2023

Greenshield Administration Drug Trends Report

Emerging trends in drug claims, specialty drugs, biologics and biosimilars, as well as the impact of new therapies.

GreenShield™ Administration

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Introduction

Section 1

Welcome to our fourth annual Drug Trends Report

GreenShield was started by Windsor, Ontario pharmacist William Wilkinson in 1957, with a simple yet significant purpose: To champion better health for all. He believed that all Canadians deserved affordable access to health care. He innovated to support this need by introducing the first pre-paid drug plan in North America and established the company as a not-for-profit from the outset.

GreenShield's Evolution

Innovation and a focus on helping those in need continue to be core to GreenShield's ethos. As the needs of Canadians have evolved, we have evolved to become Canada's only integrated health and benefits organization (the industry term is "payer-provider"). We have combined over 65 years of expertise in health and dental plans, administering benefits and paying claims (as a "payer"), with health services such as mental health, pharmacy, and medical services (as a "provider"). Integrating both sides of the payer-provider equation enables us to simplify access to care, remove administrative barriers, and improve health outcomes.

GreenShield Administration

This year's report is branded GreenShield Administration, to reflect the amalgamation of our best-in-class expertise in health and benefits administration across pharmacy benefits management, claims adjudication and benefits administration. GreenShield Administration is an influential leader in total health benefits management, unique in its ability to offer a full end-to-end suite of integrated health and benefits technology and services to customers of all sizes. As our business model and capabilities evolve, our annual Drug Trends Report brings you deeper insights and data, and valuable commentary on the latest trends in the industry.

The 2023 Drug Trend Report

Our Drug Trend Report underscores GreenShield's commitment to closely monitor emerging trends in the drug landscape, to proactively innovate and adapt our offerings. This year's report provides never-seen-before insights based on the +32 million claims adjudicated by GreenShield Administration this year*. It includes updates on trends related to specialty drugs, biologics, and biosimilars as well as the impacts of new, costlier, chronic disease therapies. As suspected, utilization rates continue to rise, driven by these new therapies and changes in how plan members approach their health care. A new addition to this fourth annual report is a deep dive into the prevalence of mandatory generic substitution in drug plans. Surprisingly, this cost-savings measure remains untapped in many drug benefit plans.

*Data for this analysis was conducted by IQVIA based on claims reported by GreenShield Administration.

Key Insights

Cost concentration appears to be intensifying, with over 50% of costs attributed to 5% of claimants, and over 30% of costs attributed to 1% of claimants. A large percentage of these high-cost claimants have been high-cost claimants for three or more consecutive years. This trend indicates an opportunity for enhanced patient support through strategies such as comprehensive case management provided by specialty pharmacies, and new practices for prior authorization, step therapy, and Product Listing Agreements (PLAs).

The report also reveals three therapeutic categories that are likely to have a high impact on private benefit plans in 2023:

- **ADHD, migraines and asthma:** ADHD: In 2022, the number of ADHD claimants grew by nearly 15%, with six of every 100 claimants now using ADHD medications.
- **Migraines:** Biologic migraine treatments, like Botox, pushed up the existing migraine patients' overall drug cost by over $9 million (+132%).
- **Asthma/Chronic obstructive pulmonary disease (COPD):** Medications primarily used for asthma/COPD were claimed by 16% of claimants in 2022.

In addition, diabetes now represented the second-largest share of drug costs within the top 5% of claimants. This is due to the high prevalence of the disease coupled with an escalating cost of treatment per patient driven by utilization of newer antidiabetic agents, such as Ozempic.

Shaping the future together

As always, we are committed to providing key insights on benefits utilization rates and the impact of cost-management measures that can help you better serve your clients and plan members today, and in the future.

Thank you for your continued trust in us as your source for navigating pharmacy benefits management.

Together, we look forward to shaping the future of health care with informed decisions to unlock **Better Health for All.**

Mark Rolnick, Executive Vice President
Head of GreenShield Administration

Charles Rosen, Senior Vice President,
Managing Director of GreenShield Administration

Terminology

Term	Definition
Biologic drug	A drug product that is produced from living organisms.
Biosimilar	A biologic drug that is highly similar to another biologic drug known as the "originator" biologic. Biosimilars are produced after patent expiry of the originator biologic.
Biosimilar penetration rate	Proportion of claims that were filled for biosimilar drugs.
Brand-name drugs	Also called "innovator" or "reference" drugs. These drug products are initially marketed as new chemical entities. They are the first version sold by a single manufacturer that, in most cases, originally researched and developed the drug. The innovator drug is granted a patent which protects it from generic drug competition for a specified number of years to allow the manufacturer to recover the costs associated with developing the new drug.
Case management	A specialty pharmacy value-added service that coordinates patient-specific medical needs over the lifespan of their illness. These services may vary depending on the individual and specific illness but are designed to complement the patient's current health care team and journey.
Claimant	Any covered individual who has submitted at least one claim.
Generic drug	A copy of a brand-name drug which is produced after the "innovator" drug patent expires. The generic drug is pharmaceutically equivalent to the brand-name drug: it contains the identical medicinal ingredients, in the same amounts, and in a similar dosage form. Generic medications may have different non-medicinal ingredients than the brand-name drug, but these must not affect the safety, efficacy, or quality of the drug compared to the brand-name drug. There may be many generic versions of the same brand-name drug, and these are usually available at a lower cost.
Generic penetration rate	Measures the percentage of multi-source products (where generic alternatives are available) that were filled with a generic product.
Generic share of claims	Measures the percentage of the total number of claims made up of generic products.
Glatiramer (Copaxone® or Glatect®)	Glatect and Copaxone are non-biologic complex drugs (NBCDs); however, biosimilar policies often apply to these molecules. As a result, in this report, references to an originator biologic include Copaxone, and references to a biosimilar include Glatect.

Terminology

Term	Definition
Mandatory generic substitution	A common drug plan feature whereby the drug cost cannot exceed the price of the lower-cost alternative drug, which is typically a "generic" drug, even if the doctor writes "no substitution" on the prescription. This encourages patients to take the lower-cost, generic drug wherever possible.
Multi-source products	These are brand-name drugs that are no longer protected under patent exclusivity and have one or more therapeutically equivalent generic(s) available (marketed by different pharmaceutical manufacturers). Once the patent expires, the generic drug product can be substituted for the brand-name product.
Non-specialty drug	Refers to drug products that cost less than $10,000 per claimant. The cost is solely determined by its annual average claimant cost without dispensing fees.
Originator biologic	Biologic drug that is first to market. Sometimes referred to as the "reference" biologic or "innovator" biologic.
Single-source products	Drug products for which the patent has not yet expired (or has certain exclusivities), so that only one manufacturer can make it. Single-source drug products are usually brand-name drug products.
Specialty drug	Refers to drug products that cost $10,000 or more per claimant. The cost is solely determined by its annual average claimant cost without dispensing fees.
Specialty pharmacy	A pharmacy with expertise in managing complex diseases that require usage of high-cost biologics and other specialty drug products.
Total drug cost	Amount paid by the plan and patient. Includes drug costs, markups, and dispensing fees.

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Drug utilization trends

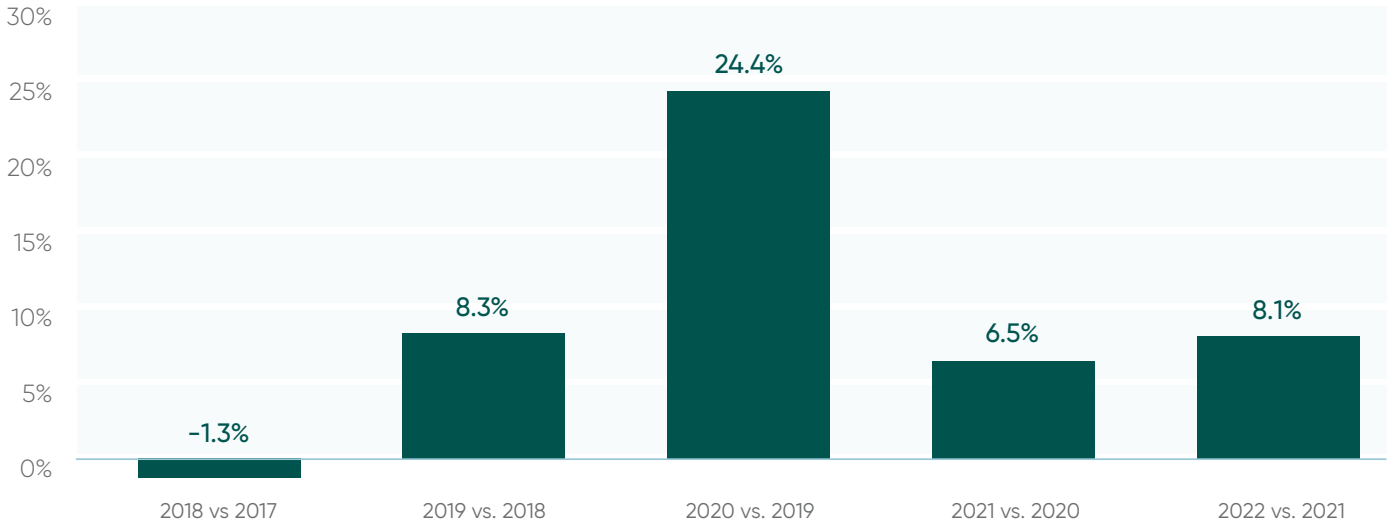
Section 2

Overall trends

Since 2018, the total drug costs adjudicated by GreenShield Administration have risen from about $1.4 billion to $2.2 billion in 2022. At the same time, the number of claimants has increased from 1.8 million to 2.3 million. As outlined in Figure 1, there was an 8.1 per cent growth in total adjudicated drug cost between 2021 and 2022.

FIGURE 1

Year-over-year growth in total adjudicated drug cost, 2018 to 2022



The number of overall drug claims adjudicated by GreenShield Administration surpassed 32 million in 2022. The average drug cost per claim has grown steadily since 2018; except in 2020, when temporary COVID-19-related policies allowing shorter days' supply (i.e., 30 days) were implemented reducing the average days' supply per claim and resulting in a lower drug cost per claim. Once these policies were lifted during the second half of 2020, the average days' supply normalized and subsequently resulted in a greater drug cost per claim in 2021 and 2022 compared to 2020. In 2022, the 0.6 per cent increase in cost per claim was offset by a 2.3 per cent reduction in claims per claimant resulting in a decrease in average drug cost per claimant (Table 1 following page).

The number of overall drug claims adjudicated by GreenShield Administration surpassed 32 million in 2022.

TABLE 1

Total drug cost, claimants, total drug cost per claim, and total drug cost per claimant, 2018 to 2022

Metric	2018	2019	2020	2021	2022
Total drug cost	$1.4B	$1.5B	$1.9B	$2.0B	$2.2B
Claimants	1.8M	2.0M	2.1M	2.1M	2.3M
Insured lives	3.8M	4.0M	4.5M	4.6M	4.9M
Total drug cost per claim	$64	$66	$64	$68	$69
Drug cost per claimant	$783	$786	$932	$970	$953
Drug cost per insured life	$373	$389	$430	$450	$453

GreenShield Administration total drug costs were heavily influenced by different levels of claimant growth during the study period. In 2022, we experienced a 9.9 per cent claimant increase which drove an 8.1 per cent increase in drug expenditures.

Cost concentration

As evident in previous years, a relatively small portion of claimants is responsible for a disproportionately large share of overall expenditures. In 2022, 53.5 per cent of the total adjudicated GreenShield Administration drug cost was associated with the top five per cent of claimants, and 31.1 per cent was associated with the top one per cent of claimants. This cost concentration appears to be intensifying – the share of cost for the top five per cent of our claimants made up an increasing share of total drug cost over the years, from 51.5 per cent in 2018 to 53.5 per cent in 2022. In 2022, the top five per cent most expensive claimants cost 21 times more on average, compared to the remaining 95 per cent of the claimant population ($10,199 versus $467). These high-cost claimants had six times more claims (76 claims versus 11) at an average cost per claim that was more than double that of the rest of the claimant population ($134 versus $44).

The high-cost claimants not only made up most of the total drug cost, but a large percentage of them also stayed high-cost claimants for three or more consecutive years. Over half (53.2 per cent) of the top five per cent of claimants from 2020 were also ranked in the top five per cent in both 2021 and 2022. And this percentage increased in 2022 versus the previous years.

This relatively high persistence of high-cost claimants warrants not only the consideration of strategies to ensure both appropriateness of continued usage of high-cost drugs, but also patient support through strategies such as comprehensive case management provided by specialty pharmacies. Given their expertise in managing complex diseases that require usage of high-cost biologic and other specialty drug products, specialty pharmacies are ideally positioned to play a growing role in these integrated care processes.

TABLE 2

Total drug cost distribution by claimant group, 2022

Claimant group	2018 Share of total drug cost	2022 Share of total drug cost	2022 Average claims per claimant	2022 Average cost per claim	2022 Average annual cost per claimant
Top 1%	30.3%	31.1%	79	$373	$29,618
Top 5% (Includes top 1%)	51.5%	53.5%	76	$134	$10,199
All other 95%	48.5%	46.5%	11	$44	$467

TABLE 3

Proportion of high-cost claimants that remain in the same group for three consecutive years

Claimant group	2018-2020	2019-2021	2020-2022
Top 1%	49.0%	47.3%	56.2%
Top 5% (Includes top 1%)	47.9%	45.8%	53.2%

TABLE 4

Total cost per claimant, 2018 to 2022

	2018	2019	2020	2021	2022
Total drug cost per claimant	$783	$786	$932	$970	$953

The average total drug cost per GreenShield Administration claimant reached $953 in 2022, which represents a 21.8 per cent increase from 2018 (Table 4).

Claimants with an annual treatment cost of over $6,000 contributed about two-thirds of the increase in average claimant cost, including a 20 per cent increase due to claimants with an annual treatment cost of over $50,000.

The large contribution from claimants with an annual cost over $6,000 was in part due to the substantial increase in claimants within these categories between 2018 and 2022 (Figure 3 following page). More importantly, their claimant growth rates were significantly higher than claimants with lower costs.

The average total drug cost per claimant reached $953 in 2022 – a 21.8 per cent increase from 2018.

FIGURE 2

Contribution to the total cost per claimant growth by annual treatment cost range, 2022 vs. 2018

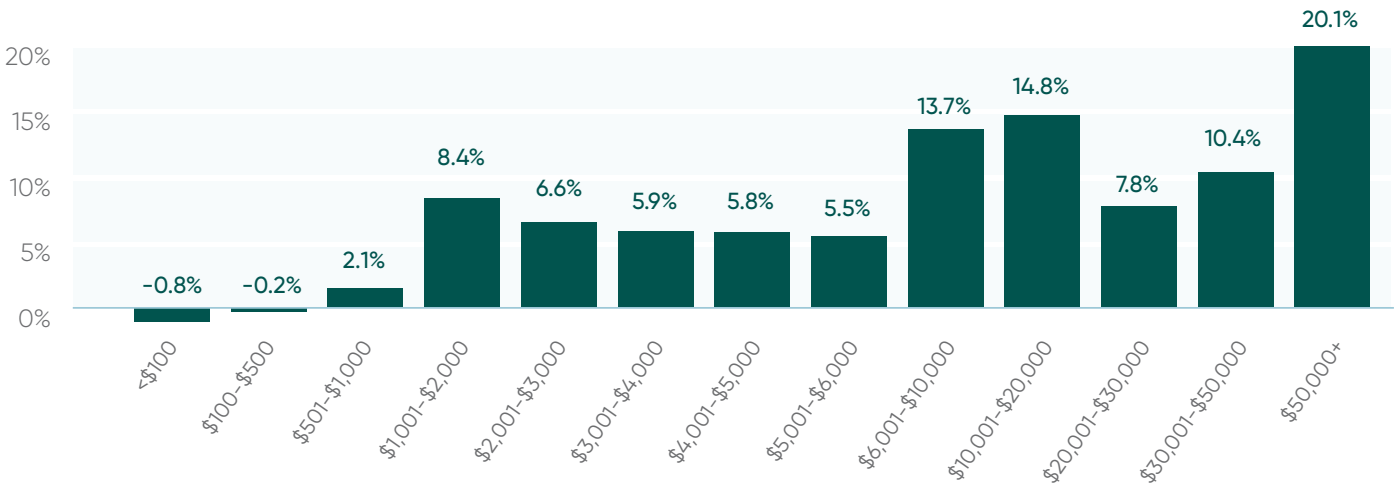
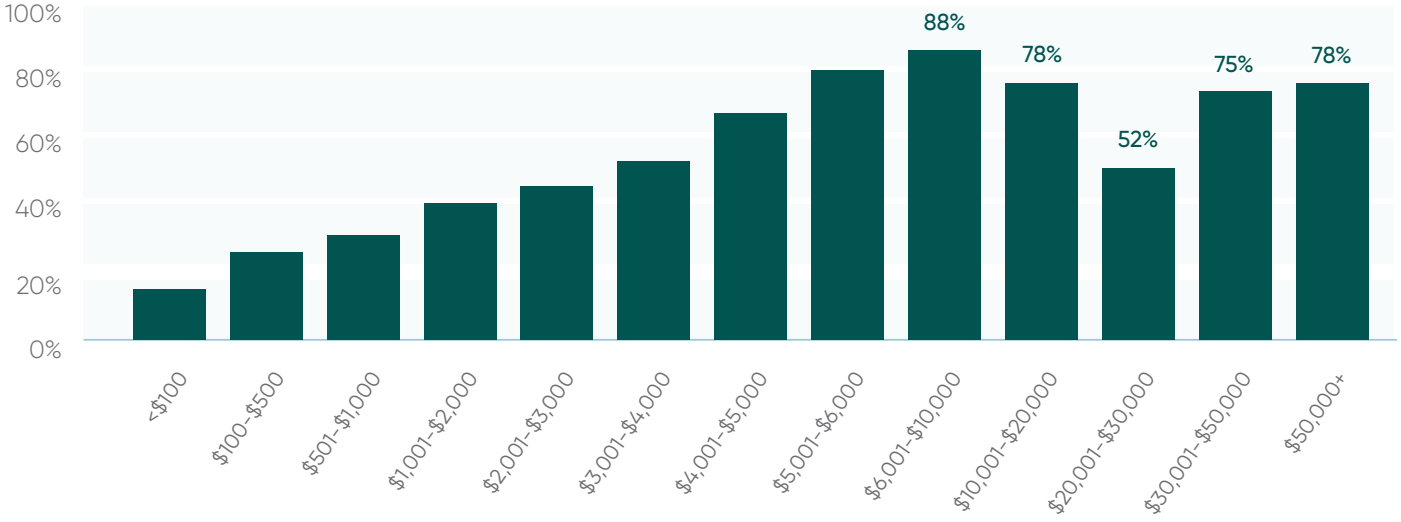


FIGURE 3

Change in the number of claimants by annual treatment cost range, 2022 vs. 2018



Nevertheless, claimants with an annual treatment cost of over $6,000 made up only 2.1 per cent of the GreenShield Administration total claimant population in 2022. Most of the claimants (81.2 per cent of our 2.3 million claimants) had an annual treatment cost of less than $1,000 in 2022 but accounted for a disproportionate 21.9 per cent of the total drug cost (Table 5).

