Cost-minimization analysis of introducing sublingual immunotherapy for the treatment of house dust mite allergic rhinits in Ontario

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Background

The SQ HDM SLIT-tablet was recently approved by Health Canada as allergy immunotherapy (AIT) for the treatment of moderate to severe house dust mite (HDM) induced allergic rhinitis (AR)[1]. AIT is a 3-year treatment and has traditionally been delivered as subcutaneous (SCIT) injections, administered in the physician's office. The sublingual immunotherapy tablet (SLIT-tablet) is suitable for at-home treatment after the first dose has been administered in the physician's office. This analysis was done to understand the economic implications of introducing SQ HDM SLIT-tablet in Ontario, where SCIT is already an available treatment option.

House House dust mites are one of the most common source of indoor allergens worldwide, and its presence as a perennial allergen makes HDM respiratory allergic disease a chronic condition. In Canada, the most common species of HDM include *Dermatophagoides pteronyssinus (D. pteronyssinus)* and *Dermatophagoides farinae (D. farinae)*[4].

Methods

Based on the evidence available it was assumed that the SQ HDM SLIT-tablet has at least the same efficacy as SCIT, and thus a cost-minimization analysis (CMA) was deemed appropriate to estimate the economic impact of the SQ HDM SLIT-tablet compared to SCIT. The underlying assumption of therapeutic equivalence could be considered conservative given the evidence supporting a favorable safety profile for SLIT vs. SCIT[11,12,13]. A societal perspective was adopted in the model, including relevant costs such as; costs of medications, services of health care professional and patient resources. Costs and resources were based on published sources, where possible. In case no published sources were available the input to the model was based on physician opinion. The time horizon in the model was 3 years, which corresponds to treatment course of AIT. A discount rate of 1.5% was applied in accordance with CADTH guidelines[2]. To understand the robustness of the results, sensitivity analyses were performed.

Results

The CMA shows that the societal cost of 3 year treatment with SCIT was 7,420 CAD, compared to 5,048 CAD if treated with the SQ HDM SLIT-tablet, leading to an overall saving of 2,372 CAD. The sensitivity analyses showed the results to be robust. Of the sensitivity analyses nurse time per injection visit as well as number of injections per vial had the biggest impact on the results.

Table 1: Resource use SCIT and SQ HDM SLIT-tablet

	SCIT			SQ HDM SLIT-tablet		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
10 mL vial* (10 inj.)	**3.1**	**1.3**	**1.3**	**-**	**-**	**-**
SQ HDM SLIT-tablet (30 tabl.)	**-**	**-**	**-**	**12**	**12**	**12**
Start-up visits	**-**	**-**	**-**	**1**	**-**	**-**
- GP (20%)*	-	-	-	0.05	-	-
- Specialist (80%)*	-	-	-	0.95	-	-
Titration visits (1 wk. between inj.[3])	**24**	**-**	**-**	**-**	**-**	**-**
- GP (20%)*	4.8	-	-	-	-	-
- Specialist (80%)*	19.2	-	-	-	-	-
Maintenance visits (4 wks. between inj.[3])	**7**	**13**	**13**	**-**	**-**	**-**
- GP (95%)*	6.65	12.35	12.35	-	-	-
- Specialist (5%)*	0.35	0.65	0.65	-	-	-
Nurse time (0.5 pr. inj.)*	**23.25**	**9.75**	**9.75**	-	-	-
Nurse time (0.75 pr. start-up, tablet)*	**-**	**-**	**-**	**0.75**	**-**	**-**
Follow-up visits	**1**	**1**	**1**	**1**	**1**	**1**
- GP (20% SCIT, 50% SLIT-tablet)*	0.2	0.2	0.2	0.5	0.5	0.5
- Specialist (80% SCIT, 50% SLIT-tablet)*	0.8	0.8	0.8	0.5	0.5	0.5
Patient's time*[3]	**57.57#**	**24.87#**	**24.87#**	**3^**	**1.25^**	**1.25^**
Patient's travel distance (20 km. pr. visit)[3]	**620**	**260**	**260**	**40**	**20**	**20**

** Based on physician input #Patient's time include: Travel time round trip; 40 min.[3], wait time; 15 min.[3], injection time; 4 min*, post-injection time; 30 min.[3], physician consultation time; 20 min.* ^Patient's time include: Travel time round trip; 40 min.[3], wait time; 15 min.[3], physician consultation time; 20 min.* and for year 1 only, a 30 min. post-tablet observational time after first tablet intake[1]*

