

### Patients' Preferences and Willingness-to-Pay for Disease-Modifying Therapies: A Discrete Choice Experiment in the U.S. Surachat Ngorsuraches, Ph.D.<sup>1</sup>, Natasha Frost, M.D.<sup>2</sup>, Jerome Freeman, M.D., F.A.C.P.<sup>3</sup>, Diana Brixner, Ph.D.<sup>4</sup>, FAMCP, Jane Mort, Pharm.D.<sup>1</sup>, and James Clem, Pharm.D.<sup>1</sup> <sup>1</sup>College of Pharmacy and Allied Health Professions, South Dakota State University, <sup>2</sup>School of Medicine and Public Health, University of Wisconsin-Madison, <sup>3</sup>Sanford School of Medicine, University of South Dakota, <sup>4</sup>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.

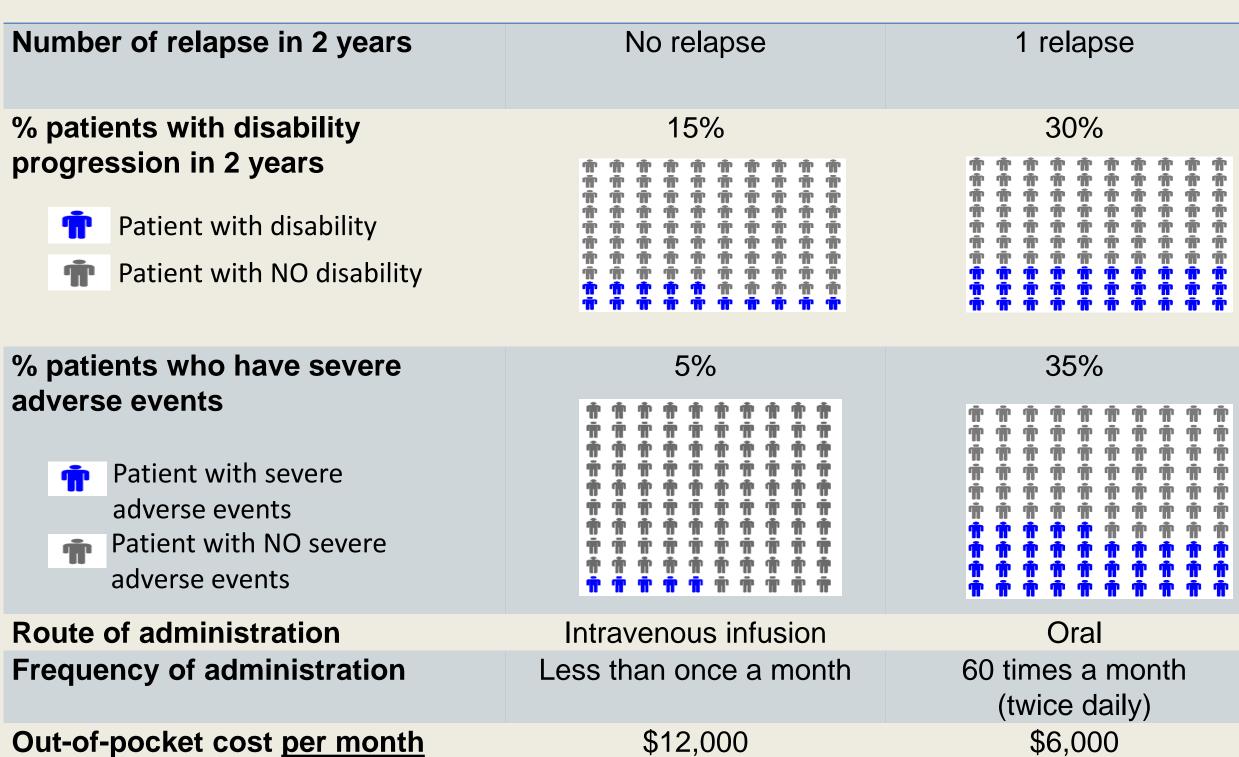
## Methods

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	
Number of relapse in 2 years	
% Patients with disability progression in 2 years	0
% Patients who have severe adverse events	5
Route of administration	Or
Frequency of administration	
	30
	60
Out-of-pocket cost per month	\$0,