TABLE 5

Share of claimant and share of total drug cost by annual treatment cost range, 2022

Annual total drug cost per claimant interval	Share of claimants	Share of total drug cost
<$100	28.9%	1.4%
$100–$500	38.4%	10.1%
$501–$1,000	13.9%	10.4%
$1,001–$2,000	10.0%	14.8%
$2,001–$3,000	3.5%	8.9%
$3,001–$4,000	1.7%	6.0%
$4,001–$5,000	0.9%	4.2%
$5,001–$6,000	0.6%	3.3%
$6,001–$10,000	0.9%	7.5%
$10,001-$20,000	0.6%	9.5%
$20,001-$30,000	0.3%	7.7%
$30,001-$50,000	0.2%	7.0%
$50,000+	0.1%	9.1%
Total	**100%**	**100%**

Delving a bit deeper into the characteristics of these high-cost claimants, patients suffering from rheumatoid arthritis (RA), Crohn's disease, colitis, and psoriasis represented the largest share of total drug cost in both the top one per cent and top five per cent high-cost claimant groups (Table 6). While the claimants in the top one per cent typically required specialty medications to manage their conditions, the top five per cent high-cost claimants, in contrast, suffered from more common chronic diseases that require less costly treatment such as diabetes, mental health conditions, respiratory issues, and high cholesterol.

Fifty-four per cent of the top one per cent high-cost claimants used products for RA/Crohn's/colitis/psoriasis, which made up 40.9 per cent of their total drug cost. In comparison, 22.5 per cent of the top five per cent of claimants used RA/Crohn's/colitis/psoriasis products, which made up 26.5 per cent of the total drug cost (Table 6). The top one per cent of claimants also had a larger share of high-cost specialty medications to treat conditions such as cancer, multiple sclerosis, and cystic fibrosis. As a result, the top one per cent most costly claimants had a higher cost concentration in the top 10 disease states at 81.2 per cent compared to 66.5 per cent for the top five per cent high-cost claimants.

Diabetes had a different dynamic in the two categories; it represented the second-largest share of drug costs in the top five per cent claimant group, compared to the ninth-largest share in the top one per cent group. This was due to the high prevalence of the disease, paired with an escalating cost of treatment per patient driven by utilization of newer antidiabetic agents, such as Ozempic.

TABLE 6

Top 10 disease states by share of total drug cost and share of claimants for top one per cent and top five per cent of high-cost claimants, 2022

Top 1%			
Rank	**Disease state**	**Share of total drug cost**	**Share of claimants**
1	RA/Crohn's/colitis/psoriasis	40.9%	54.0%
2	Cancer	12.0%	18.9%
3	Multiple sclerosis	6.9%	8.8%
4	Cystic fibrosis	5.5%	1.3%
5	Asthma and COPD	4.4%	29.2%
6	Skin irritations/conditions	3.8%	24.7%
7	HIV	2.7%	5.1%
8	Macular degeneration	1.9%	3.7%
9	Diabetes	1.6%	17.1%
10	Paroxysmal nocturnal haemoglobinuria (PNH)	1.5%	0.1%
Top 5%			
Rank	**Disease state**	**Share of total drug cost**	**Share of claimants**
1	RA/Crohn's/colitis/psoriasis	26.5%	22.5%
2	Diabetes	10.1%	38.8%
3	Cancer	8.4%	10.3%
4	Multiple sclerosis	4.6%	2.6%
5	Asthma and COPD	4.3%	29.0%
6	Cystic fibrosis	3.2%	0.3%
7	Anxiety/depression	2.7%	44.5%
8	Skin irritations/conditions	2.6%	20.0%
9	HIV	2.2%	2.3%
10	Elevated cholesterol	1.9%	42.7%

Generic products continued to make up a greater share of claims within GreenShield Administration, accounting for 66.2 per cent of all claims in 2022 – up from 65.6 per cent in 2021.

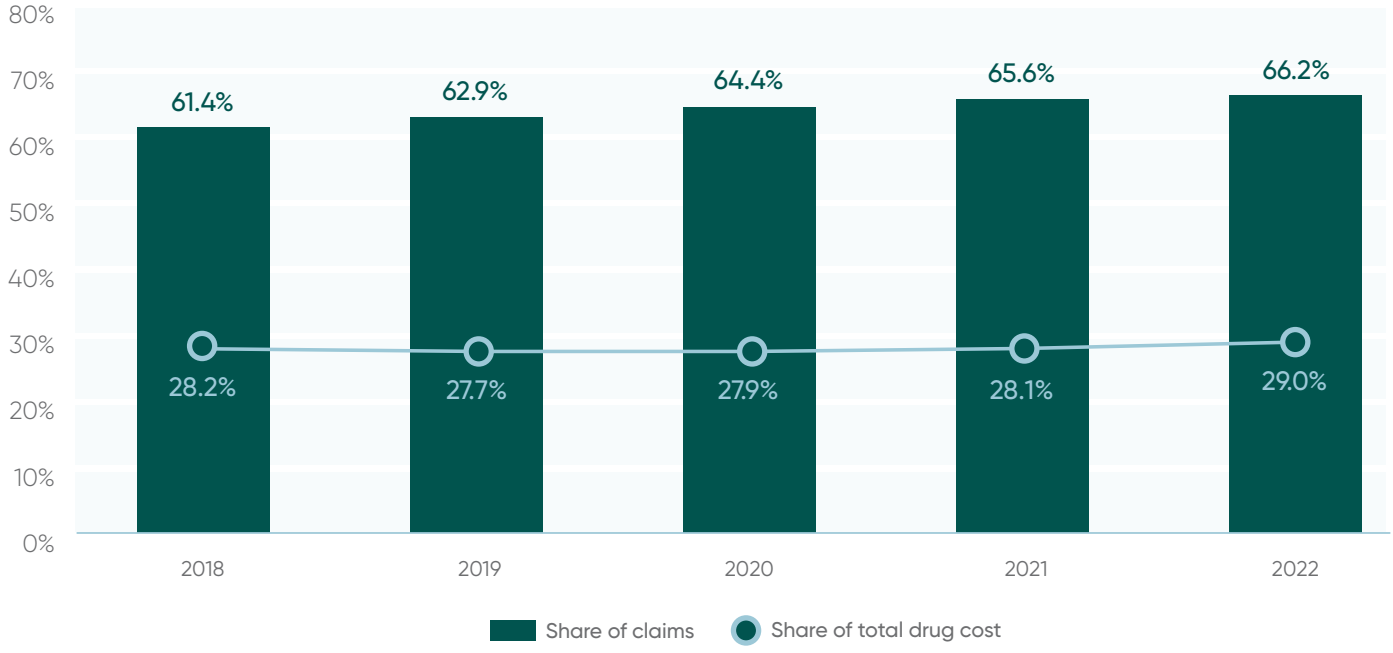
Generic utilization

Increasing the utilization of generic drugs continues to be an important element of cost management in private drug plans, and mandatory generic policies are an essential vehicle to achieving those savings (section five will further investigate the impact of generic substitution policies). Generic products continued to make up a greater share of claims within GreenShield Administration, accounting for 66.2 per cent of all claims in 2022 up from 65.6 per cent in 2021, and their corresponding share of total drug cost also grew compared to previous years (Figure 4). While this growth in generic utilization is encouraging, there is room for upwards growth. For reference, public plans in Canada have achieved generic utilization rates of 73 per cent*, and in the United States, generic utilization has reached over 90 per cent**.

At the regional level, the Atlantic provinces had some of the highest generic share of claims at over 70 per cent, while Ontario and Quebec, the two largest provinces in expenditure, had two of the lowest generic-fill rates at 66.9 per cent and 64.5 per cent, respectively (Figure 5 following page).

FIGURE 4

Generic share of claims and total drug cost, 2018 to 2022

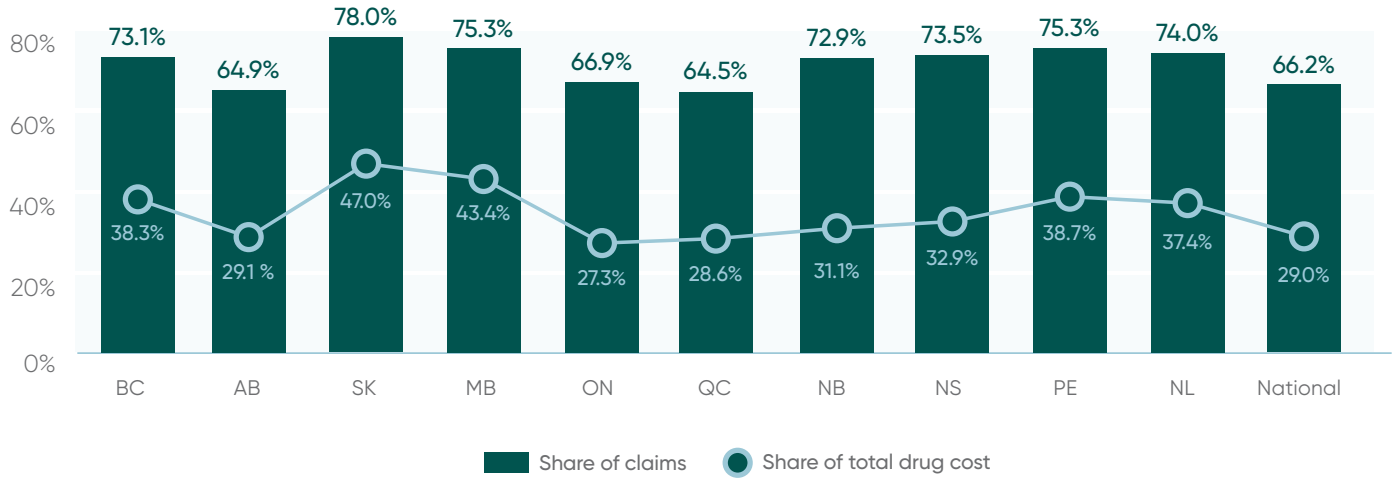


*CompassRx, eighth edition, Annual Public Drug Plan Expenditure Report, 2020/21. Government of Canada website: https://www.canada.ca/en/patented-medicine-prices-review/services/npduis/analytical-studies/compassrx-8th-edition.html

**United States Generic Drugs Market Forecast Report 2023: A $147.57 Billion Market by 2028 from $101 Billion in 2022 – Increasing Prevalence of Life-threatening Diseases Creating Opportunities. ResearchAndMarkets.com: https://www.globenewswire.com/en/news-release/2023/05/10/2665713/28124/en/United-States-Generic-Drugs-Market-Forecast-Report-2023-A-147-57-Billion-Market-by-2028-from-101-Billion-in-2022-Increasing-Prevalence-of-Life-threatening-Diseases-Creating-Opportu.

FIGURE 5

Generic share of claims and costs by province, 2022



Generic penetration

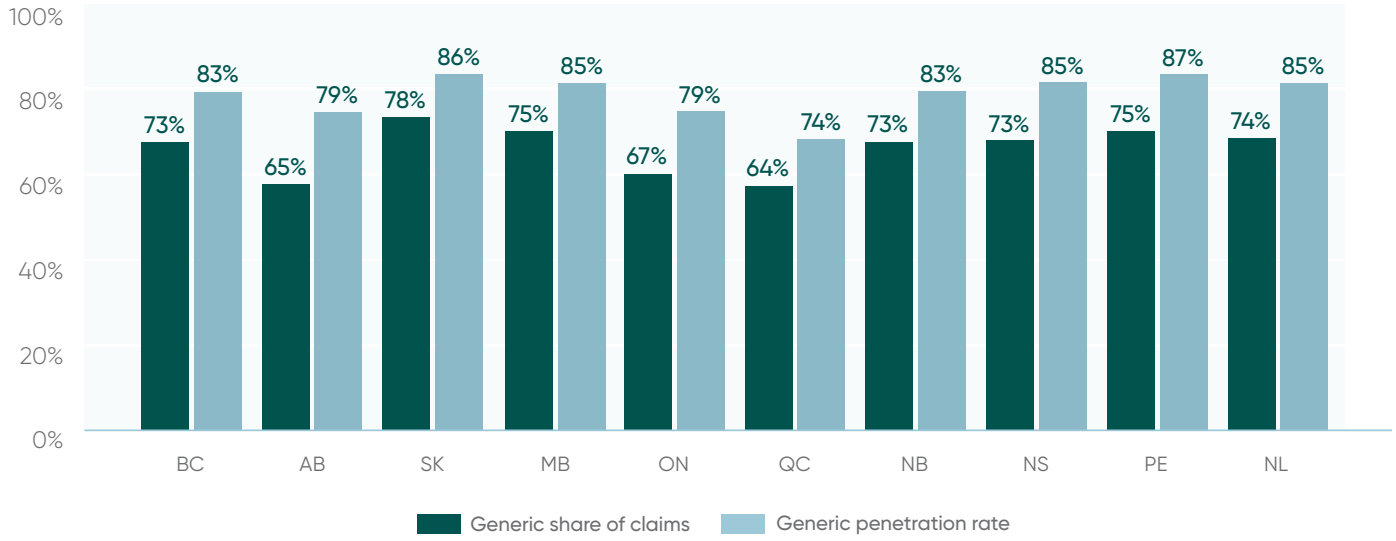
Unlike generic share of claims which measures the percentage of the total number of claims made up of generic products, the **generic penetration** rate measures the percentage of multi-source products (where generic alternatives are available) that were filled with a generic product. In this analysis, single-source products, including biosimilars, are excluded. Multi-source generic products made up nearly 90 per cent of GreenShield Administration claims in 2022 and accounted for about 48 per cent of the total drug cost.

Similar to generic share of claims, Quebec also had the lowest generic penetration rate at 74 per cent followed by Ontario and Alberta, while the other provinces had penetration rates between 83 per cent and 87 per cent (Figure 6).

Generic penetration rates also varied notably across therapeutic classes in 2022. Table 7 (following page) shows the generic penetration rates across multi-source products within the top 10 disease states.

FIGURE 6

Generic share of claims and generic penetration rate by province, 2022



The common chronic disease states like anxiety/depression, hypertension, and elevated cholesterol had generic penetration rates above 90 per cent in 2022 with similar results across all provinces. This is likely because these generic products have been available within these therapeutic areas for a while and have become the norm.

In contrast, ADHD and asthma/COPD showed two of the lowest generic penetration rates across these top disease states. ADHD had a generic penetration rate of only 38 per cent nationally, including only 21 per cent in Saskatchewan.

TABLE 7

Generic penetration rate across multi-source products by disease state and province, 2022

Disease state	BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	National
Elevated cholesterol	95%	97%	99%	98%	93%	97%	98%	97%	99%	98%	96%
Hypertension	97%	95%	96%	97%	95%	95%	97%	98%	99%	97%	95%
Acid-related gastrointestinal conditions	94%	94%	96%	96%	89%	95%	95%	94%	96%	95%	93%
Anxiety/depression	93%	94%	94%	97%	93%	89%	97%	97%	99%	98%	91%
Infection	86%	87%	93%	87%	87%	84%	91%	92%	90%	92%	85%
Diabetes	88%	77%	91%	94%	70%	77%	77%	84%	89%	86%	77%
Pain	89%	89%	89%	92%	74%	69%	81%	86%	86%	87%	73%
RA/Crohn's/colitis/psoriasis	78%	79%	79%	83%	77%	66%	76%	78%	77%	78%	72%
Asthma and COPD	56%	53%	65%	65%	58%	59%	63%	62%	60%	67%	59%
ADHD	46%	31%	21%	26%	42%	38%	47%	60%	45%	50%	38%

Top 10 therapeutic classes*

Despite only 5.3 per cent of claimants submitting claims for rheumatoid arthritis (RA)/Crohn's/colitis/psoriasis medications in 2022, these inflammatory conditions made up the largest share of total drug cost, accounting for 15 per cent (Table 8).

Diabetes continues to grow not only in prevalence at 6.8 per cent but also in overall share of costs (8.4 per cent in 2022 compared to 7.3 per cent in 2018).

