACEi).

Methods: From United States private (Commercial) and Medicaid MarketScan® health plan data, we identified two cohorts of adults initiating hydrochlorothiazide or ACEi therapy between January 2011 and December 2017. Subjects were followed from one year after the first filled hydrochlorothiazide or ACEi prescription, until the first event, at discontinuation or change of the initial therapy, loss of health plan coverage, end of study period, or death. Incident NMSC was defined using diagnostic and procedure codes. We estimated crude incidence rates and hazard ratios (aHR) based on multivariable Cox PH model with 95% confidence intervals (CI) adjusted for age, sex, calendar year, region of residence (Commercial only), comorbidities, past use of photosensitizing and/or immunosuppressant drugs, and race/ethnicity (Medicaid only).

Results: In the Commercial cohort (N=1,746,662), NMSC incidence (per 100 person-years) was 1.01 (95% CI 0.98-1.04) for hydrochlorothiazide and 1.05 (95% CI 1.03-1.08) for ACEi. NMSC incidence was lower in Medicaid data (N=254,267), particularly in blacks (4.6/100,000 person-years, 95% CI 2.89-7.28). In Medicaid, most ACEi users were white (N=79,905, 53.5%), while most hydrochlorothiazide users were non-white (N=57,572, 54.9%). NMSC risk was not significantly different for hydrochlorothiazide versus ACEi (Commercial aHR 0.96; 95% CI 0.93-1.00; Medicaid aHR 1.08; 95% CI 0.86-1.35).

Conclusions: NMSC risk and antihypertensive use may differ greatly by race/ethnicity, which should be considered in pharmacoepidemiologic analyses like ours. Even adjusting for race/ethnicity, we were unable to detect a differential NMSC risk between hydrochlorothiazide and ACEi.

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Muscle toxicity with sodium glucose co-transporter 2 (SGLT-2) inhibitors and statins: a disproportionality analysis of spontaneous adverse event reporting databases

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Withdrawn by author

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Polypharmacy and potentially inappropriate medications in older adults living in rural regions: a population-based cohort study

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Background: Polypharmacy, defined as the concurrent use of multiple medications, and the use of potentially inappropriate medications (PIMs) are associated with negative health outcomes in older adults. Advanced age and comorbidities are risk factors for polypharmacy and PIM exposure; however, studies are limited on the effect of material and social deprivation and rurality (municipalities with less than 10,000 inhabitants).

Methods: We conducted a population-based study in the province of Quebec (Canada) in older adults (≥66 years) alive and covered by the public drug insurance plan from April 1st, 2015 to March 31st, 2016 (more than 90% of the Quebec older population). Polypharmacy was defined as having ≥10 different medications prescribed during a year; PIMs were defined using the 2015 Beers criteria. We used logistic regression to identify associated factors while controlling for sex, age, and comorbidities. Sensitivity analyses were conducted using thresholds of ≥15 and ≥20 medications for polypharmacy.

Results: Out of 1,101,732 included older adults, 246,746 (22.4 %) lived in rural regions. Of those, 38.9 % were exposed to polypharmacy and 50.0 % used at least one PIM. Living in a rural region was associated with polypharmacy (OR: 1.19; 95 % CI: 1.18-1.21) and PIM use (OR: 1.20; 95 % CI: 1.19-1.22). Living in more socially and materially deprived areas was also associated with both issues. Sensitivity analyses showed stronger associations with higher polypharmacy thresholds.

Conclusions: Rurality and material and social deprivation were significantly associated with polypharmacy and PIM use. Deprescribing interventions targeting these populations may be relevant.

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Pharmacist's Prescribing Activities and Characteristics of the Patients Accessing Pharmacist Prescribing Services

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Background: In Nova Scotia, pharmacists' scope of prescribing practice has expanded, creating uncertainty to the extent prescribing activities have been adopted into practice. This study describes the prescribing activities of community pharmacists and the characteristics of patients using pharmacist prescribing services.

Methods: Administrative health data from the Drug Information System identified a cohort of community pharmacists who have prescribed and a cohort of patients using pharmacist prescribing services. Pharmacist prescribing was assessed in each of the three fiscal years from April 1, 2017 to March 31, 2020. Descriptive analysis included cross-tabulations with chi-square and Kruskal-Wallis tests carried out to examine differences.

Results: A total of 1185 pharmacists were identified as prescribers. First prescribing events (FPEs) for patients increased over time with a mean 261.4 in year one to 347.3 per pharmacist in year three ($p<.0001$). Pharmacists in rural areas prescribed more frequently (mean of 1058 FPEs/pharmacist) than those in urban areas (mean of 740) over the study period ($p < .001$).