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

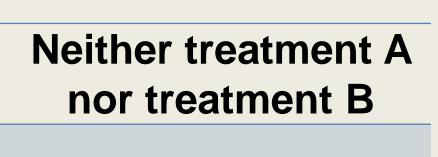
### Choice set example **Treatment Feature Treatment A** Number of relapse in 2 years



Images created by iconarray.com. Risk Science Center and Center for Bioethics and Social Sciences in Medicine, University of Michigan. Accessed 2017-01-06

### Level 0,1,2

0%,15%,30% 5%,20%,35% Dral, IM, SC, IV <1 a month times a month times a month \$6000, \$12000



**Treatment B** 

Neither treatment A nor treatment B

- A total of 1,200 patients with MS (from the treatment alternative in each choice set.
- preferences of each attribute.
- The WTPs (maximum out-of-pocket amount) for all attributes and DMTs were calculated.

508 (42%) usable responses

### **Patient characteristics**

Average age

Female

White

Married

Higher than college

Employed outside home

Average # MS years

Average # of relapses during last 2 yea

- Type of MS **Relapsing-remitting MS** Secondary-progressive MS **Primary-progressive MS Progressive-relapsing MS** Do not know
- **MS** symptoms by Patient Determined I Normal Mild disability Moderate disability Gait disability Early cane Late cane **Bilateral support** Bedridden

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

iConquerMS<sup>TM</sup> email list) were asked to choose one

Multinomial logit model was used to determine relative

## Results

53.0 <u>+</u> 11.0 years old
78.1%
95.6%
68.7%
38.6%
36.4%
13.4 <u>+</u> 9.4 years
1.1 <u>+</u> 2.4
66.1% 19.7% 9.1% 2.0% 3.1%
21.7% 15.7% 10.0% 10.4% 14.2% 7.7% 18.9% 1.4%

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

### **Multinomial logit**

Constant	

**Relapse rate** 

Disability

Severe ADR

**Route of adminis** (Reference = IV) Oral IM

SC

Frequency

Monthly cost

Log-likelihood=-2689.65; Akaike information criterion=1.80, Pseudo-R<sup>2</sup>=0.171

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

Willingness-to-pay for DMTs

**Interferon beta-1b Interferon beta-1a** Interferon beta-1a **Pegylated interfero Glatiramer acetate Fingolimod (Gileny** Teriflunomide (Aub **Dimethyl fumarate** Daclizumab (Zinbry Alemtuzumab (Len Natalizumab (Tysal

t model			
	Coefficient	Standard error	P-value
	2.4371	0.1132	0.0000
	-0.3874	0.0413	0.0000
	-0.0404	0.0027	0.0000
	-0.0408	0.0028	0.0000
stration			
	0.4534	0.0568	0.0000
	-0.2450	0.0635	0.0001
	-0.1720	0.0532	0.0012
	-0.0106	0.0014	0.0000
	-0.0001	0.0000	0.0000

	Avorago willingnoss_to_	2017 WAC	
	Average willingness-to- pay per year	per year	
(Betaseron®)	\$12,670	\$86,659	
(Avonex <sup>®</sup> )	\$14,716	\$81,965	
(Rebif <sup>®</sup> )	-\$32,588	\$86,416	
on beta-1a (Plegridy <sup>®</sup> )	\$100,199	\$81,956	
e (Copaxone®) 20mg	\$7,021	\$86,554	
ya®)	\$85,741	\$82,043	
bagio®)	\$80,322	\$76,612	
e (Tecfidera®)	\$59,997	\$82,977	
yta <sup>®</sup> )	\$45,975	\$82,000	
ntrada <sup>®</sup> )	\$27,925	\$103,749	
bri®)	\$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

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iConquerMS<sup>™</sup> for data collection.