TABLE 8

Top therapeutic classes by total drug costs, 2022 vs. 2018

Disease state	2022		2018	
	Prevalence rate	Share of total drug cost	Prevalence rate	Share of total drug cost
RA/Crohn's/colitis/psoriasis	5.3%	15.0%	5.6%	14.2%
Diabetes	6.8%	8.4%	6.2%	7.3%
Anxiety/depression	21.2%	6.1%	19.2%	5.9%
Asthma and COPD	16.4%	5.6%	13.7%	5.6%
ADHD	6.0%	5.2%	3.8%	3.9%
Cancer	1.6%	4.8%	1.5%	4.7%
Hypertension	17.7%	3.8%	18.1%	4.9%
Acid-related gastrointestinal conditions	16.3%	3.0%	14.8%	3.3%
Infection	40.0%	3.0%	43.0%	4.0%
Skin irritations/conditions	13.6%	2.7%	12.3%	1.8%

* Note that the disease states are determined using the primary indication of an individual drug. The prevalence rates are calculated as a share of the total number of GreenShield Administration claimants who claimed drugs associated with a specific disease state.

TABLE 9

Top therapeutic classes by prevalence rate, 2022 vs. 2018

Disease state	2022		2018	
	Prevalence rate	Share of total drug cost	Prevalence rate	Share of total drug cost
Infection	40.0%	3.0%	43.0%	4.0%
Anxiety/depression	21.2%	6.1%	19.2%	5.9%
Pain	18.1%	2.4%	19.1%	3.3%
Hypertension	17.7%	3.8%	18.1%	4.9%
Asthma and COPD	16.4%	5.6%	13.7%	5.6%
Acid-related gastrointestinal conditions	16.3%	3.0%	14.8%	3.3%
Allergies	13.9%	1.8%	15.1%	1.9%
Skin irritations/conditions	13.6%	2.7%	12.3%	1.8%
Elevated cholesterol	13.3%	2.7%	12.6%	3.0%
Osteoarthritis	12.0%	0.7%	12.3%	0.9%

The most prevalent condition continues to be infection with approximately 929,000 individuals claiming medications for this condition in 2022. This represents 40 per cent of the GreenShield Administration claimants who used medications to treat an infection in 2022 (Table 9), although it only made up three per cent of the total drug cost.

While the 2022 infection prevalence rate still fell behind the 2018 level, it had bounced back notably from the 37.8 per cent and 35 per cent in 2020 and 2021, respectively (Table 10).

The year-over-year increase in the infection prevalence rate occurred through all age groups with the most substantial increase in claimants younger than 15 years old – increasing from 44.9 per cent to 57 per cent in 2022. Again, this largely coincides with the relaxing of COVID-19-related restrictions such as the removal of indoor capacity limits, social gathering limits, and masking.

TABLE 10

Prevalence rates of infection by age group, 2018 to 2022

Age group	Percentage of total claimants using infection medications					
	2018	2019	2020	2021	2022	Relative difference (2022 vs. 2021)
0–14	56.0%	60.1%	50.7%	44.9%	57.0%	26.8%
15–24	36.4%	43.4%	39.2%	37.6%	41.5%	10.5%
25–34	46.3%	45.3%	39.8%	37.1%	42.0%	13.1%
35–44	47.6%	46.1%	40.2%	36.8%	42.2%	14.5%
45–54	43.8%	42.6%	37.0%	34.1%	38.3%	12.4%
55–64	43.2%	41.7%	35.7%	33.6%	37.6%	11.9%
65+	29.8%	28.6%	25.5%	25.2%	25.8%	2.5%
Average	**43.2%**	**43.6%**	**37.8%**	**35.0%**	**40.0%**	**14.1%**

As the COVID-19 pandemic continued into 2022, its impact was evident on the rates of anxiety and depression. The COVID-19 pandemic was a likely contributor to the 13 per cent and 8.1 per cent anxiety/depression claimant growth in 2020 and 2021, respectively; however, this growth had largely slowed to 5.8 per cent in 2022.

The slowdown in anxiety/depression claimant growth occurred across most age groups (except for the 55–64-years-old cohort). The diminished growth was most significant among claimants aged 0–14 and 35–44 where their year-over-year growth rates fell more than 50 per cent compared to their 2021 level (Figure 8).

FIGURE 7

Anxiety/depression claimant year-over-year growth since 2018

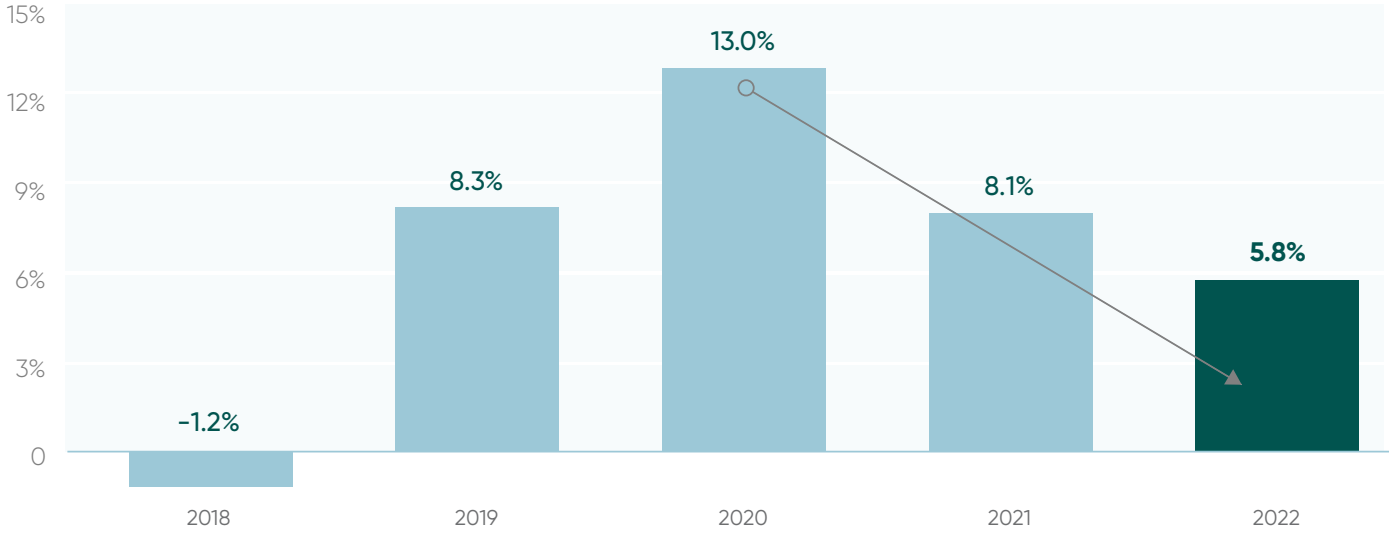
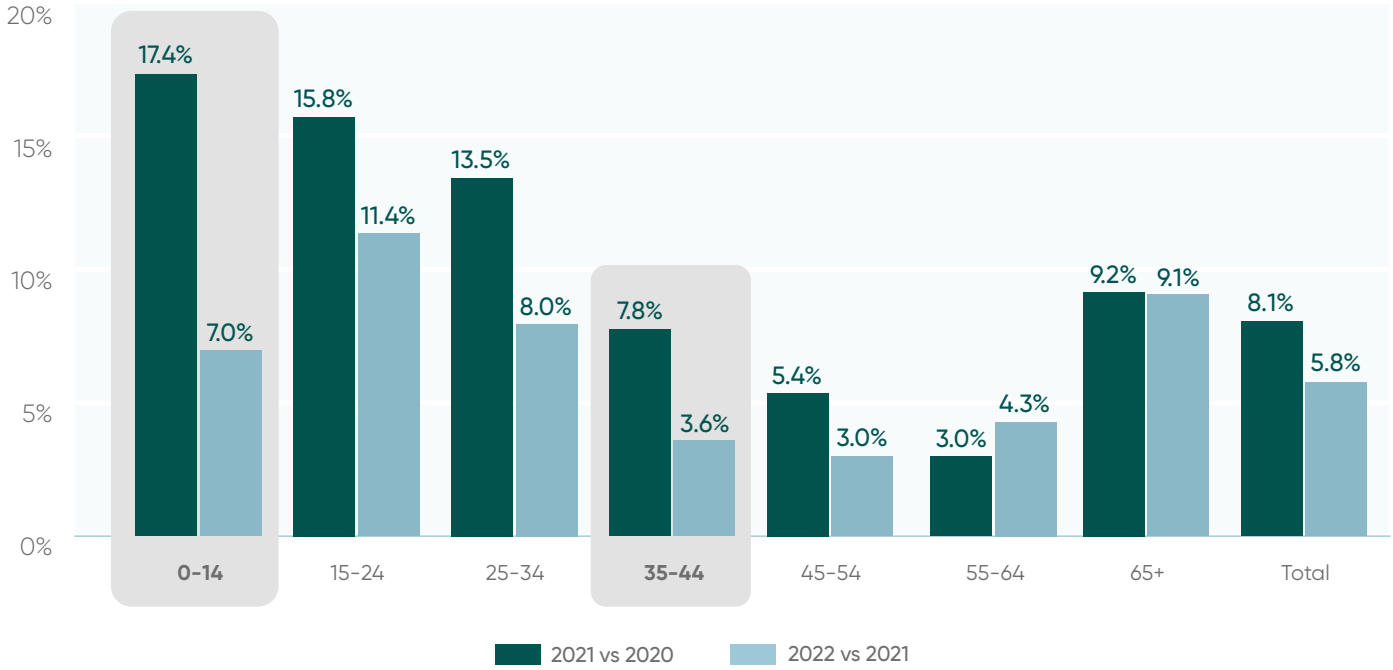


FIGURE 8

Anxiety/depression year-over-year claimant growth by age group, 2021 and 2022



Top 10 drug products

The top 10 products made up a notable share of total cost within GreenShield Administration. Some of these products are used by very few claimants (i.e., a prevalence rate of less than 0.5 per cent of our total claimant population) but have an average cost per claimant typically above $10,000. The other products, in contrast, have higher prevalence rates but cost much less for each claimant.

Infliximab and adalimumab were the top two ingredients in total drug cost in 2018 and maintained their top standings five years later. However, thanks to biosimilar strategies, their total drug cost had declined by about 20 per cent year-over-year in 2022 (Table 11). On the other hand, semaglutide, elexacaftor/tezacaftor/ivacaftor, and dupilumab, which launched after 2017, joined the top 10 list in 2022. Most remarkably, Ozempic (semaglutide), new to the market since 2018, rose rapidly in 2022 with a year-over-year total drug cost growth of approximately 94 per cent, and Trikafta's (elexacaftor/tezacaftor/ivacaftor) total drug cost jumped by an astonishing 930 per cent year-over-year.

TABLE 11

Top 10 products by total drug cost in 2022

2018 Rank	2022 Rank	Product	Brand name	Disease state	Total cost per claimant (2022)	Prevalence rate (2022)	Share of total drug cost (2022)	YOY total drug cost growth (2022)	Compound annual growth rate (2017 to 2021)
1	1	Infliximab	Remicade	RA/Crohn's/ colitis/psoriasis	$30,178	0.1%	3.5%	-21.1%	11.3%
2	2	Adalimumab	Humira	RA/Crohn's/ colitis/psoriasis	$14,265	0.2%	2.7%	-19.1%	11.1%
New since 2018	3	Semaglutide	Ozempic	Diabetes	$1,725	1.4%	2.6%	93.9%	N/A
3	4	Methylphenidate	Concerta	ADHD	$705	3.3%	2.4%	14.7%	14.7%
5	5	Ustekinumab	Stelara	RA/Crohn's/ colitis /psoriasis	$26,295	0.1%	2.2%	17.5%	28.9%
6	6	Lisdexamfetamine	Vyvanse	ADHD	$816	2.4%	2.0%	21.9%	19.1%
New since 2021	7	Elexacaftor/ tezacaftor/ ivacaftor	Trikafta	Cystic fibrosis	$129,682	0.01%	1.4%	928.9%	N/A
New since 2018	8	Dupilumab	Dupixent	Skin irritations/ conditions	$18,318	0.1%	1.2%	33.0%	N/A
14	9	Budesonide/ formoterol	Symbicort	Asthma and COPD	$319	3.4%	1.1%	24.6%	10.9%
10	10	Escitalopram	Cipralex	Anxiety/ depression	$269	3.9%	1.1%	5.0%	9.0%

The ranking of the top 10 products varied significantly across British Columbia, Alberta, Ontario, and Quebec. These provinces made up more than 95 per cent of the total cost in 2022. Only semaglutide and lisdexamfetamine were ranked in the top 10 across each of these four major provinces.

For example, Concerta (methylphenidate) represented a much larger portion of spend in Quebec (3.5 per cent) compared to the 1.1 per cent in Ontario, in part due to the lower use of the generic and regulations that prohibit generic pricing cutbacks in Quebec (Table 12).

TABLE 12

Top 10 products by total drug cost within certain provinces, 2022

Product	Brand name	Disease state	Share of total cost within the province				
			National	BC	AB	ON	QC
Infliximab	Remicade	RA/Crohn's/colitis/ psoriasis	3.5%	0.2%	2.0%	3.1%	4.4%
Adalimumab	Humira	RA/Crohn's/colitis/ psoriasis	2.7%	0.7%	2.3%	2.9%	2.9%
Semaglutide	Ozempic	Diabetes	2.6%	2.6%	3.3%	3.1%	2.2%
Methylphenidate	Concerta	ADHD	2.4%	0.8%	2.4%	1.1%	3.5%
Ustekinumab	Stelara	RA/Crohn's/colitis/ psoriasis	2.2%	0.6%	1.8%	1.9%	2.6%
Lisdexamfetamine	Vyvanse	ADHD	2.0%	1.1%	3.9%	1.6%	2.2%
Elexacaftor/ tezacaftor/ ivacaftor	Trikafta	Cystic fibrosis	1.4%	1.0%	0.2%	0.6%	2.1%
Dupilumab	Dupixent	Skin irritations/ conditions	1.2%	0.9%	1.4%	1.4%	1.2%
Budesonide/ formoterol	Symbicort	Asthma and COPD	1.1%	1.6%	1.9%	1.2%	0.9%
Escitalopram	Cipralex	Anxiety/depression	1.1%	0.9%	0.8%	0.7%	1.4%

3

Specialty drugs

Section 3

Overall trends

In 2022, there were over 28,000 GreenShield Administration claimants that used a specialty drug to treat their medical conditions. These specialty drug products were associated with $629.7 million in total drug costs (Table 13). Although the number of claimants with specialty products rose by 7.5 per cent in 2022, their specialty products expenditure only increased 2.1 per cent. This was not only the lowest year-over-year (YOY) cost growth rate seen for specialty products during the reporting period, but it was also lower than the 10.8 per cent increase in non-specialty product expenditures in 2022.

TABLE 13

Specialty drugs total cost, number of claims, and number of claimants, 2018 to 2022

Period	Total drug cost		Claims		Claimants	
	Amount	YOY growth	Number	YOY growth	Number	YOY growth
2018	$354.5M	7.1%	126.3K	6.4%	17.5K	8.4%
2019	$409.3M	15.5%	141.6K	12.2%	19.9K	13.9%
2020	$560.5M	36.9%	187.7K	32.5%	23.9K	20.5%
2021	$616.9M	10.1%	199.3K	6.2%	26.3K	9.9%
2022	$629.7M	2.1%	209.8K	5.2%	28.3K	7.5%

Cost and utilization

The proportion of overall drug spend owing to specialty drugs decreased from 30.1 per cent in 2021 to 28.4 per cent in 2022. As in previous years, a very small proportion (1.2 per cent) of claimants was responsible for a large share of overall costs.

As evident in Figure 9, the contribution of specialty drugs to overall spending has steadily climbed since 2018, and then dropped in 2022, largely thanks to biosimilar penetration, which will be explored in a later section.

