Patients' Preferences and Willingness-to-Pay for Disease-Modifying Therapies: A Discrete Choice Experiment in the U.S.

Surachat Ngorsuraches, Ph.D.[1], Natasha Frost, M.D.[2], Jerome Freeman, M.D., F.A.C.P.[3], Diana Brixner, Ph.D.[4], FAMCP, Jane Mort, Pharm.D.[1], and James Clem, Pharm.D.[1]

[1]College of Pharmacy and Allied Health Professions, South Dakota State University, [2]School of Medicine and Public Health, University of Wisconsin-Madison,

[3]Sanford School of Medicine, University of South Dakota, [4]College of Pharmacy, University of Utah

Background

- While disease-modifying therapies (DMTs) for multiple sclerosis (MS) treatments are costly, patient valuation of DMTs has not been examined.

Objective

- To examine parents' preferences and willingness-to-pay (WTP) for DMTs.

Methods

- Six attributes and their levels from literature and the interviews of neurologists and patients were used to develop a discrete choice experiment, web-based questionnaire.

Attribute	Level
Number of relapse in 2 years	0,1,2
% Patients with disability progression in 2 years	0%,15%,30%
% Patients who have severe adverse events	5%,20%,35%
Route of administration	Oral, IM, SC, IV
Frequency of administration	<1 a month 30 times a month 60 times a month
Out-of-pocket cost per month	$0, $6000, $12000

- Each questionnaire was composed of seven choice sets and each choice set contained those six attributes with different levels.

Choice set example

Treatment Feature	Treatment A	Treatment B	Neither treatment A nor treatment B
Number of relapse in 2 years	No relapse	1 relapse	
% patients with disability progression in 2 years 🔵 Patient with disability ⚪ Patient with NO disability	15%	30%	
% patients who have severe adverse events 🔵 Patient with severe adverse events ⚪ Patient with NO severe adverse events	5%	35%	Neither treatment A nor treatment B
Route of administration	Intravenous infusion	Oral	
Frequency of administration	Less than once a month	60 times a month (twice daily)	
Out-of-pocket cost per month	$12,000	$6,000	

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- A total of 1,200 patients with MS (from the iConquerMS™ email list) were asked to choose one treatment alternative in each choice set.

- Multinomial logit model was used to determine relative preferences of each attribute.

- The WTPs (maximum out-of-pocket amount) for all attributes and DMTs were calculated.

Results

- 508 (42%) usable responses

Patient characteristics

Average age	53.0±11.0 years old
Female	78.1%
White	95.6%
Married	68.7%
Higher than college	38.6%
Employed outside home	36.4%
Average # MS years	13.4±9.4 years
Average # of relapses during last 2 year	1.1±2.4
Type of MS	
Relapsing-remitting MS	66.1%
Secondary-progressive MS	19.7%
Primary-progressive MS	9.1%
Progressive-relapsing MS	2.0%
Do not know	3.1%
MS symptoms by Patient Determined Disease Steps	
Normal	21.7%
Mild disability	15.7%
Moderate disability	10.0%
Gait disability	10.4%
Early cane	14.2%
Late cane	7.7%
Bilateral support	18.9%
Bedridden	1.4%

- Patients preferred DMTs with lower relapse rate, lower disability progression, lower severe adverse events, lower frequency of administration, and lower cost.

- The patients preferred and were willing to pay more for oral DMTs, compared to other dosage forms.

Multinomial logit model

	Coefficient	Standard error	P-value
Constant	2.4371	0.1132	0.0000
Relapse rate	-0.3874	0.0413	0.0000
Disability	-0.0404	0.0027	0.0000
Severe ADR	-0.0408	0.0028	0.0000
Route of administration (Reference = IV)			
Oral	0.4534	0.0568	0.0000
IM	-0.2450	0.0635	0.0001
SC	-0.1720	0.0532	0.0012
Frequency	-0.0106	0.0014	0.0000
Monthly cost	-0.0001	0.0000	0.0000

Log-likelihood=-2689.65; Akaike information criterion=1.80, Pseudo-R^2=0.171

- Patients were willing to pay for all DMTs, except interferon beta-1a SC.

Willingness-to-pay for DMTs

	Average willingness-to-pay per year	2017 WAC per year
Interferon beta-1b (Betaseron®)	$12,670	$86,659
Interferon beta-1a (Avonex®)	$14,716	$81,965
Interferon beta-1a (Rebif®)	-$32,588	$86,416
Pegylated interferon beta-1a (Plegridy®)	$100,199	$81,956
Glatiramer acetate (Copaxone®) 20mg	$7,021	$86,554
Fingolimod (Gilenya®)	$85,741	$82,043
Teriflunomide (Aubagio®)	$80,322	$76,612
Dimethyl fumarate (Tecfidera®)	$59,997	$82,977
Daclizumab (Zinbryta®)	$45,975	$82,000
Alemtuzumab (Lemtrada®)	$27,925	$103,749
Natalizumab (Tysabri®)	$64,155	$78,214

Conclusions

- Patients with MS weighted importance on the route of administration and the number of relapses relatively high, compared to other DMT attributes.

- Their WTPs for DMTs varied widely and the majority of them were lower than the DMT market prices.

Acknowledgement