The patient cohort identified 372,203 individuals. There were more FPEs for older age groups (mean 4.3 versus 1.7 for those 80+ compared to <18 years, respectively). FPEs were more frequent for those with more comorbidities (>2, 2, 1, and 0 comorbidities corresponded to a mean of 4.3, 3.2, 3.1, and 2.2).

Conclusion: This study demonstrated an increase in pharmacist prescribing over a 3-year period. Those of older age or multiple comorbidities used prescribing services most often. Pharmacist prescribing is an important access point for primary care.

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Health utilities in burn injury survivors: A systematic review

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Background: There are an estimated 11 million burn injuries requiring medical attention every year worldwide. Although potentially deadly, burn injuries are now considered a chronic disease with multiple lifetime physical and psychological sequelae. However, it remains unclear how these events affect patients' utility scores. We aimed to conduct a systematic review to summarize the utility scores of burn injury survivors.

Methods: We conducted on March 18th, 2020 a systematic review of the published literature using a search strategy designed in collaboration with a research librarian (FB). Our search strategy aimed to identify studies that provided burn injury survivors' utility scores via a standardized indirect instrument.

Results: We identified 15 studies that reported burn injury survivors' utility scores. Most studies used the EQ-5D instruments to assess patients' utility scores. Results varied substantially between studies, ranging from a low of 0.11 to a high of 0.94. Our review identified two key trends. First, utility scores seem to be negatively correlated with the severity of the burn injury. Second, utility scores in adults tend to increase in function of the time since injury.

Conclusion: Unfortunately, due to differences in study design and settings, patient populations and instruments used to assess patients' utility scores, we were unable to combine all study results into a single value. In spite of this limit, results we identified support previous trends identified by others regarding the relationship between utility scores and the burn injury severity and/or the time since injury.

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Prescribing patterns among in-person vs virtual primary care visits pre- and post-COVID-19 in Ontario, Canada

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Background: The COVID-19 pandemic led to a shift towards virtual visits for primary care. This study aimed to understand the impact of COVID-19 on prescription patterns for in-person vs virtual visits in a primary care setting in Ontario, Canada.

Methods: Using the IQVIA EMR database, prescriptions patterns among patients pre- and post-COVID-19 were assessed using an index date of March 15, 2020. Patients were included if they had ≥1 medical visit in the 5 years prior to March 15, 2019, were ≥18 years old at index, ≥1 diagnosis of ambulatory care sensitive conditions or mental illness within 5 years prior to index date, and ≥1 medical visit 12 months pre- or post- index. In-person and virtual visits were compared by the number of patients with a least one prescription, and the mean number of prescriptions per person.

Results: Pre- vs post-index, the number of in-person visits decreased (31,441 vs 17,192), while the number of virtual visits increased (5,200 vs 10,408). The proportion of patients with ≥1 prescription decreased for both in-person (81% vs 71%) and virtual visits (62% vs 52%, $p<0.0001$). The mean number of prescriptions for in-person visits dropped 24.1% pre- vs post-index (10.4 vs 7.9, $p<0.0001$), while it increased for patients with virtual visits (3.0 vs 3.3, $p<0.0001$).

Conclusion: Our study reported fewer patients receiving prescriptions in both patient groups. However, the mean number of prescriptions increased slightly among the virtual care cohort. Future research should examine the impact of virtual vs in-person visits on patient outcomes.

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Management of uncertainty in CADTH recommendations on drugs for rare diseases

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Background: Drugs for rare diseases (DRDs) present unique challenges for traditional HTA approaches, leading many international agencies to develop DRD accommodations, including greater acceptance of evidence uncertainty and higher willingness-to-pay (WTP) thresholds. This study sought to understand how CADTH applies DRD accommodations allowed by their procedures, with the objective of informing future policy.

Methodology: CADTH recommendations completed between January 2017 – March 2021 for drugs with orphan designation were reviewed based on predefined variables: unmet need, clinical uncertainty, economic evidence, and clinical expert and patient input to identify accommodations made for DRDs.

Results: 36 DRD recommendations were reviewed. Only 14 were explicitly recognized as 'rare' by CADTH in the recommendation and reasons and no explicit DRD accommodations were identified.

89% (n=32) received 'reimburse with condition/criteria' while 11% (n=4) received negative recommendations. While clinical uncertainty was cited for all DRDs, insufficient evidence on meaningful endpoints was the primary reason for negative recommendations. No positive recommendations were associated with requests for further evidence generation to address uncertainty.