FIGURE 9

Specialty drugs share of total drug cost and share of claimants, 2018 to 2022

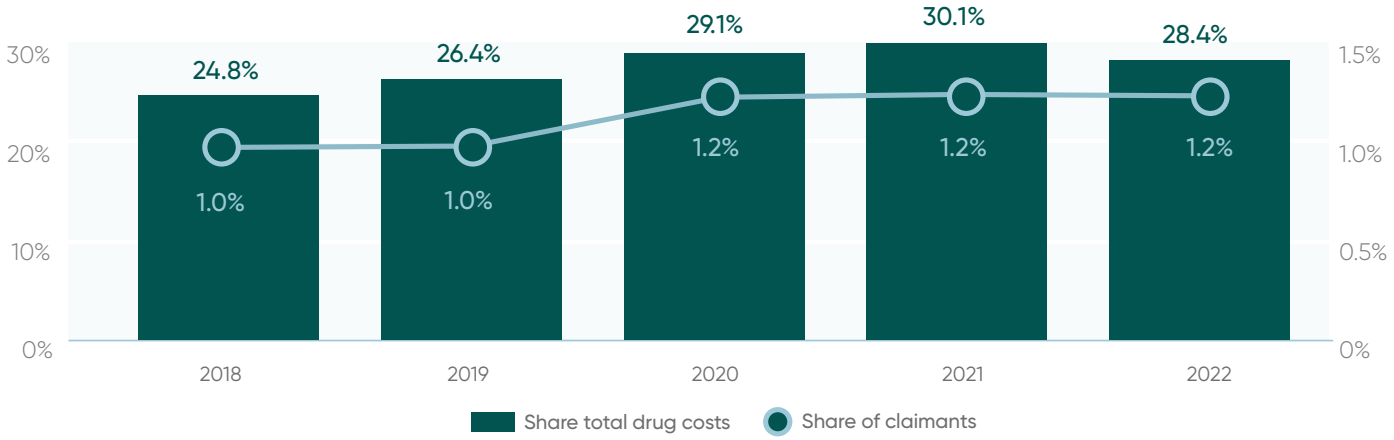
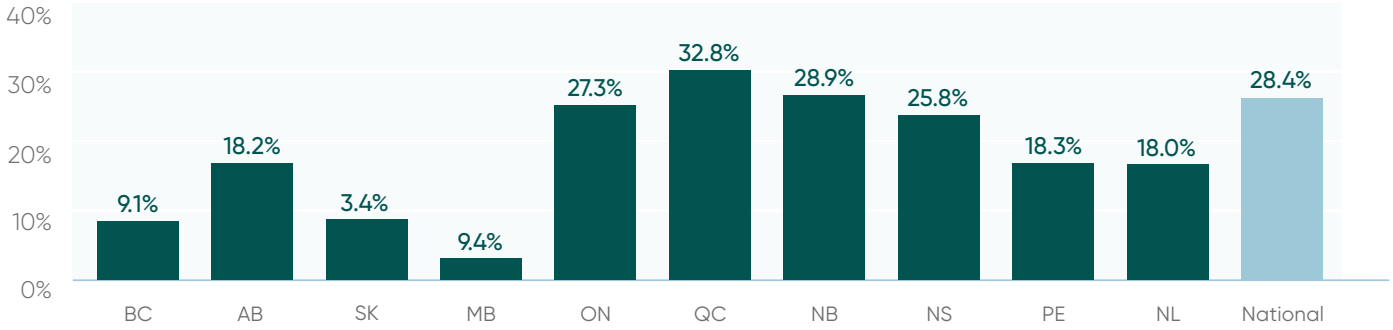


FIGURE 10

Specialty drugs expenditure by province, 2022



Specialty share of total drug cost varied significantly across the country in 2022. For instance, the western region had a relatively lower specialty share of total drug cost compared to the other provinces thanks to coordination with the public drug programs (Figure 10).

As noted below (Table 14), in 2022, over 28,000 claimants utilized a specialty drug product for the treatment of their condition. The vast majority (more than 96 per cent) of these claimants used products costing between $10,000 and $49,999 per year. Products with an annual treatment cost between $10,000 and $49,999 made up 82.4 per cent of the specialty product total cost in 2022, down from 85 per cent in 2021 and 89.1 per cent in 2018 (Table 14). The notable smaller market share in 2022 was thanks to the strong biosimilar penetration into infliximab and adalimumab markets.

Products costing between $50,000 and $99,999 experienced a modest 9.3 per cent cost decline in 2022, which was partially driven by the diminished claimant population (-5.4 per cent) along with the strong Revlimid generic penetration. The generic of Revlimid accounted for 70 per cent of the lenalidomide claims in 2022 up from 10 per cent in the prior year. As a result, Revlimid total drug cost plummeted by 80 per cent (or $6 million) year-over-year. Meanwhile, the greater claimant utilization of Lynparza and Calquence pushed up the cost by $1.1 million and $1.2 million, respectively. That partially offset the significant cost savings from Revlimid and limited the year-over-year cost decline within this range of specialty product cost.

In comparison, expensive specialty products costing over $100,000 per year made up a growing share of costs during this study period. The most substantial growth occurred in products with an annual treatment cost of $100,000 to $249,999, which in turn accounted for eight per cent of the specialty product total cost in 2022 up from 4.8 per cent in 2021. Trikafta, the cystic fibrosis medication, was the sole cost growth contributor. Trikafta expenditures jumped by more than 900 per cent (or $27.8 million) in 2022, while all the other cystic fibrosis medications (including Orkambi, Symdeko, and Kalydeco) experienced a negative cost growth in 2022.

The impact of the specialty products costing $250,000 or above was relatively small. These products combined made up about 4.1 per cent of the specialty cost in 2022. Products that cost between $250,000 and $499,999 increased by 8.4 per cent thanks solely to the newly launched product used for blood disorders, Ultomiris. Costs for this product rose by $3.2 million, which was partially offset by a $1.4 million decline in Soliris spend.

TABLE 14

Total cost and claimant measures by cost of specialty products, 2022

Range of specialty product cost	Total cost measures				Claimant measures		
	Share of total drug cost			YOY cost growth (2022 vs.2021)	Number of claimants (2022)	2022 vs. 2021 (absolute difference)	YOY growth (2022)
	2018	2021	2022				
$10,000–$49,999	89.1%	85.0%	82.4%	-1.3%	27.4K	1.8K	7.2%
$50,000–$99,999	5.5%	6.2%	5.5%	-9.3%	0.5K	- 29	-5.4%
$100,000–$249,999	3.0%	4.8%	8.0%	70.4%	0.4K	0.1K	56.7%
$250,000–$499,999	2.0%	3.1%	3.3%	8.4%	49	1	2.1%
$500,000+	0.4%	0.9%	0.8%	-8.7%	9	0	0%
Total	**100.0%**	**100.0%**	**100.0%**	**2.1%**	**28.3K**	**1.9K**	**7.5%**

Overall, medications used for RA/Crohn's/colitis/psoriasis made up 49 per cent of total specialty products in 2022 (Figure 11) down from 52 per cent in 2021. Expenditures for these conditions dropped by 4.8 per cent in 2022 to $308 million thanks to strong biosimilar penetration within Remicade and Humira (Table 15 below and Table 16 following page). Similarly, the other top disease states – cancer and multiple sclerosis – also reported a negative cost growth year-over-year due to strong generic penetration.

Cystic fibrosis expenditures doubled in 2022 to $36.8 million. As a result, cystic fibrosis accounted for six per cent of the specialty product cost up from three per cent for the prior year. Trikafta was the sole growth contributor in this class with more than 900 per cent increase (or $27.8 million) in 2022.

Asthma and COPD specialty drug costs grew 11 per cent (or $2.9 million) in 2022 with Xolair, Nucala, and Fasenra contributing 66 per cent, 24 per cent, and nine per cent of the cost growth, respectively.

FIGURE 11

Share of total drug cost by top five disease states in total drug cost for specialty drugs, 2018 to 2022

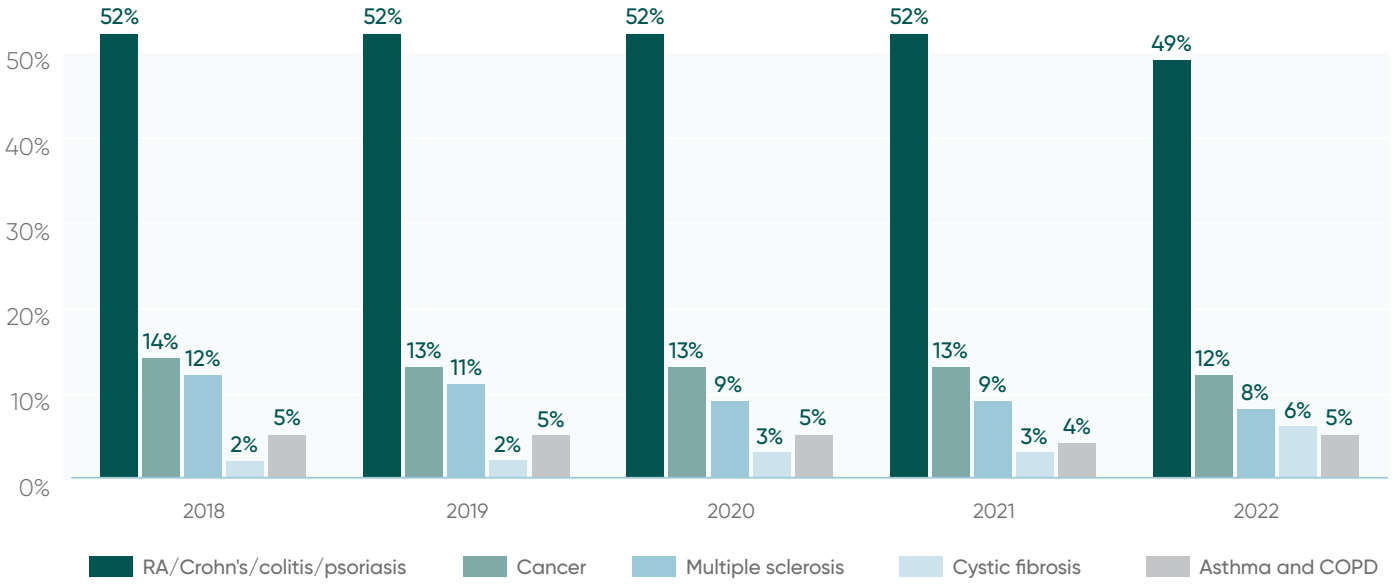


TABLE 15

Top 10 specialty disease states year-over-year total drug cost growth, 2018 to 2022

Top 10 disease states	2018 vs. 2017	2019 vs. 2018	2020 vs. 2019	2021 vs. 2020	2022 vs. 2021
RA/Crohn's/colitis/psoriasis	2.9%	14.6%	38.5%	10.4%	-4.8%
Cancer	18.0%	5.9%	44.2%	7.8%	-3.3%
Multiple sclerosis	1.4%	9.7%	11.4%	4.9%	-1.6%
Cystic fibrosis	37.8%	44.1%	68.3%	12.6%	112.7%
Asthma and COPD	9.4%	13.3%	40.3%	-0.1%	11.2%
Skin irritations/conditions	N/A	141.0%	75.3%	56.1%	33.0%
HIV	3.8%	12.3%	13.5%	-1.4%	-1.4%
Paroxysmal nocturnal haemoglobinuria (PNH)	39.3%	21.1%	61.7%	-1.3%	-12.0%
Kidney disorders	19.4%	50.3%	40.5%	18.5%	27.2%
Blood disorders	53.0%	39.8%	56.8%	7.5%	99.4%

N/A: Not available.

TABLE 16

Top 10 specialty disease states total drug cost, 2018 to 2022

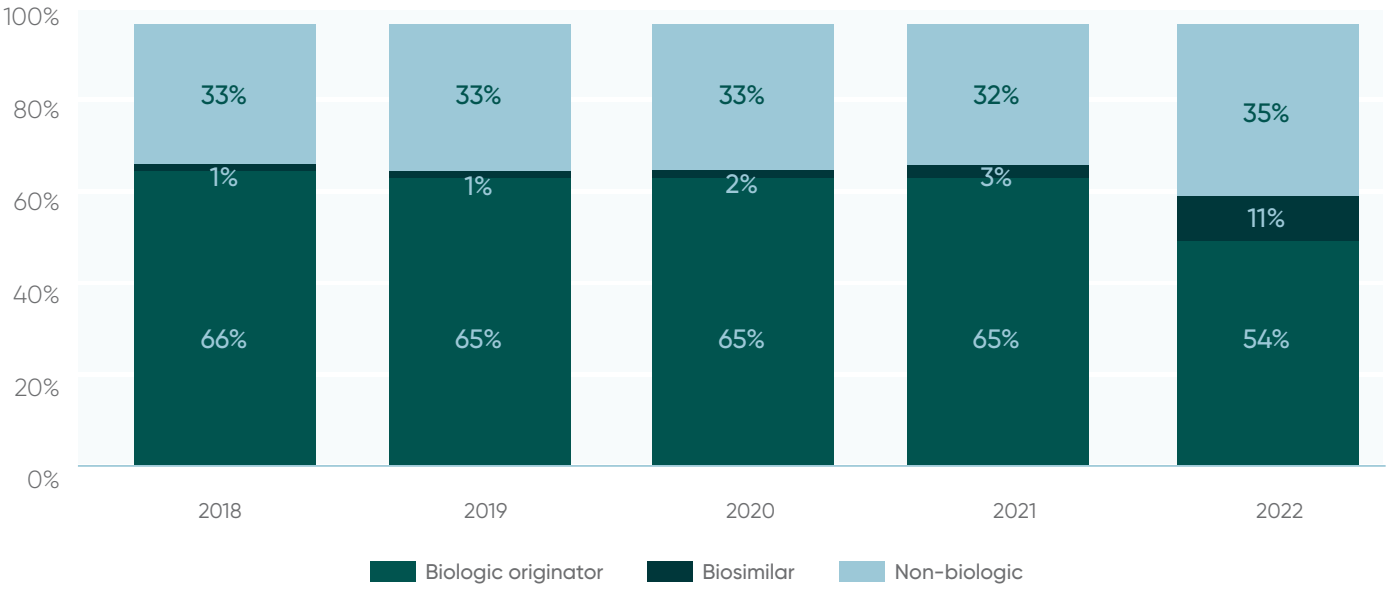
Top 10 disease states	2018	2019	2020	2021	2022
RA/Crohn's/colitis/psoriasis	$184.8M	$211.7M	$293.1M	$323.7M	$308.2M
Cancer	$48.7M	$51.6M	$74.3M	$80.2M	$77.5M
Multiple sclerosis	$42.1M	$46.2M	$51.5M	$54.0M	$53.1M
Cystic fibrosis	$6.3M	$9.1M	$15.4M	$17.3M	$36.8M
Asthma and COPD	$16.3M	$18.4M	$25.9M	$25.8M	$28.8M
Skin irritations/conditions	$3.1M	$7.5M	$13.2M	$20.6M	$27.4M
HIV	$13.6M	$15.2M	$17.3M	$17.1M	$16.8M
Paroxysmal nocturnal haemoglobinuria (PNH)	$6.1M	$7.4M	$12.0M	$11.9M	$10.4M
Kidney disorders	$1.8M	$2.7M	$3.8M	$4.5M	$5.7M
Blood disorders	$1.2M	$1.7M	$2.6M	$2.8M	$5.6M

Specialty biologics versus specialty non-biologics

Biologics made up the majority of the specialty expenditures over the study period; however, this category's composition changed significantly in 2022. Biosimilars have grown to represent 17 per cent of specialty biologic spend or 11 per cent of overall specialty expenditures (Figure 12).

FIGURE 12

Biologics and non-biologics share of specialty total drug cost by year, 2018 to 2022



Greater use of biosimilars of Remicade and Humira pushed down the RA/Crohn's/colitis/psoriasis cost by six per cent year-over-year. However, RA/Crohn's/colitis/psoriasis still made up 70.5 per cent of total specialty biologics expenditures in 2022 (Table 17).

Specialty non-biologics expenditures were less concentrated than their biologic counterparts. The top five conditions within the non-biologic specialty products group made up 82.2 per cent of the total drug cost compared to 91.1 per cent under biologic specialty products. Cystic fibrosis contributed $19.5 million towards the year-over-year cost growth within this product cohort with the increase solely attributable to Trikafta.

Greater use of biosimilars within Remicade and Humira pushed down the RA/Crohn's/colitis/psoriasis cost by six per cent year-over-year.

TABLE 17

Top five disease states for specialty biologics/non-biologics, 2022

Specialty biologics				Specialty non-biologics			
Disease state	**Share of total drug cost**	**YOY total drug cost difference**	**YOY total drug cost growth**	**Disease state**	**Share of total drug cost**	**YOY total drug cost difference**	**YOY total drug cost growth**
RA/Crohn's/colitis/psoriasis	70.5%	-$18.3M	-6.0%	Cancer	33.2%	-$2.8M	-3.7%
Asthma and COPD	7.0%	$2.9M	11.2%	Cystic fibrosis	16.8%	$19.5M	112.7%
Multiple sclerosis	4.5%	$1.1M	6.4%	Multiple sclerosis	15.8%	-$2.0M	-5.4%
Skin irritations/conditions	6.7%	$6.8M	33.0%	RA/Crohn's/colitis/psoriasis	8.7%	$2.8M	17.4%
Paroxysmal nocturnal haemoglobinuria (PNH)	2.5%	-$1.4M	-12.0%	HIV	7.7%	-$0.2M	-1.4%
Top 5 total	**91.1%**	**-$8.9M**	**-2.3%**	**Top 5 total**	**82.2%**	**$17.3M**	**10.6%**

Focus on biosimilars

Biosimilars present comparable safety and efficacy to their originator products but at a significantly lower cost. Overall, there are 14 biologic originators with biosimilars (Table 19 on page 29) on the market, and the total drug cost for biosimilars reached $88 million in 2022, up 200 per cent (or $59 million) from the previous year. In contrast, spending on biologic originators (the biologics where a biosimilar was available) declined by 50 per cent (or $98 million) in 2022 (Figure 13).

Biosimilars continued to gain momentum throughout GreenShield Administration's business in 2022. The significant growth in the use of biosimilars was led by the biosimilars of Remicade and Humira as their total drug costs jumped by 260 per cent and 1,490 per cent year-over-year to $35.4 million and $26.3 million in 2022, respectively (Figure 14). This strong growth contributed 85 per cent of the biosimilar total drug cost growth in 2022.