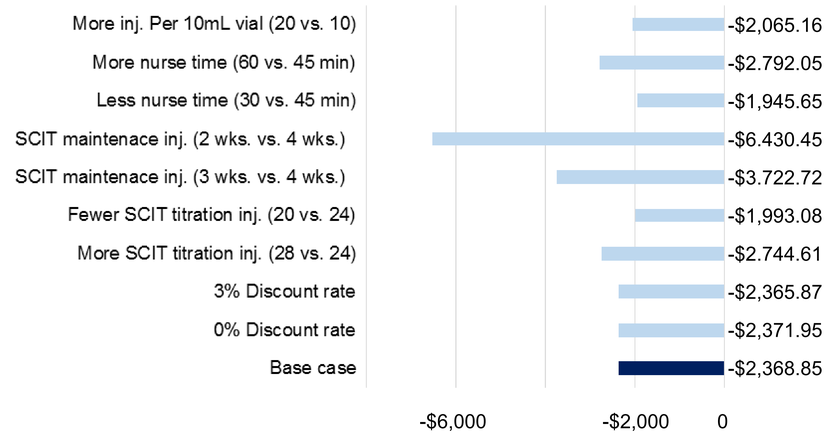
Table 2: Resource costs

Cost category	Cost type	$CAD/unit
HDM SCIT vials	10 mL concentrate (Omega)	$107.64[6]
SQ HDM SLIT-tablet	Box of 30 tablets	$117.30
	Dispensing fee/claim	$9.93[5]
Physician	Medical specific re-assessment (follow-up visit), A474	$61.25[12]
	Partial assessment (pre-or post-injection) with specialist, A478	$38.05[12]
	Injection (sole reason for visit), G202	$4.45[12]
	Injection (with consultation at same visit, G212	$9.75[12]
Nurse	Hourly wage	$30.00[7]
Patient	Average hourly wage	$25.79[8]
	Travel expense by private car	$0.51[9]

Table 3: Cost of three year treatment

Cost category	SQ HDM SLIT-tablet	SCIT	SQ HDM SLIT-tablet vs. SCIT
Drug cost	$4,643.90	$613.55	$3,968.23
Physician cost	$221.80	$2,606.25	-$2384.45
Nurse cost	-	$855.00	-$855.00
Total Health Care Costs	**$4,865.70**	**$4,074.80**	**$761.76**
Indirect cost	$182.41	$3,345.25	-$3,130.60
Total costs	**$5,048.10**	**$7,420.05**	**-$2,368.85**

Figure 1: Sensitivity analyses



Conclusion

The economic analysis shows that SQ HDM SLIT-tablet is a cost-minimizing alternative to HDM SCIT when considered from a social perspective in Ontario.

References

1. Please see Canadian Product Monograph for ACARIZAX® for specific indication 2. Guidelines for Economic Evaluation of Health Technologies: Canada. 4 ed. Ottawa, Ontario 3. Blume S.W et al "Administration and Burden of Subcutaneous Immunotherapy for Allergic Rhinitis in U.S. and Canadian Clinical Practice" J Manag Care Spec Pharm. 2015;21(11):982-90 5. Ontario Public Drug Programs, RAMQ 6. Association Québécoise des pharmaciense propriétaires, AQPP 7. www.careersinnursing.ca 8. Statistics of Canada, www.statcan.gc.ca 9. Government of Canada 2016 kilometer rates for the province or territory, www.Canada. 10. Epstein TG et al "Immediate and delayed-onset systemic reactions after subcutaneous immunotherapy injections: ACAAI/AAAAI surveillance study of subcutaneous immunotherapy: year 2" Ann Allergy Asthma Immunol. 2011;107(5):426-431 11. Bernstein DI et al "Immunotherapy Committee AAoAA, Immunology. Twelve-year survey of fatal reactions to allergen injections and skin testing: 1990-2001" J Allergy Clin Immunol. 2004;113(6):1129-36. 12. Demoly P et al "Effective treatment of house dust mite-induced allergic rhinitis with 2 doses of the SQ HDM SLIT-tablet: Results from a randomized, double-blind, placebo-controlled phase III trial" J Allergy Clin Immunol. 2016;137(2):444-451