Price reductions were recommended in all cases (mean 70%), with over 75% referencing an ICER of $50,000 per QALY, suggesting no accommodation in terms of WTP.

Conclusion: This analysis highlights the opportunity to transparently apply considerations for significant unmet need in CADTH's procedures to DRD reviews and the difficulty in applying HTA methods to DRDs without a dedicated framework. Conditions of evidence generation and alternative WTP thresholds could also be considered as part of a modified HTA approach to manage uncertainty for DRDs.

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Mental health-related healthcare costs among patient with psoriasis initiated on conventional systemic agents before and after the introduction of biologic agents on the provincial drug formulary for psoriasis

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Chronic and high dose opioid prescribing patterns for non-cancer patients in primary care practices in Nova Scotia, Canada from 2011-2018

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Background: Canadian opioid guidelines recommend limiting initial opioid prescriptions to less than 90 morphine milligram equivalents (MME) daily to reduce known risks associated with chronic opioid therapy (COT) and high-dose opioid therapy (HD-COT). The objective was to report opioid prescribing patterns from electronic medical record (EMR) data from 2011-2018.

Methods: Data from EMRs of participating primary care providers of the Canadian Primary Care Sentinel Surveillance Network in Nova Scotia, Canada were extracted. Patients were included if aged ≥ 18 years, and had visited their primary care provider in the past 2 years without a cancer or palliative care diagnosis. COT was defined as opioid therapy with a total duration of ≥84 days in the year, and HD-COT was defined as >90 MME per day on average. Trends were analyzed using the Cochran-Armitage test.

Results: Records from approximately 350,000 patients (mean 44,553 patients/year) met inclusion criteria and were extracted. Patients prescribed any opioid decreased from a maximum of 6.1% (2660/43,430) in 2013 to 4.7% (2129/44,880) in 2018 ($p<0.0001$). COT prescribing changed from 2.5% (1019/41,211) in 2011 to 2.6% (1154/44,880) in 2018 ($p=0.999$). HD-COT prescriptions comprised 29.2 – 34.1% of the annual COT prescriptions ($p=0.403$). The top three prescribed opioids in 2018 were hydromorphone (27.8%), oxycodone/acetaminophen (19.2%) and codeine/acetaminophen (17.2%) combinations.

Conclusions: COT/HD-COT prescribing patterns can help primary care providers compare their practice to their peers, identify high-risk patients or resources needed to manage opioid therapy. Future research will examine the prevalence of urine drug screening and concurrent sedative/hypnotic therapy.

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Effect of two different types of exercise volumes on exercise capacity, physical activity and quality of life in subjects undergoing percutaneous coronary intervention

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Background and Purpose: phase II of cardiac rehabilitation includes 36 sessions of exercise developed over 12 weeks, an intervention format that seems to be based on historical practice and not on scientific evidence. The objective was to evaluate the effect of two different types of exercise volumes on exercise capacity, physical activity levels, and quality of life in subjects undergoing percutaneous coronary intervention.

Methods: A randomized controlled clinical trial was performed in 17 subjects, who were randomly assigned to two groups. The first (n = 7) was trained 8 consecutive weeks and the second (n = 10) 12 weeks. The six-minute walk test, the International Physical Activity Questionnaire and the SF-36 were applied before starting the cardiac rehabilitation program, at 8 and 12 weeks.

Results: No significant differences were found between the intervention groups. The rise of VO2 max was only significant in the 8-week-group. Both groups improved the distance walked, and sedentary behavior. The 12-week intervention group improved the quality of life, specifically in the domain of physical functioning, and the 8-week intervention group in the domains of social function, physical and emotional role. Finally, the percentage of participants meeting physical activity recommendations was higher in the 12-week cardiac rehabilitation group.

Conclusions: The implication for the practice is that the exercise traditionally used in cardiac rehabilitation shows early changes in exercise capacity and quality of life. The results of the levels of physical activity and sedentary behavior improved after 12 weeks of rehabilitation without the presence of adverse events

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Benzodiazepine use in patients authorized for medical cannabis in Alberta, Canada

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Withdrawn by author

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Clinical outcomes and health system costs associated with leukemia and lymphoma care in Ontario: A population-based observational study

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Background: Approximately, 17,700 Canadians were diagnosed with either leukemia or lymphoma (L/L) in 2019, 43% of whom were from Ontario. Progressive advances in the treatments of cancer have led to a marked increase in survival rates, albeit at a very high monetary cost. Is it wise to publicly fund expensive therapies? Answering this requires an understanding of clinical outcomes and health system costs of currently offered treatments for L/L, unfortunately which have not been systematically studied for Ontario.