FIGURE 13

Biosimilar and their biologic originator total drug cost, 2018 to 2022

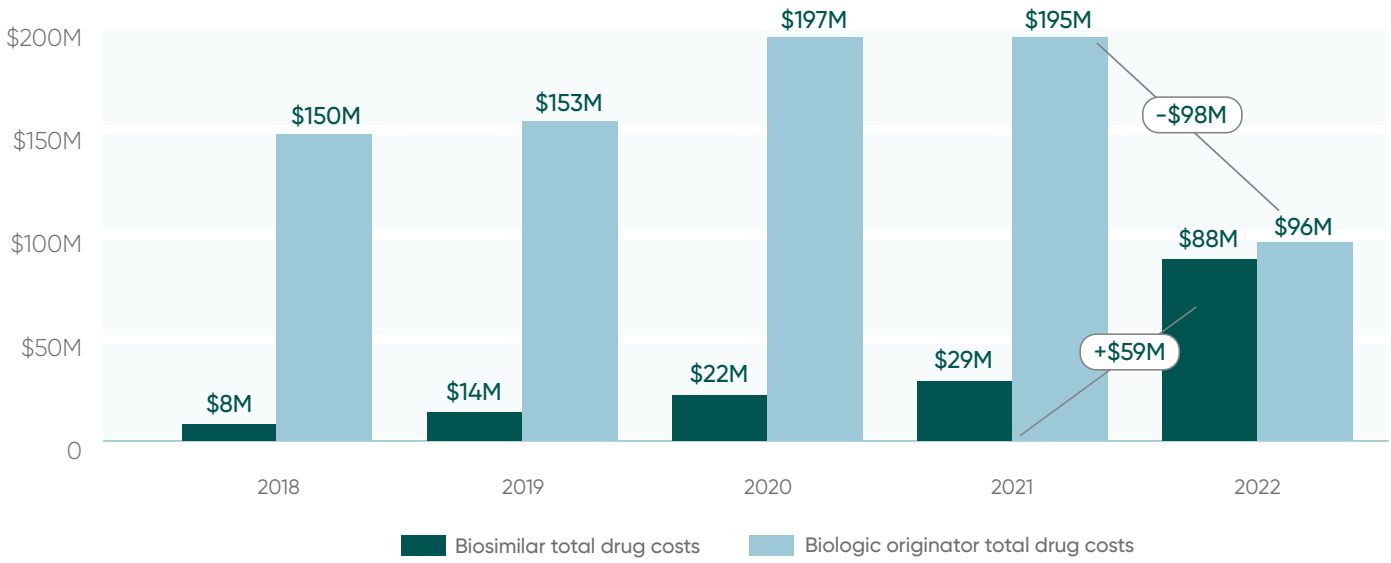
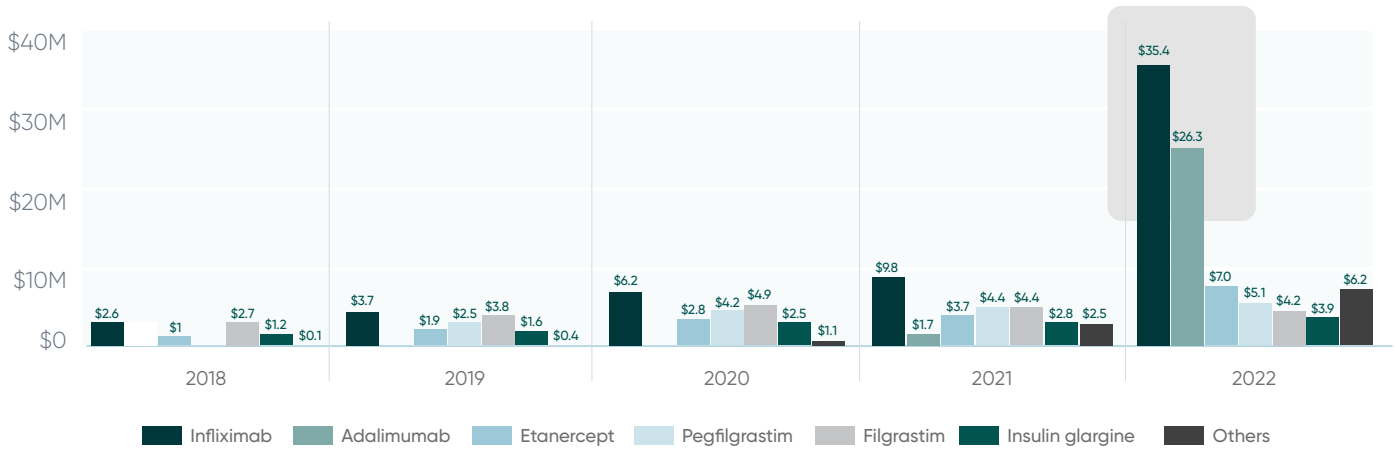


FIGURE 14

Biosimilar total drug costs by drug, 2018 to 2022



* Note: Others include the total drug costs from the biosimilars of glatiramer, rituximab, bevacizumab, insulin lispro, teriparatide, enoxaparin, insulin aspart, and trastuzumab.

The rapid biosimilars utilization growth for GreenShield Administration reflected our much greater biosimilar penetration than in other private drug plans monitored by IQVIA in 2022 (Table 18). Nevertheless, the biologic originators, Remicade and Humira, still made up 1.9 per cent and 1.5 per cent of the total drug cost, respectively, in 2022.

Provincial government policies that implement biosimilar transitioning under their health care plans have now been launched in 10 out of the 13 jurisdictions (British Columbia, Alberta, New Brunswick, Quebec, Northwest Territories, Nova Scotia, Saskatchewan, Ontario, Newfoundland and Labrador, and Yukon). These policies have had the effect of driving biosimilar adoption in each of these provinces, but due to the timing of implementation, there are dramatic differences in biosimilar penetration across the country.

Biosimilar initiatives were implemented by public drug programs in the provinces of British Columbia, Alberta, Quebec, and New Brunswick prior to the end of 2022. These programs, especially in British Columbia and Quebec, further increased the biosimilar adoption of infliximab and adalimumab in GreenShield Administration and other private drug plans (Figure 15 below and Figure 16 following page). However, the Alberta and New Brunswick public biosimilar initiatives had limited impact on the private market, as their biosimilar penetration rates were markedly lower than the ones in British Columbia or Quebec.

While biosimilars of Remicade and Humira showed strong penetration among GreenShield Administration claims in the provinces of British Columbia and Quebec by the end of 2022, claims for these biosimilars still largely fell behind when compared to their public counterparts (Figure 15 below and Figure 16 following page).

TABLE 18

Biosimilars share of claims by molecule, 2022

Molecule	GreenShield Administration	Other private drug plans*	Ontario public drug plans*	RAMQ*
	Biosimilar share of claims			
Infliximab (Remicade)	57.7%	21.8%	30.9%	88.1%
Adalimumab (Humira)	58.3%	26.8%	26.9%	84.0%
Etanercept (Enbrel)	69.7%	44.3%	46.6%	91.8%
Glatiramer (Copaxone)**	35.0%	20.9%	35.7%	84.1%
Insulin aspart (NovoRapid)	18.7%	6.4%	3.4%	55.9%

* Source: IQVIA, PharmaStat

** Glatect and Copaxone are non-biologic complex drugs (NBCDs); however, biosimilar policies often apply to these molecules. As a result, in this report, references to an originator biologic include Copaxone, and references to a biosimilar include Glatect.

FIGURE 15

Biosimilar penetration of infliximab by province, October through December 2022

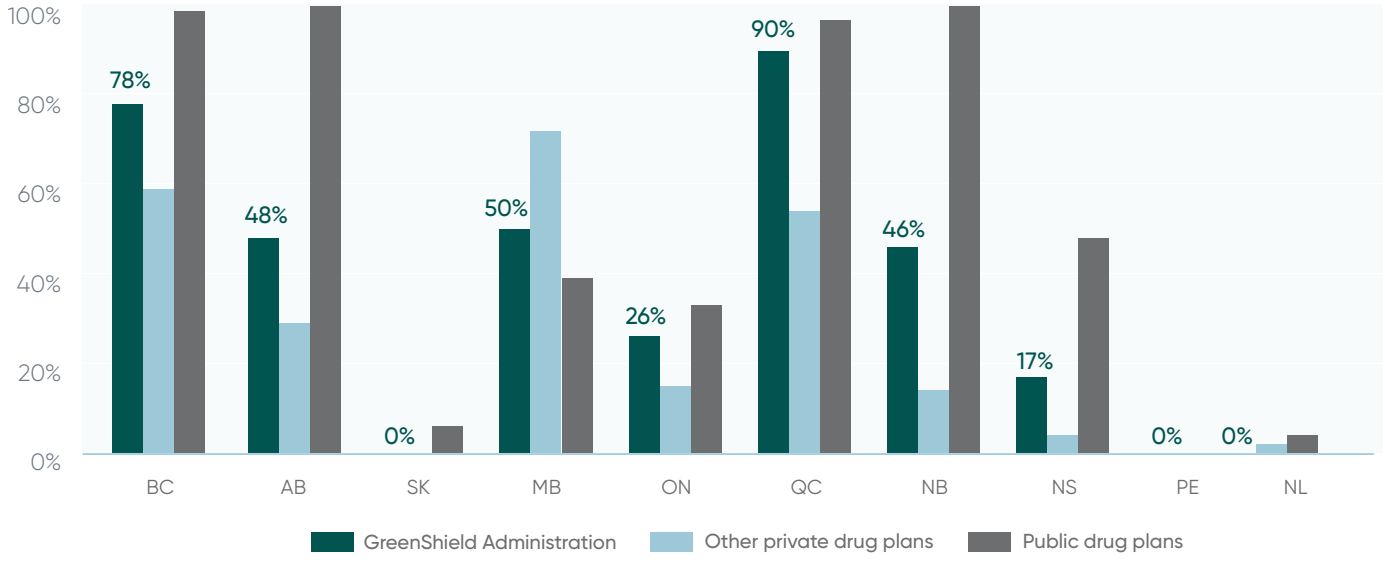
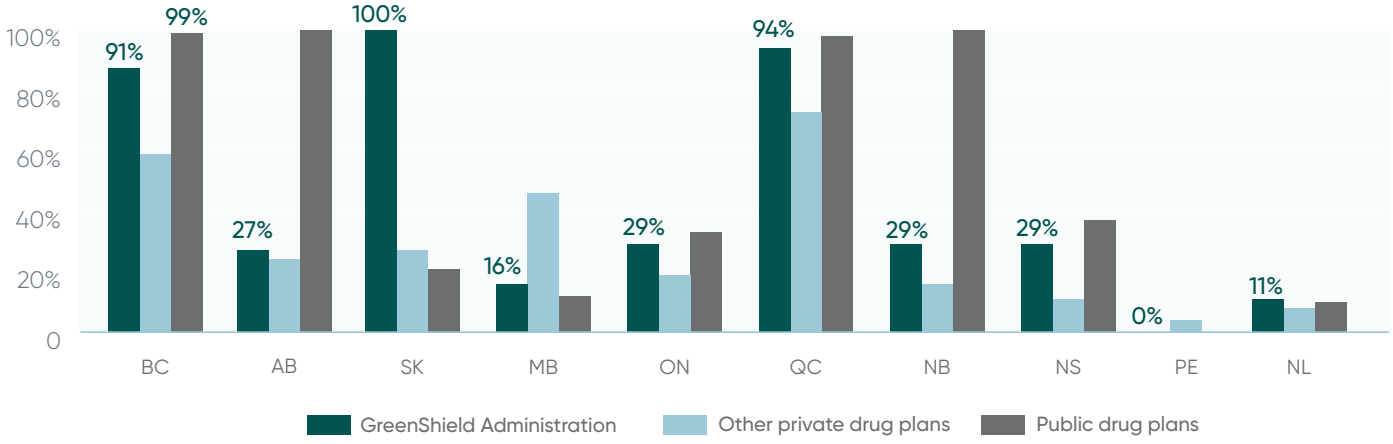


FIGURE 16

Biosimilar penetration of adalimumab by province, October through December 2022



Correlation between biosimilar share and available biosimilars

The number of biosimilars available for each biologic product varies from one to eight alternatives. Within public drug programs, most provinces listed all the available biosimilars in their formularies by the end of 2022. Biosimilars of Remicade are exceptions; Remsima and Ixifi are two of the five available biosimilars that were not yet covered by provincial drug programs. The number of biosimilars listed in public drug programs had limited impact on the corresponding biosimilar penetration rate. As an example, Enbrel (etanercept) has only two biosimilars in the market, which is less than the number of biosimilar alternatives available for Remicade or Humira.

TABLE 19

Number of biosimilars listed by public drug programs

No.	Product	Brand name	Biosimilar total cost (2022)	Number of biosimilars available	Number of biosimilars listed by the public drug programs*									
					BC	AB	SK	MB	ON	QC	NB	NS	PE	NL
1	Infliximab	Remicade	$35.4M	5	3	3	3	3	3	3	3	3	2	3
2	Adalimumab	Humira	$26.3M	8	8	8	8	8	8	8	8	8	8	8
3	Etanercept	Enbrel	$7.0M	2	2	2	2	2	2	2	2	2	2	2
4	Pegfilgrastim	Neulasta	$5.1M	4	0	4	0	0	4	4	4	4	4	4
5	Filgrastim	Neupogen	$4.2M	2	2	2	2	2	2	2	2	0	2	2
6	Insulin glargine	Lantus	$3.9M	2	0	2	2	2	2	2	2	2	2	2
7	Glatiramer	Copaxone**	$1.7M	1	1	1	1	1	1	1	1	1	1	1
8	Rituximab	Rituxan	$1.5M	4	3	4	3	4	4	4	4	3	4	3
9	Insulin lispro	Humalog	$1.4M	1	1	1	1	1	1	1	1	1	1	1
10	Insulin aspart	NovoRapid	$700K	2	2	2	2	2	2	2	1	2	2	2
11	Enoxaparin	Lovenox	$500K	4	3	3	4	4	4	3	3	3	3	4
12	Bevacizumab	Avastin	$200K	5	0	0	0	0	0	0	0	0	0	0
13	Teriparatide	Forteo	$100K	2	0	0	0	0	2	2	0	0	0	0
14	Trastuzumab	Herceptin	$3K	5	0	0	0	0	0	0	0	0	0	0

* Based on the provincial formulary-listing status as of March 2023; excludes any provincial cancer programs.
** Applies to the 20mg/ml strength only.

Enbrel's biosimilars made up a much higher share in Alberta and Ontario than the biosimilars of Remicade and Humira claimed through GreenShield Administration drug plans. In addition, biosimilar penetration rates were similar across these three products in British Columbia and Quebec (Figure 17).

While the number of available biosimilars had limited impact on their penetration rate, the biosimilar launched first usually makes up a stronger market share than other subsequent entrants (Table 20). In addition, the greater the number of biosimilar alternatives, the less concentration of share of total drug cost for any one biosimilar alternative.

FIGURE 17

Biosimilar share of claims by province, October through December 2022

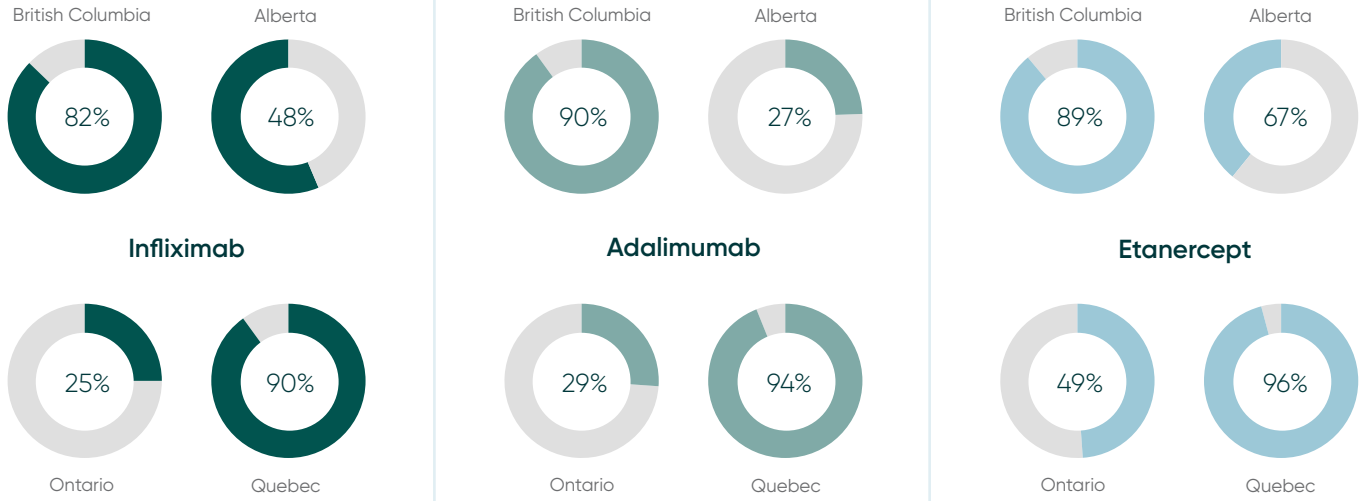


TABLE 20

Adalimumab, etanercept, and infliximab share of biosimilar total cost by province, October through December 2022

Molecule	Manufacturer	Product name	BC	AB	ON	QC	NB	NS
Adalimumab	Samsung Bioepis	Hadlima*	19%	17%	25%	16%	78%	26%
	Amgen	Amgevita	29%	17%	23%	14%	4%	0%
	Sandoz Canada Inc	Hyrimoz	36%	27%	18%	39%	0%	0%
	Fresenius Kabi Canada	Idacio	4%	4%	14%	6%	0%	0%
	BGP Pharma ULC	Hulio	9%	19%	11%	6%	17%	70%
	Pfizer Canada	Abrilada	2%	15%	7%	15%	0%	0%
	Celltrion Healthcare	Yuflyma	0%	0%	3%	0%	0%	0%
	JAMP Pharma	Simlandi	0%	0%	0%	3%	0%	4%
Etanercept	Samsung Bioepis	Brenzys*	25%	43%	63%	50%	100%	100%
	Sandoz Canada Inc	Erelzi	75%	57%	37%	50%	0%	0%
Infliximab	Hospira	Inflectra*	57%	94%	80%	87%	41%	100%
	Samsung Bioepis	Renflexis	43%	6%	16%	7%	53%	0%
	Amgen	Avsola	0%	0%	3%	6%	6%	0%
	Celltrion Healthcare	Remsima SC	0%	0%	1%	0%	0%	0%
	Pfizer Canada	Ixifi	0%	0%	0%	0%	0%	0%

*Indicates the biosimilars with the earliest Notice of Compliance (NOC) date

4

Non-specialty drugs

Section 4

Overall trends

While specialty drugs continue to dominate industry conversations, there are important trends pertaining to non-specialty drugs starting to emerge, which require close attention. The dynamics of non-specialty drugs are best illustrated by dividing GreenShield Administration claimants into cost intervals (Table 21). Each of these cost intervals is dominated by specific therapeutic categories such as asthma, migraines, and diabetes.

