EE145

Comparison of Time-driven Activity-based Costs Incurred by Patients and Caregivers Related to Intravitreal Injections for Retinal Vein Occlusion

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Introduction

- Retinal vein occlusion (RVO) is the second-most-common cause of vision loss related to retinal vascular conditions, affecting approximately 28 million adults worldwide.[1]
- Standard management of RVO involves ongoing intravitreal (IVT) injections with anti-vascular endothelial growth factor (VEGF) therapy.[2,3]
- Four anti-VEGF IVT injection therapies are used in Canada for RVO, with administration involving patient-specific dosing and maintenance injection frequencies that vary from every (Q) 4 to 16 weeks (W).[4-11]
- Reception of these injections places a substantial burden on patients and their caregivers related to travel needs, lost productivity, and other factors.[12-14] The financial impact of this burden on Canadians is unclear.

Objective

A time-driven activity-based costing (TDABC) study was conducted to quantify the financial burden associated with IVT injection of anti-VEGF therapies that is experienced by Canadian patients with RVO and their caregivers.

Methods

- The journey of patients with RVO and their caregivers was modeled to capture activities (direct and indirect) related to reception of IVT anti-VEGF therapies over a three-year period in the context of the publicly funded Canadian healthcare system.
- Costs for productivity loss (i.e., driving, appointment, and recovery time), ancillary needs (i.e., gas, parking) (Table 1), and treatment (list price; Table 2) were quantified in Canadian dollars using publicly available data.
- Costs related to IVT injection-related anxiety, stress, and adverse events were excluded given variability in reporting of frequency and costs and/or a limited differential impact across regimens.
- Visit frequencies for the injections were considered according to Health Canada-approved (aflibercept 2 mg originator[5] and biosimilars[6,7], ranibizumab originator[8] and biosimilars,[9,10] and faricimab[11]) or studied (bevacizumab[4]; off label) dosing regimen(s) for RVO (n = 10 regimens).
- Preliminary findings were validated by Fighting Blindness Canada.

Results

$1,914 CAD

Additional cost incurred by RVO patients and caregivers per injection visit related to **productivity loss and travel**

For each of the 10 regimens considered, **the total additional cost** to patients and caregivers was **higher than the total drug cost**

Faricimab

administered at a **Q16W maintenance** interval (14 visits over 3 years) **had the lowest total cost burden ($45,687 CAD) of all regimens evaluated**

Table 1. Model inputs and assumptions based on patient journey

Input Type	Assumptions	Cost (CAD)
Productivity Loss		
Time driving to and from appointment	■ 66 min each way: 132 min per person[15-17] ■ Total time (patient + caregiver): 264 min ■ Average wage: $32.96/hour[18,19a]	$145.02
Appointment time	■ Preparation, waiting, procedure, in-clinic recovery: 105 min per person[15,20] ■ Total time (patient + caregiver): 210 min ■ Average wage: $32.96/hour[18,19a]	$115.36
Recovery time	■ 24 hr lost to foggy vision for patient[15-17] ■ 24 hr lost to caregiving activities[15-17] ■ Total time (patient + caregiver): 48 hr ■ Average wage: $32.96/hour[18,19a]	$1,582.08
Travel by Car		
Cost of gas to and from clinic	■ Average distance: 160 km (return)[b] ■ Fuel consumption rating: 0.09 L/km[b] ■ Average gas price: $1.45/L[21]	$20.88
Cost of parking	■ Parking time: 2 hours[15] ■ Average cost: $25/hour[b]	$50.00
TOTAL		**$1,913.34**

[a] Weighted average; assumes 50% of patients with RVO are aged >65 years. Average 2023 annual income for Canadians >65 years: $52,500; 1,950 hours = $26.92/hr. Average 2025 income for employed Canadians: $38.99/hr (average of $31.21/hr for hourly employees and $46.77/hr for salaried employees).
[b] Based on Canadian averages.

Table 2. Summary of 3-year treatment costs for IVT anti-VEGF injections for RVO

Drug Regimen	Treatment Frequency	No. of Visits over 3 yrs	Total Drug Cost for 3 yrs (CAD)	Additional Patient/Caregiver Costs (CAD)	Total Financial Burden (CAD)
Bevacizumab[4] Q4W	Q4W for first 6 doses, then Q4W	39	$20,241	$74,620	$94,861
Aflibercept originator[5] Q12W (Regimen 1)	Q4W for first 6 doses, then Q12W	17	$24,106	$32,527	$56,633
Aflibercept biosimilar[6,7] Q12W (Regimen 1)			$14,464	$32,527	$46,990
Aflibercept originator[5] Q8W (Regimen 2)	Q4W for first 6 doses, then Q8W	22	$31,196	$42,094	$73,290
Aflibercept biosimilar[6,7] Q8W (Regimen 2)			$18,718	$42,094	$60,811
Ranibizumab originator[8] Q8W	Q4W for first 6 doses, then Q8W	22	$34,650	$42,094	$76,744
Ranibizumab biosimilar[9,10] Q8W			$19,800	$42,094	$61,894
Faricimab[11] Q16W (Regimen 1)	Q4W for first 6 doses, then Q16W	14	$18,900	$26,787	$45,687
Faricimab[11] Q12W (Regimen 2)	Q4W for first 6 doses, then Q12W	17	$22,950	$32,527	$55,477
Faricimab[11] Q8W (Regimen 3)	Q4W for first 6 doses, then Q8W	22	$29,700	$42,094	$71,794

Lowest cost Highest cost

Discussion & Conclusions

- Intravitreal anti-VEGF injection regimens that require more frequent visits result in increased productivity loss and higher travel burden for patients and caregivers.
- Although drug costs for IVT anti-VEGF injection therapy for RVO are not inconsequential, additional treatment-related activity costs are higher.
- Among the 10 IVT injection regimens considered, faricimab dosed at a Q16W maintenance interval was associated with the lowest number of injection visits and lowest total financial burden.
  - This economic benefit is consistent with the durability shown in pivotal trials: ~60% of BALATON (BRVO) and ~50% of COMINO (CRVO/HRVO) patients achieved a ≥Q12W dosing schedule at Week 68.[22]
- These findings indicate that longer-duration IVT therapies such as faricimab can reduce the economic burden experienced by patients with RVO and their caregivers, an important consideration in the management of this chronic disease.
- These results may be impacted by type of patient/caregiver employment, distance from treatment centre, and variations in local costs related to travel needs.

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Disclosures

S. Somani is a consultant for Johnson & Johnson and serves on advisory boards for Apellis, Apotex, Bayer, and Roche.
A. Szigiato serves on advisory boards for Apellis, Apotex, Bayer, and Roche, and has received research funding from Bayer and an educational grant from Roche.
P. Shah is a consultant for Apotex, Astellas, Bayer, Roche, and Sandoz.
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Abbreviations

BRVO, branch retinal vein occlusion; **CAD**, Canadian dollars; **CRVO**, central retinal vein occlusion; **hr**, hour(s); **HRVO**, hemiretinal vein occlusion; **IVT**, intravitreal; min, min(s); **QXW**, every X weeks; **RVO**, retinal vein occlusion; **TDABC**, time-driven activity-based costing; **VEGF**, vascular endothelial growth factor; **yrs**, years.

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