Objectives: 1. Estimate incidence of L/L in Ontario; 2. Describe patterns of care and clinical outcomes of L/L patients; 3. Estimate overall health system costs associated with L/L care; 4. Estimate attributable all-cause mortality and net health-system costs of L/L care.

Methods: The study includes records of around 44,000 patients from the Ontario Cancer Registry who were diagnosed with L/L as primary cancer. The matched sample of controls are randomly selected from the Registered Persons Database. Direct standardization methods are used to estimate L/L incidence rates. Cohort and period survival methods are used to describe and estimate the time-to-event outcomes. Annual aggregate health-system costs, phase-specific costs, and lifetime cost-per-patient are calculated using patient-level case costing methodology. Propensity score methods are used to elucidate the level of monetary costs and outcomes attributable to L/L.

Expected results: This study presents a complete picture of clinical outcomes and costs of L/L for Ontario.

Conclusions: The results of this study would inform healthcare providers in predicting and communicating the likely trajectory of L/L care.

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Using real-world data to determine preliminary health system costs of Canadian women screened for breast cancer

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BACKGROUND: The multi-institutional study “Personalized risk assessment for prevention and early detection of breast cancer: Integration and implementation” consists of four activities (1-4) in which the objective of Activity 4.2 was to determine the real-world costs associated with screening women for breast cancer (BC) in Ontario using provincial databases
.

METHODS: We identified the earliest screening mammogram among women aged 49-74 years of average-risk for BC between 1-January-2013 and 31-December-2019 using physician billings, and followed for 8-months (i.e., screening episode (SE)). SEs were stratified by Ontario Breast Screening Program (OBSP) vs. non-OBSP screening, and if negative or positive. A positive SE was characterized by any follow-up diagnostic procedure (e.g., ultrasound, CT/MRI or biopsy). Overall and mean cost per woman for each of the four cohorts (CAD 2021) were determined for all encounters using standard fee-for-service amounts. Additional costs included OBSP program and overhead.

RESULTS: There were 1,546,386 women identified (median age 59 years) with negative OBSP (74%), positive OBSP (13%), negative non-OBSP (11%) and positive non-OBSP (3%) screening episodes. Over the six-year period, the overall total cost to screen was $234.4 million and 74.3% of costs were due to screening. The OBSP group was responsible for screening 1.3 million women, $202.9 million in total costs, 85.4% screened negative and mean cost per negative/positive OBSP screen was $112/$384, respectively. The non-OBSP group was responsible for screening 206,249 women, $31.5 million in total costs, 79.1% screened negative and mean cost per negative/positive non-OBSP screen was $117/$287, respectively.

CONCLUSIONS: These preliminary screening cost results stratified by OBSP/non-OBSP and negative/positive and are currently being further investigated and clinical implications will need to be considered

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Historical and projected spending on drugs for rare diseases in Canada between 2010 and 2025

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Background: Rare diseases (life-threatening, debilitating, or serious chronic conditions with prevalences of ~50/100,000 people) affect approximately 8.3% of Canadians. However, Canadians only gain access to approximately 60% of drugs for rare diseases (DRDs), which is partially related to payer concerns regarding affordability and high per-patient costs. Limiting access to DRDs dramatically reduces survival and quality of life among patients and their caregivers. We projected Canadian DRD spending relative to public drug spending to provide perspective for decision-makers.

Methods: Historical Canadian-marketed DRDs (2010-2020) were identified using definitions from the EMA orphan drug database. Pipeline DRDs (2021-2025) were identified using the EMA and FDA databases. Public claims data, published prevalence rates, and regulatory and health technology assessment factors were used to estimate DRD spending, which was compared to total Canadian public drug spending.

Results: We identified 164 DRDs. Public DRD spending grew from $14.8 million in 2010 (11 DRDs) to $380.9 million in 2020, $527.6 million in 2021, and $1.6 billion in 2025 (164 DRDs). Projected DRD spending increased from 2% of $15 billion total public drug spending in 2019 to 8.3% of $19.4 billion in 2025. These projections ignore confidential manufacturer discounts and health outcome-related cost offsets.

Conclusions: Projected DRD spending is in line with the proportion of Canadians afflicted with rare diseases and is likely overestimated because it does not consider manufacturer discounts or health outcome-related cost offsets. Limiting DRD access is not aligned with patient or societal values and creates unfair treatment gaps in Canada’s healthcare system.

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