The overarching theme is the growing utilization of biologic drugs to treat these relatively common conditions that have typically been treated with traditional small molecule drugs. This utilization is driving unprecedented growth in spending and will require closer management of not only the appropriateness of drug therapy but also overall disease management. Total non-specialty drug cost reached $1.6 billion in 2022 up 10.8 per cent year-over-year thanks to the 10.4 per cent increase in the total number of non-specialty claimants (Table 21). The three fastest growing claimant-cost-interval categories in 2022 were the <$500, $1,000–$1,999, and the $5,000–$9,999 intervals; the dynamics of each are outlined below.

TABLE 21

Utilization by claimant cost intervals, 2022

Claimant cost intervals	Share of total drug cost	Contribution to total drug cost growth	Total drug cost growth 2022 vs. 2021 (YOY)	Claimant growth 2022 vs. 2021 (YOY)
<$500	**44.6%**	**55.0%**	**10.3%**	**10.3%**
$500–$999	14.7%	12.7%	7.0%	7.7%
$1,000–$1,999	**6.6%**	**15.7%**	**21.9%**	**20.6%**
$2,000–$2,999	1.8%	4.0%	20.9%	17.1%
$3,000–$3,999	0.8%	0.4%	3.6%	2.7%
$4,000–$4,999	0.6%	0.1%	1.3%	3.8%
$5,000–$9,999	**2.5%**	**4.5%**	**16.2%**	**21.3%**
Non-specialty	71.6%	92.4%	10.8%	10.4%
Specialty	28.4%	7.6%	2.1%	7.4%

Claimant cost interval $5,000–$9,999

Spending on drugs for claimants with an annual treatment cost of $5,000–$9,999 grew by 16.2 per cent (to $54 million or 2.5 per cent of our total drug cost) in 2022. This growth was attributed to a 21.3 per cent increase in claimants especially with the greater utilization of the biologic treatments within its top disease states.

Products used for eye diseases, such as macular degeneration, made up 24.3 per cent of the total drug cost within this cohort of products in 2022 (Table 22 following page), followed by the products used for migraines, high cholesterol, cancer, and HIV. The combination of these top five indications made up 83.7 per cent of the total drug cost.

TABLE 22

Top five disease states for claimants in the $5,000–$9,999 cost interval, 2022

Rank	Disease state	Share of total drug cost	Total drug cost growth	Claimant growth
			2022 vs. 2021	2022 vs. 2021
1	Macular degeneration	24.3%	7.2%	20.1%
2	Migraines	19.6%	25.1%	23.6%
3	Elevated cholesterol	15.1%	18.5%	18.7%
4	HIV	12.6%	62.4%	56.0%
5	Cancer	12.0%	13.0%	16.4%
Top 5 total		83.7%	Not available	

Migraines

Migraine products in the $5,000–$9,999 cohort experienced strong growth in 2022. Their total drug cost grew by 25 per cent year-over-year thanks to a 23.6 per cent increase in claimants using newer CGRP inhibitor biologic treatments, including Aimovig, Ajovy, and Emgality. Moreover, this substantial utilization growth also led the migraine class to contribute 28.2 per cent of the total drug cost growth within the $5,000–$9,999 product interval relative to its 19.6 per cent share of total drug cost.

Elevated cholesterol

Total drug cost for elevated cholesterol medications within the $5,000–$9,999 cohort grew by 18.5 per cent year-over-year. This noticeable growth was mainly driven by an increase in the number of claimants using PCSK9 inhibitors, such as Praluent and Repatha, which reached 1,500 claimants in 2022, up by 18.7 per cent from the previous year.

HIV

HIV total drug cost jumped by 62.4 per cent year-over-year in 2022. This substantial cost growth was mainly attributed to the relatively new HIV medications, like Descovy and Dovato, and they largely offset the cost decline on Truvada, Viread, Isentress, and Prezista which faced strong generic competition. As a result, HIV made up 12.6 per cent of total drug cost within the $5,000–$9,999 cohort.

Cancer

Total drug cost for cancer products in the $5,000–$9,999 cohort increased 13 per cent year-over-year due to 16.4 per cent growth in the number of claimants. Pegfilgrastim contributed 90 per cent of the year-over-year total cost growth within this therapeutic class.

Claimant cost interval $1,000–$1,999

Drug spending for claimants with an annual treatment cost between $1,000 and $1,999 have experienced exceptional growth over the years. In 2022, the total drug cost for this interval grew by 21.9 per cent; this was also the fastest annual growth rate across all cost intervals.

The top five conditions for this product interval made up 73.2 per cent of the total drug cost including 44.8 per cent from diabetes medication. Diabetes medications were the significant driver in this cohort and were responsible for 103 per cent of the total drug cost growth in 2022. This increase was attributed to higher Ozempic expenditures which rose 93 per cent year-over-year.

Migraine products in the $5,000–$9,999 cohort experienced strong growth in 2022 – their total drug cost grew by 25 per cent year-over-year.

Weight control was the other stand-out category within this cost interval. Contrave and Saxenda made up 16 per cent and 84 per cent of the weight control total drug cost in 2022. They experienced a 12 per cent and 27 per cent year-over-year total drug cost growth, respectively, thanks to the 19 per cent increase in the number of claimants.

In the medical devices/equipment category, a 44 per cent increase in the number of claimants contributed to the 18 per cent year-over-year total drug cost growth within the $1,000–$1,999 cohort.

TABLE 23

Top five disease states for claimants in the $1,000–$1,999 cost interval, 2022

Rank	Disease state	Share of total drug cost	Total drug cost growth	Claimant growth
			2022 vs. 2021	2022 vs. 2021
1	Diabetes	44.8%	70.3%	66.2%
2	Weight control	11.6%	24.4%	19.1%
3	Cervical dystonia	6.7%	12.1%	10.5%
4	Medical devices/equipment – CGM/FGM*	5.9%	17.9%	44.3%
5	Pain	4.1%	-1.0%	-5.6%
Top 5 total		**73.2%**	**Not available**	

* CGM = continuous glucose monitoring; FGM = flash glucose monitoring

Claimant cost interval <$500

Drug spend for claimants with an annual treatment cost that was less than $500 total drug cost grew by 10.3 per cent year-over-year in 2022 and made up 44.6 per cent of total drug cost, and these claimants contributed 55 per cent of the total drug cost increase year-over-year.

The top five conditions made up 39.4 per cent of the total drug cost and accounted for 44.6 per cent of the total drug cost increase within the interval. Products used for asthma/COPD and infectious diseases made the most notable contribution in 2022.

Large cost growth for asthma/COPD and infection products was mainly driven by the 44.9 per cent and 25.7 per cent jump in number of claimants, respectively, in 2022. At the start of the pandemic, social distancing and masking certainly played a role in interrupting respiratory infection transmission; however, more recently, infections bounced back, coinciding with the relaxing of COVID-19-related restrictions and the increase in respiratory illness transmission.

TABLE 24

Top five disease states for claimants in the <$500 cost interval, 2022

Rank	Disease state	Share of total drug cost	Total drug cost growth	Claimant growth
			2022 vs. 2021	2022 vs. 2021
1	Anxiety/depression	10.9%	8.4%	5.8%
2	Hypertension	8.5%	3.5%	5.3%
3	Asthma and COPD	8.0%	21.6%	44.9%
4	Acid-related gastrointestinal conditions	6.2%	7.9%	5.6%
5	Infection	5.8%	24.8%	25.7%
Top 5 total		**39.4%**	**Not available**	

5

Emerging and future trends

Section 5

Overall trends

GreenShield Administration continuously monitors emerging trends in the drug landscape to prepare and adapt our programs and services to meet our partners' needs. In this spirit of continuous evaluation, we assessed the impact of mandatory generic substitution on drug plan expenditures to understand the value it brings to our partners. In addition, after a thorough review of our claims data and literature, we identified three therapeutic categories (attention deficit hyperactivity disorder [ADHD], migraines, and asthma) that are likely to have a high impact on private benefit plans in 2023.

Mandatory generic substitution

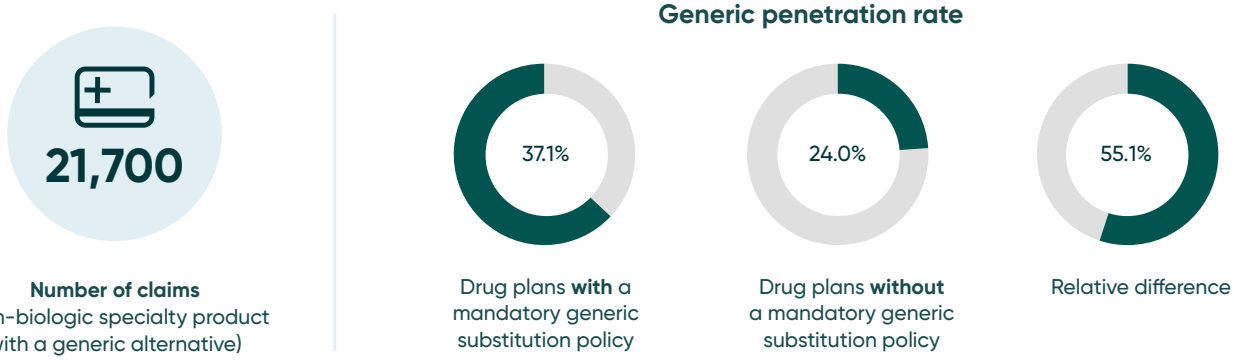
Mandatory generic substitution programs represent a key savings opportunity for drug plans not only pertaining to the use of traditional products but also within non-biologic specialty product expenditures. With specialty drug products in particular, generic substitution can translate into thousands of dollars in savings per plan member per year given the high cost of these products.

Non-biologic specialty products accounted for 35 per cent of specialty cost expenditures in 2022. The subset of non-biologic **multi-source** specialty products that have generic alternatives accounted for 21,700 GreenShield Administration claims in 2022 (including both brand and generic products). These multi-source products made up about 5.8 per cent of the specialty total drug cost and 10 per cent of the specialty product claims.

In 2022, approximately 55 per cent of plan sponsors supported by the GreenShield Administration adjudication system had an active mandatory generic substitution policy in place to promote the use of lower-cost generics for both traditional and specialty non-biologic multi-source medications. Generics made up 37 per cent of the multi-source non-biologic specialty product claims in drug plans with a mandatory generic substitution policy in place. This was much higher than the 24 per cent generic penetration rate for drug plans that did not have a mandatory generic substitution policy (Figure 18).

FIGURE 18

Non-biologic specialty generic penetration rate by drug plan type, 2022



In comparing generic penetration rates at a product level, drug plans with a mandatory generic substitution policy in place had much higher generic penetration rates for most of the top 10 multi-source non-biologic specialty products than the drug plans without mandatory generic substitution in 2022.

TABLE 25

Top 10 non-biologic specialty generic penetration rates by drug plan type, 2022

Rank	Top 10 non-biologic specialty products (In total cost)	Brand name	Indication	1st generic claim date through the IQVIA database	Generic penetration rate in 2022			
					All plans	Drug plans with mandatory generic substitution	Drug plans without mandatory generic substitution	Relative difference
1	Teriflunomide	Aubagio	Multiple sclerosis	May 24, 2022	22.0%	22.5%	22.0%	2.2%
2	Apremilast	Otezla	RA/Crohn's/ colitis/ psoriasis	December 6, 2022	0.0%	0.0%	0.3%	-100.0%
3	Fingolimod	Gilenya	Multiple sclerosis	September 26, 2019	48.0%	53.7%	27.9%	92.6%
4	Dimethyl fumarate	Tecfidera	Multiple sclerosis	October 14, 2021	27.0%	30.8%	13.0%	137.0%
5	Lenalidomide	Revlimid	Cancer	October 15, 2021	70.0%	76.6%	47.9%	59.8%
6	Imatinib	Gleevec	Cancer	May 17, 2013	66.0%	76.5%	36.2%	111.3%
7	Abiraterone	Zytiga	Cancer	January 25, 2021	48.0%	51.8%	25.6%	102.4%
8	Dasatinib	Sprycel	Cancer	January 31, 2020	79.0%	86.8%	53.5%	62.3%
9	Everolimus	Afinitor	Cancer	January 20, 2020	70.0%	86.0%	49.5%	73.6%
10	Tobramycin	Tobi	Infection	March 31, 2016	30.0%	30.6%	23.7%	29.2%

Generic penetration rates were also influenced by the timing of the first generic to enter the market. For example, the generic penetration rate for apremilast (Otezla) remained low across both plan types in 2022, as the generic alternative did not come onto the market until the end of 2022. In contrast, fingolimod (Gilenya), which has been available as a multi-source drug since September 2019, experienced a much higher generic penetration rate among plans with a mandatory generic substitution policy in place versus plans without a mandatory generic requirement.

In looking at the corresponding cost per claim for plans with a mandatory generic substitution policy in place versus plans without this requirement, we can see the combined impact of a higher generic penetration rate along with generic pricing cutbacks (Table 26 following page). For example, looking at dimethyl fumarate (Tecfidera) claims in Quebec, the combination of a higher generic penetration rate (44.3 per cent versus 30.4 per cent) along with generic pricing cutbacks, where applicable, contributes to a 57.9 per cent lower cost per claim for plans with mandatory generic substitution compared to plans without a mandatory generic requirement.

TABLE 26

Dimethyl fumarate (Tecfidera) generic penetration rate and drug cost per claim (select provinces) by drug plan type, 2022

Province	Generic penetration rate			Average cost per claim*		
	Drug plans with mandatory generic substitution	Drug plans without mandatory generic substitution	Absolute difference	Drug plans with mandatory generic substitution	Drug plans without mandatory generic substitution	Relative difference
BC	24.0%	25.8%	-1.8%	$689	$616	11.8%
AB	6.1%	6.3%	-0.1%	$1,083	$710	52.5%
MB	34.8%	0.0%	34.8%	$629	$1,699	-63.0%
ON	12.3%	4.0%	8.3%	$1,194	$1,422	-16.0%
QC	44.3%	30.4%	14.0%	$620	$1,471	-57.9%
National	**30.8%**	**13.0%**	**17.8%**	**$841**	**$1,396**	**-39.8%**

* This does not account for differences in claim size (days' supply) which may also influence the average cost per claim.

Attention deficit hyperactivity disorder

Attention deficit hyperactivity disorder (ADHD) is one of the most common neurodevelopmental disorders of childhood. It is usually first diagnosed in childhood and often lasts into adulthood. Children with ADHD may have trouble paying attention, controlling impulses, or be overly active. The cause(s) and risk factors for ADHD are unknown, but current research shows that genetics plays an important role.**

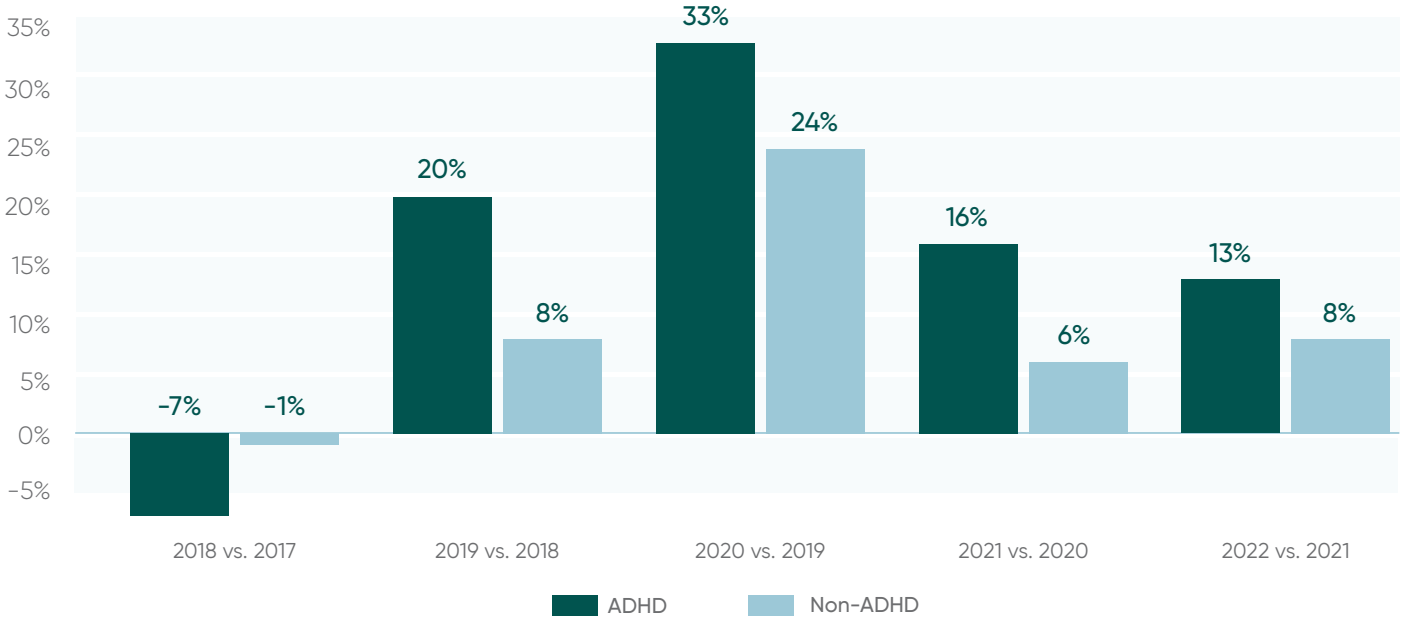
ADHD is treated through a combination of approaches, including behavioural therapy, social skills training, and pharmacotherapy. Several pharmacotherapeutic options exist, including commonly prescribed lisdexamfetamine (Vyvanse) and methylphenidate (Concerta). ADHD total drug cost has been growing at double-digit rates since 2019 and represents 5.2 per cent (or $116 million) of GreenShield Administration's total drug expenditures in 2022. ADHD's year-over-year growth rate has slowed down since its peak in 2020; however, it still outpaced the non-ADHD products in both 2021 and 2022 (Figure 19 following page). The rise in ADHD drug expenditures is driven by the strong growth in the number of claimants using these medications. In 2022, the number of ADHD claimants grew by 14.6 per cent with six of every 100 GreenShield Administration claimants now using ADHD medications.

In 2022, the number of ADHD claimants grew by 14.6 per cent with six of every 100 GreenShield Administration claimants now using ADHD medications.

** "What is ADHD?", Centers for Disease Control and Prevention website: https://www.cdc.gov/ncbddd/adhd/facts.html.

FIGURE 19

ADHD and non-ADHD total cost year-over-year (YOY) growth



	2018 vs. 2017	2019 vs. 2018	2020 vs. 2019	2021 vs. 2020	2022 vs. 2021
ADHD total cost YOY change	-7.4%	20.1%	33.0%	15.9%	13.1%
ADHD claimant YOY change	-7.8%	21.8%	26.5%	13.5%	14.6%

FIGURE 20

ADHD prevalence rate by age group, gender, and province, 2022

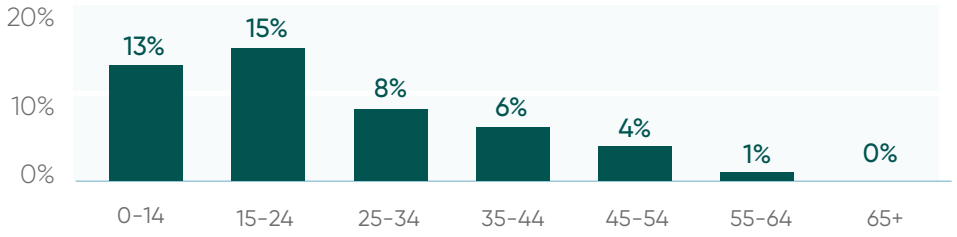
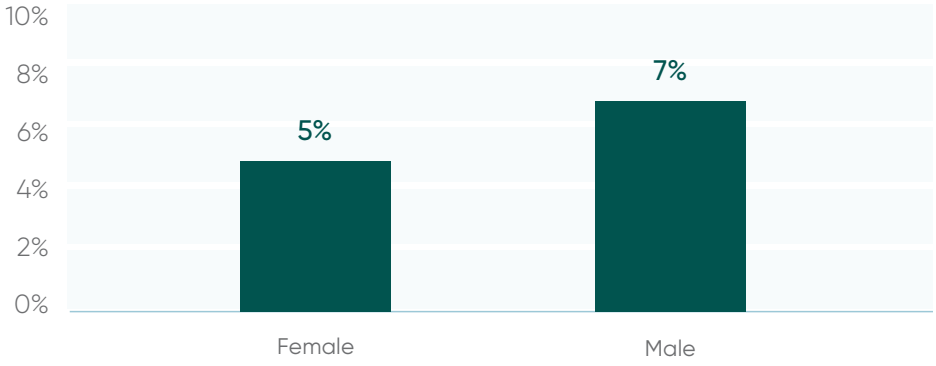
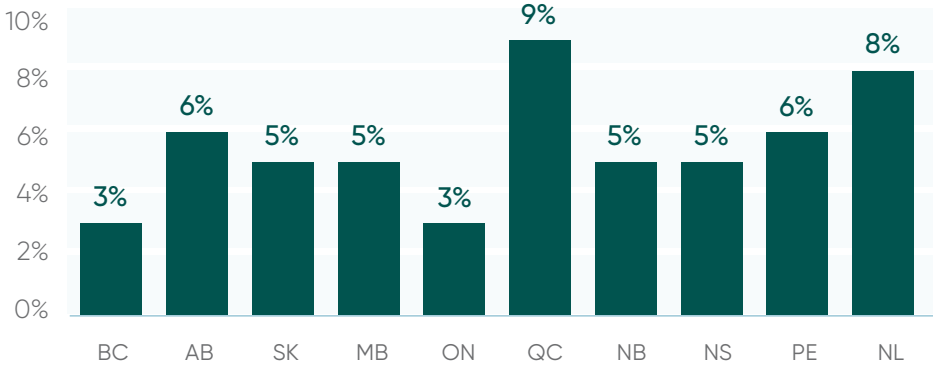


FIGURE 20 (CONTINUED)

ADHD prevalence rate by age group, gender, and province, 2022





In 2022, ADHD was found to be more prevalent in patients younger than 25 years old, males, and in certain provinces (Quebec and Newfoundland) (Figure 20).

While non-adult claimants (younger than 25 years old) had much higher ADHD prevalence, the adult cohort has shown a steady and notable growth in prevalence rate since 2018. In particular, strong growth rates in the prevalence of ADHD were observed among claimants aged 25-34 and 35-44 (Figure 21 following page). Overall, the number of adult ADHD claimants jumped by high double-digit rates in 2022. This was a much stronger growth than the five per cent increase in claimants aged 0-14 and the 14 per cent increase in claimants aged 15-24 (Figure 22 following page).

Strong growth rates in the prevalence of ADHD were observed among claimants aged 25-34 and 35-44.

FIGURE 21

ADHD prevalence rate by age group, 2018 to 2022

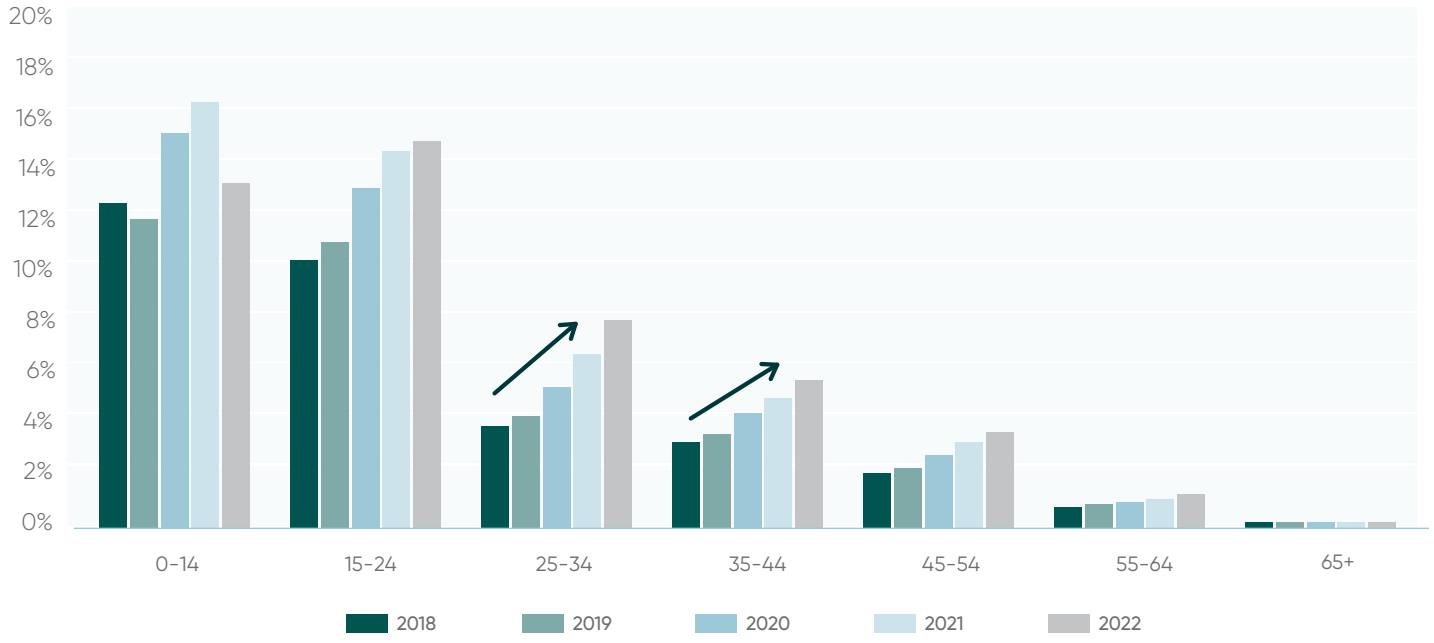
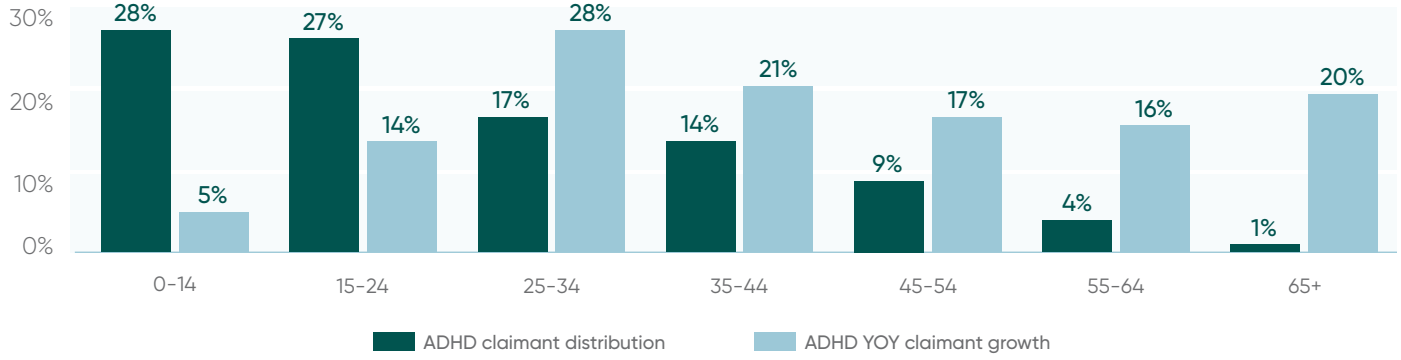


FIGURE 22

ADHD claimant distribution and year-over-year (YOY) claimant growth, 2022



ADHD product utilization

ADHD total drug cost expenditure was dominated by Vyvanse, Concerta, and Biphentin/Foquest which made up 85 per cent of the ADHD total drug cost in 2022 (Table 27 following page). The majority of the top 10 ADHD products faced generic competition with the exception of Vyvanse and Biphentin/Foquest. Vyvanse, in particular, drove ADHD growth in 2022 and contributed to $8.3 million or 61.9 per cent of the ADHD total cost growth in 2022. Spending on Concerta and its generic alternatives rose 16.2 per cent and contributed $5.3 million to the growth in ADHD spend.

TABLE 27

ADHD product utilization

Chemical name	Brand name	Product type	Share of total drug cost (2022)	Absolute total drug cost difference (2022 vs. 2021)	Total cost growth (2022)	Claim growth (2022)
Lisdexamfetamine	Vyvanse	Single source	39.2%	$8.3M	22.2%	18.4%
Methylphenidate	Concerta	Multi-source	32.9%	$5.3M	16.2%	10.5%
Methylphenidate	Biphentin/ Foquest	Single source	13.0%	$1.5M	10.8%	11.6%
Guanfacine	Intuniv XR	Multi-source	7.1%	-$2.5M	-23.1%	3.9%
Amphetamine (mixed salts)	Adderall XR	Multi-source	3.5%	$0.5M	13.6%	16.6%
Atomoxetine	Strattera	Multi-source	3.3%	$0.3M	8.2%	7.0%
Dextroamphetamine	Dexedrine	Multi-source	1.0%	$0.04M	3.4%	5.8%
Total			**100%**	**$13.4M**	**13.1%**	**12.6%**

Generic penetration rates vary significantly for ADHD multi-source products as there appears to be a strong preference for the brand among these products. While many ADHD products have lower-cost generic alternatives available, they are not being utilized to a large degree. In particular, the brand product Concerta accounted for 81 per cent of the methylphenidate claims in 2022, although its generic alternatives have been commercialized for several years. The relatively smaller generic penetration rate for methylphenidate subsequently dragged down the average generic penetration rate across ADHD multi-source products to 38 per cent, which was notably lower than the 77 per cent generic penetration rate for non-ADHD multi-source products nationally (Table 28).

The national generic penetration rate for Concerta was strongly influenced by Quebec, as 80 per cent of our Concerta claims came from this province. Overall, 83 per cent of methylphenidate claims in Quebec were filled with the brand product Concerta. This preference for brand Concerta was evident throughout all provinces and ranged from 55 per cent in Nova Scotia to 88 per cent in Saskatchewan (Table 28).

TABLE 28

Generic penetration rate on ADHD products, 2022

Region	Methylphenidate (Concerta)	Guanfacine (Intuniv XR)	Amphetamine (mixed salts) (Adderall XR)	Atomoxetine (Strattera)	Dextroam-phetamine (Dexedrine)	ADHD multi-source products	Non-ADHD multi-source products
Total drug cost (all products)	$38.2M	$8.3M	$4.1M	$3.8M	$1.1M	$55.4M	$1.0B
Generic penetration rate							
National	19%	54%	77%	95%	46%	38%	77%
BC	36%	13%	62%	96%	53%	46%	83%
AB	20%	28%	41%	88%	31%	31%	80%
SK	12%	21%	19%	100%	50%	21%	88%
MB	19%	2%	73%	78%	62%	26%	86%
ON	26%	46%	65%	89%	69%	42%	80%
QC	17%	58%	90%	95%	38%	38%	75%
NB	33%	52%	78%	93%	57%	47%	84%
NS	45%	35%	89%	98%	43%	60%	85%
PE	28%	64%	92%	100%	No claims	45%	87%
NL	41%	36%	73%	98%	55%	50%	86%

Migraines

Migraine is a chronic neurological disorder characterized by headaches that can cause severe throbbing pain typically on one side of the head. It is often accompanied by nausea, vomiting, and extreme sensitivity to light and sound. Migraine attacks can last for hours to days, and the pain can be severe enough to interfere with daily activities. Migraines affected 2.3 per cent (or 53,500) of GreenShield Administration claimants in 2022. Traditionally migraines have been treated with pain relievers, such as triptans, non-steroidal anti-inflammatory drugs (NSAIDs), and even opioids, but more recently a new category of biologic drug treatments, called anti-CGRPs (also called calcitonin gene-related peptide [CGRP] receptor antagonists or CGRP inhibitors), has been approved. These medications are designed to prevent migraines by targeting CGRP, a protein involved in generating the head pain associated with migraine.

In 2022, nearly eight per cent (or 4,200) of our claimants used biologic medications to manage their migraine condition. Biologic migraine medication use has grown at a 28.2 per cent annualized growth rate between 2018 and 2022, driven primarily by the growing utilization of this relatively new class of biologic medications (anti-CGRPs).

To assess the impact of the anti-CGRP medications on a number of efficacy indicators, we conducted a longitudinal analysis of patients utilizing one of four targeted biologic products (Aimovig, Emgality, Ajovy, and Botox) used for migraine prevention. For Botox, since it can be used for multiple conditions, only patients who were using the medication specifically for the prevention of migraines were included in the analysis. The patients were tracked for a time period of one year before and one year after their first claim (index date) for the targeted biologic product. Patients were divided into two cohorts: those that had a non-biologic migraine treatment claim within the 12-month look-back period prior to their initiation of biologic drug therapy (termed **existing** patients) and those that did not have any non-biologic migraine treatment claim during the same time period (termed **naïve** patients).

The post-index period begins from a patient's first biologic claim date and looks at the first 12 months of their biologic therapy treatment journey. This time period is used to identify treatment patterns and to assess the prevalence of various other conditions as a comparator to the utilization that happened in the 12-month look-back period prior to their index date.

Migraines affected 2.3 per cent (or 53,500) of GreenShield Administration claimants in 2022.

For the group of claimants using biologic migraine treatment, 3,202 were selected based on the longitudinal study criteria*, including 2,051 existing migraine therapy patients and 1,151 naïve patients that were new to all migraine treatments. The number of study patients that used Botox as their first biologic treatment between 2016 and 2022 made up 60 per cent of the total selected migraine claimant population, followed by 30 per cent with Aimovig (Table 29).

TABLE 29

Number of selected claimants by product

Product	Existing patients	Naïve patients	Total
Botox	1,119	819	1,938 (61%)
Aimovig	701	258	959 (30%)
Emgality	171	49	220 (7%)
Ajovy	60	25	85 (3%)
Total	**2,051**	**1,151**	**3,202 (100%)**

* Additional patient selection criteria:

- The study period is defined as 2016 to 2022.
- Each selected patient was assigned an index date based on the date of their first claim for a targeted biologic medication within the study period.
- Patient utilization was tracked one year before and one year after the patient's first claim for a targeted biologic product between 2016 and 2022.
- Only patients that were "active" were included in the analysis. This "active" classification was determined by ensuring that the patients had claim activities for any products (including the targeted products and non-targeted products) beyond the one-year look-back period and beyond the one-year post-index period to ensure the patient remained valid throughout.

The treatment journey for study patients differed between existing versus naïve migraine patients after initiating the biologic migraine medications (Table 30). Within the cohort of existing migraine patients, 18 per cent stopped using non-biologic migraine medications such as triptans once they began using biologic migraine treatments. (Triptans are used for acute treatment of migraine attacks and made up more than 95 per cent of the non-biologic migraine claims.) In contrast, 16 per cent of the naïve patients that were new to migraine treatment added non-biologic migraine medications along with the biologic medication to manage their migraine.

Migraine patients also suffered from other migraine-related comorbidities (Table 30). For instance, 54.9 per cent of the existing migraine patients used pain medications to manage their migraine headaches and nearly 70 per cent used anxiety/depression medications prior to the initiation of biologic migraine treatment. Additional medications primarily used for the treatment of other conditions, including hypertension, epilepsy/seizure, gastroparesis, and cervical dystonia, could also be used to manage migraines (prophylaxis or symptom management).*

Once patients began treatment with a biologic migraine medication, the largest decline in prevalence was observed for other uses of Botox (non-migraine conditions) where the claimant may have used Botox primarily for non-migraine conditions and secondarily as their migraine treatment before switching to another biologic option. The study also observed a substantial decline in the use of propranolol, topiramate, and metoclopramide – primarily used for hypertension, epilepsy/seizure disorders, and gastroparesis, respectively – which pushed down their respective prevalence rates.

The decline of anxiety/depression and pain prevalence rates was less notable. While some patients' reliance on mental health and pain medications decreased after taking the biologic treatment, 91 per cent of the existing patient cohort still used medications to treat anxiety/depression, and 94 per cent continued to use pain medications after starting the new biologic migraine treatments.

Constipation, on the other hand, was one of very few conditions with greater prevalence for both the existing (35 per cent) and naïve (26 per cent) migraine patients, as this is considered one of the common side-effects of the biologic migraine medications.

TABLE 30

Migraine claimant significant disease states prevalence rate

Disease state	Prevalence rate					
	Existing migraine patients (2,051)			Naïve migraine patients (1,151)		
	Prior to index period	On and beyond index period	Relative difference	Prior to index period	On and beyond index period	Relative difference
Non-biologic migraine products	100.0%	82.2%	-17.8%	N/A	15.9%	N/A
Biologic migraine products	N/A	100.0%	N/A	N/A	100.0%	N/A
Other uses of Botox (non-migraine conditions including cervical dystonia)	17.1%	2.0%	-88.5%	19.0%	1.0%	-95.0%
Anxiety/depression	68.8%	62.5%	-9.2%	32.5%	30.5%	-6.1%
Epilepsy/seizure disorders	52.2%	34.9%	-33.2%	19.6%	15.7%	-19.9%
Gastroparesis	9.4%	7.5%	-19.8%	2.0%	2.1%	7.5%
Hypertension	41.4%	30.7%	-25.8%	16.5%	13.8%	-16.0%
Pain	54.9%	51.4%	-6.3%	27.8%	27.3%	-1.9%
Constipation	10.0%	13.5%	34.5%	2.4%	3.1%	26.0%

N/A: Not applicable

* Additional notes:

- 17 per cent of the existing migraine patients had a claim for Botox that was categorized as other uses of Botox (non-migraine conditions including cervical dystonia) since they did not meet the migraine criteria from available indication data.
- 41 per cent of the existing migraine patients also used a hypertension medication prior to their biologic migraine treatment, and 41 per cent of these patients used propranolol (Teva-Propranolol). While this product is primarily indicated for hypertension, it can also be used for migraine prophylaxis.
- 73 per cent of the epilepsy/seizure migraine patients used topiramate (Pms-Topiramate), an ingredient primarily indicated for epilepsy/seizure which can also be used for migraine prophylaxis.
- All gastroparesis migraine patients used metoclopramide (Pms-Metoclopramide); while primarily used for gastroparesis, this medication can also be used to manage migraine symptoms.

In looking at the level of drug spend, biologic migraine treatments pushed up the existing migraine patients' overall total drug cost by $9.1 million (or 132 per cent) and naïve patients' total drug cost by $3.9 million (or 142 per cent) compared to their annual expenses prior to biologic migraine treatments (Table 31). This increase in migraine expenditure was, however, partially offset by a reduction in expenditures on other conditions.

Non-migraine drug expenditures decreased by $0.4 million (or 8.3 per cent) for the existing patient cohort and by $0.1 million (or 4.9 per cent) for the naïve migraine patients. This was mainly driven by the reduction in spending on Botox for other uses (non-migraine conditions). If the Botox for other uses (non-migraine conditions) is excluded, the non-migraine treatment costs rose by more than $0.2 million for the two patient cohorts; this was partially driven by higher expenditures on pain and anxiety/depression medications.

Within non-biologic migraine expenditures, 18 per cent of existing migraine patients stopped using the non-biologic migraine medications once they started the biologic migraine treatments which led to a $0.2 million savings for the existing migraine patients. In contrast, 16 per cent of the naïve patient cohort began treatment with non-biologic migraine medications which added $0.1 million to their total treatment cost.

Biologic migraine treatments pushed up the existing migraine patients' overall total drug cost by $9.1 million (or 132 per cent).

TABLE 31

Migraine claimant significant disease states total drug cost

Disease state	Total drug cost					
	Existing migraine patients (2,051)			Naïve migraine patients (1,151)		
	Prior to index period	On and beyond index period	Absolute difference	Prior to index period	On and beyond index period	Absolute difference
Non-biologic migraine products	$1.8M	$1.6M	-$0.2M	N/A	$0.1M	$0.1M
Biologic migraine products	N/A	$9.8M	$9.8M	N/A	$4.0M	$4.0M
Non-migraine products	$4.3M	$4.6M	$0.2M	$2.4M	$2.6M	$0.3M
Other uses of Botox (non-migraine conditions including cervical dystonia)	$0.7M	$0.1M	-$0.6M	$0.4M	$0.03M	-$0.4M
Total	**$6.9M**	**$16.0M**	**$9.1M**	**$2.8M**	**$6.7M**	**$3.9M**
Anxiety/depression	$562.5K	$572.9K	$10.4K	$264.9K	$273.3K	$8.4K
Epilepsy/seizure disorders	$330.2K	$270.4K	-$59.7K	$128.8K	$128.4K	-$0.5K
Gastroparesis	$6.2K	$6.9K	$0.7K	$1.4K	$1.4K	$0.0K
Hypertension	$159.7K	$143.5K	-$16.2K	$70.5K	$67.0K	-$3.5K
Pain	$427.6K	$440.8K	$13.2K	$294.3K	$284.9K	-$9.5K
Constipation	$20.3K	$23.5K	$3.2K	$9.8K	$18.1K	$8.3K

N/A: Not applicable

Asthma/COPD

Asthma is a common respiratory condition affecting 3.8 million Canadians. Symptoms of asthma include shortness of breath, wheezing, coughing, and chest tightness. This condition disproportionately affects children and youth but can afflict individuals of all ages. Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory lung disease that causes obstructed airflow from the lungs. It's typically caused by long-term exposure to irritating gases or particulate matter, most often from cigarette smoke.*

There is a significant degree of overlap in the medication regimens used to treat asthma and COPD. Medications primarily used for asthma/COPD were claimed by 16 per cent (or 382,000) of GreenShield Administration claimants in 2022; however, only 0.6 per cent (or 1,700) of these claimants used biologic medications to manage their symptoms. Nevertheless, the number of claimants using biologic medications to manage severe asthma experienced a 13.5 per cent annualized growth rate between 2018 and 2022. This analysis will focus on the subset of patients that used targeted biologic products to specifically treat asthma (Fasenra, Nucala**, Xolair**, Cinqair, or Dupixent**) and will explore the use of supporting therapies.

To assess the impact of biologic asthma medications on a number of efficacy indicators, we conducted a longitudinal analysis of patients utilizing one of five targeted biologic products (Fasenra, Nucala, Xolair, Cinqair, or Dupixent) used for asthma. The patients were tracked for a time period of one year before and one year after their first claim (index date) for the targeted biologic product. Patients were divided into two cohorts: those that had a non-biologic asthma/COPD treatment claim within the 12-month look-back period prior to their initiation of biologic drug therapy (termed **existing** patients) and those that did not have any non-biologic asthma/COPD treatment claim during the same time period (termed **naïve** patients).

The post-index period begins from a patient's first biologic claim date and looks at the first 12 months of their biologic therapy treatment journey. This time period is used to identify treatment patterns and to assess the prevalence of various other conditions as a comparator to the utilization that happened in the 12-month look-back period prior to their index date.

A subset of 863 asthma/COPD patients met the longitudinal study criteria*** including 793 existing patients and 70 naïve patients that were new to all asthma/COPD treatments. The number of patients that used Xolair as their first biologic treatment made up 60 per cent of the total selected asthma claimant population, followed by 20 per cent with Nucala and 14 per cent with Fasenra (Table 32 following page).

Asthma is a common respiratory condition affecting 3.8 million Canadians.

Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory lung disease that causes obstructed airflow from the lungs.

* "COPD," Mayo Clinic website: https://www.mayoclinic.org/diseases-conditions/copd/symptoms-causes/syc-20353679.

** As Dupixent, Nucala, and Xolair can be used for multiple conditions, only patients that had claims with indications related to asthma were used for this analysis.

*** Additional patient selection criteria:

- The study period is defined as 2016 to 2022.
- Each selected patient was assigned an index date based on the date of their first claim for a targeted biologic medication within the study period.
- Patient utilization was tracked one year before and one year after the patient's first claim for a targeted biologic product between 2016 and 2022.
- Only patients that were "active" were included in the analysis. This "active" classification was determined by ensuring that the patients had claim activities for any products (including the targeted products and non-targeted products) beyond the one-year look-back period and beyond the one-year post-index period to ensure the patient remained valid throughout.

TABLE 32

Number of selected claimants by product

Product	Existing patients	Naïve patients	Total
Xolair	473	47	520 (60%)
Nucala	164	7	171 (20%)
Fasenra	114	7	121 (14%)
Dupixent	31	8	39 (5%)
Cinqair	11	1	12 (1%)
Total	**793**	**70**	**863 (100%)**

The treatment journey for study patients differed between existing versus naïve patients after initiating the biologic asthma medications (Table 33). Within the naïve patient cohort, 38.6 per cent of patients began using non-biologic asthma/COPD medications along with the biologic medication to manage their condition. This included montelukast, albuterol, and budesonide/formoterol which made up 65 per cent of the non-biologic asthma/COPD claims. In contrast, 3.7 per cent of the existing patient cohort stopped using non-biologic asthma/COPD medications once they started using biologic treatments.

Patients with asthma/COPD also suffered from other asthma/COPD-related comorbidities (Table 33). Fifty-eight per cent of existing asthma/COPD patients also used medications to manage their allergies, and 35.6 per cent used anxiety/depression medications prior to their biologic asthma treatment. Seventy-four per cent of the existing asthma/COPD patients also used medications for endocrine disorders including 92 per cent who claimed prednisone. While prednisone's primary indication is for the treatment of endocrine disorders, such as chronic primary adrenocortical insufficiency (Addison's disease), it is also indicated for allergies.

TABLE 33

Asthma/COPD claimant significant disease states prevalence rate

Disease state	Prevalence rate					
	Existing asthma/COPD patients (793)			Naïve asthma/COPD patients (70)		
	Prior to index period	On and beyond index period	Relative difference	Prior to index period	On and beyond index period	Relative difference
Non-biologic asthma/COPD products	100.0%	96.3%	-3.7%	N/A	38.6%	N/A
Biologic asthma products	N/A	100.0%	N/A	N/A	100.0%	N/A
Other uses of Dupixent, Xolair, and Nucala (non-asthma conditions)	12.7%	1.6%	-87.1%	21.4%	7.1%	-66.7%
Allergies	58.3%	53.2%	-8.7%	41.4%	34.3%	-17.2%
Anxiety/depression	35.6%	36.2%	1.8%	14.3%	18.6%	30.0%
Endocrine disorders	74.0%	53.5%	-27.8%	12.9%	17.1%	33.3%
Infection	75.7%	66.6%	-12.0%	30.0%	38.6%	28.6%
Pain	31.8%	35.2%	10.7%	12.9%	20.0%	55.6%

N/A: Not applicable

Once patients began treatment with a biologic asthma medication, there was a decline in the prevalence of medications to treat other comorbidities, especially for the existing asthma/COPD patients. The prevalence of endocrine disorders, infection, and allergies declined by 27.8 per cent, 12 per cent, and 8.7 per cent among existing patients, respectively. In contrast, the naïve patients saw a 33.3 per cent increase in endocrine disorders and a 28.6 per cent increase in infection, along with a 17.2 per cent decrease in allergies, after using the biologic asthma medications. Pain medications experienced a 10.7 per cent increase in prevalence for existing patients and a 55.6 per cent increase among naïve patients beyond the index period. This may be because pain is considered one of the side-effects of these biologic medications. In addition, more patients used medications to manage their anxiety/depression symptoms beyond the index period, including the 30 per cent rise among naïve patients.

In looking at the level of drug spend, biologic asthma treatments pushed up the existing asthma/COPD patients' overall total drug cost by $21.2 million (or 361 per cent) and the naïve patients' drug cost by $1.1 million (or 234 per cent) compared to their annual expenses prior to the biologic asthma treatments (Table 33 previous page). This increase in expenditure was partially offset by a reduction in non-biologic asthma/COPD medications; 3.7 per cent of existing asthma/COPD patients stopped using non-biologic asthma/COPD medications once they started biologic asthma treatments, which led to a reduction of $0.02 million. In contrast, 19 per cent of the naïve patient cohort added non-biologic asthma/COPD medications to their total treatment cost resulting in a $0.02 million increase in spend. However, non-biologic asthma/COPD medications had a marginal impact on the overall total drug cost within both cohorts.

Meanwhile, the lower utilization of Xolair, Nucala, and Dupixent for non-asthma indications also contributed a $2.46 million lower spend on these medications by existing patients and $0.4 million by naïve patients. Regarding the use of medications to treat other conditions, a decline in the prevalence of endocrine disorders and infection for the existing patients helped lower overall expenditures for these patients. This was partially offset by an increase in spending on allergies and anxiety/depression.

Within the naïve patient cohort, spend on infection medication jumped by more than 31 times although its prevalence rose only by 28.6 per cent after the biologic asthma treatment. This disproportional growth was driven by one patient who used Cayston (indicated for the management of cystic fibrosis patients with chronic pulmonary *pseudomonas aeruginosa* infections) which contributed to 95 per cent of the total spend on infection.

TABLE 34

Asthma/COPD claimant significant disease states total drug cost

Disease state	Total drug cost					
	Existing asthma/COPD patients (793)			Naïve asthma/COPD patients (70)		
	Prior to index period	On and beyond index period	Absolute difference	Prior to index period	On and beyond index period	Absolute difference
Non-biologic asthma/COPD products	$1.4M	$1.4M	-$0.02M	N/A	$0.02M	$0.02M
Biologic asthma products	N/A	$23.4M	$23.4M	N/A	$1.44M	$1.44M
Other uses of Dupixent, Xolair, and Nucala (non-asthma conditions)	$2.5M	$0.1M	-$2.46M	$0.43M	$0.03M	-$0.40M
Non–asthma/COPD products	$1.9M	$2.2 M	$0.3M	$0.05M	$0.12M	$0.10M
Total	**$5.9M**	**$27.1M**	**$21.2M**	**$0.5M**	**$1.6M**	**$1.1M**
Allergies	$148.7K	$157.6K	$8.9K	$6.6K	$13.3K	$6.7K
Anxiety/depression	$111.4K	$118.2K	$6.8K	$3.6K	$5.7K	$2.1K
Endocrine disorders	$34.0K	$23.1K	-$11.0K	$0.3K	$0.5K	$0.2K
Infection	$349.4K	$290.7K	-$58.7K	$1.6K	$51.7K	$50.0K
Pain	$67.2K	$65.1K	-$2.1K	$0.5K	$1.1K	$0.6K

N/A: Not applicable

GreenShield Administration™

Unlocking Better Health for All

GreenShield is a not-for-profit health and benefits company, and the only organization in Canada operating as an integrated payer-provider— offering insurance, administering benefits, and paying claims as a 'payer' while offering health services such as mental health, pharmacy, and medical services as a 'provider.' Integrating both sides of the payer-provider equation enables us to simplify access to care, remove administrative barriers, and improve health outcomes for its customers.

GreenShield Administration: Integrated health and benefits technology, services and expertise

For over 65 years, GreenShield has earned a reputation for exceptional adjudication and administration of pharmacy, dental, and extended health claims, serving over 6 million Canadians. Through the amalgamation of our best-in-class expertise in health and benefits administration across pharmacy benefits management, claims adjudication and benefits administration, our GreenShield Administration division has become an innovative leader at the forefront of total health benefits management.

We are the only partner able to offer an end-to-end suite of integrated health and benefits technology and services, tailored to customers of all sizes. Our clientele ranges from Canada's largest public and private organizations to smaller companies that leverage our capabilities through our third-party administration services.

Our capabilities translate into tangible benefits for our clients, offering them access to proprietary data, invaluable insights into unique complexities faced by patients, and an enhanced health care experience, all while effectively managing and controlling costs.

Giving back isn't what we do; it's who we are

GreenShield is uniquely structured as a not-for-profit social enterprise. We reinvest our earnings and redeploy our services to support underserved Canadian communities via our social impact brand, GreenShield Cares. The company's overarching goal is to generate $75 million of social impact investments to improve the lives of at least 1 million Canadians by 2025, with a focus on mental health, oral health, and essential medicines.

As the industry's noble challenger GreenShield continues to innovate, evolving its offerings and services to deepen its purpose of championing **Better Health for All**.

2023

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