

INDIRECT SOCIAL COST OF MULTIPLE SCLEROSIS: RESULTS FROM A REAL-WORLD OBSERVATIONAL STUDY

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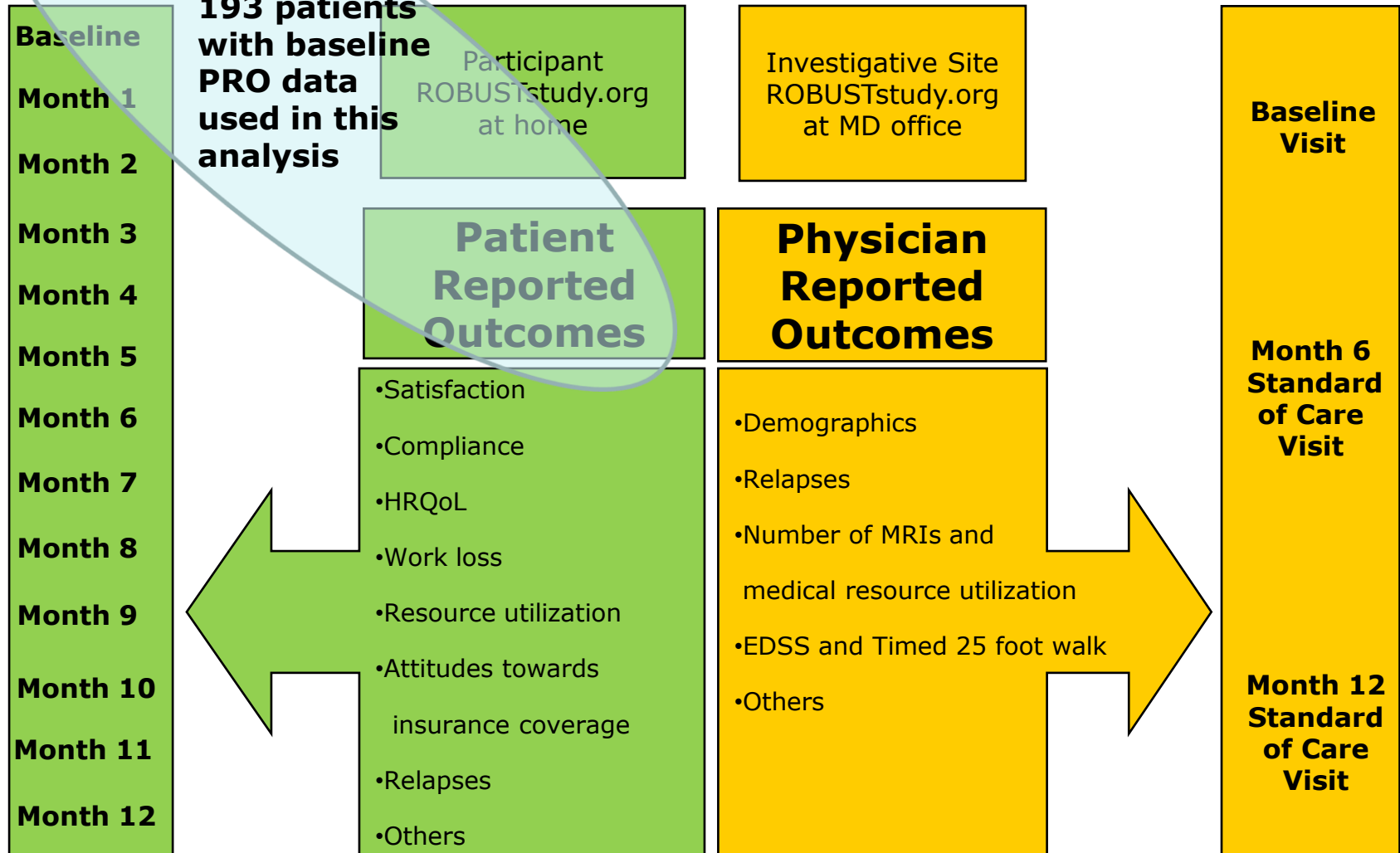
Background

- The economic burden of MS is substantial, as the disease affects every aspect of a sufferer's life including self care, relationships, work and travel
- Real-World Betaseron[®] Outcomes Study (ROBUST) is a 12-month, US prospective, observational, open-label, single-arm, multicenter outcomes study of Interferon β -1b (Betaseron[®]) given every other day for relapsing forms of multiple sclerosis
 - 226 patients were registered across 52 neurologist sites
 - Patient-reported and physician-reported data collected using an online platform

Objectives

- Assess work productivity loss among MS patients in the US from a real-world observational study
- Estimate, in monetary terms, the resulting indirect social cost due to MS

ROBUST Web Study Design



PRO Questionnaire Used

- Work Productivity and Activity Impairment Questionnaire (WPAI) specific for MS
 - *'In the past 4 weeks, how much time have you lost from work due to your MS?'*
- WPAI provides scores on
 - Absenteeism (work time missed)
 - Presenteeism (reduced on-the-job effectiveness)
 - Overall work productivity loss
 - Activity impairment
- WPAI scored from 0% to 100%, with higher scores indicating worse outcomes

Statistical Analyses

- Indirect social cost of MS was derived using the human capital approach, i.e., by valuing the lost productivity due to MS using US national average wages by education level

Education Level	Annual Wage for Full-time Worker	Annual Wage for Part-time Worker
Doctorate	\$80,860	\$40,430
Masters	\$63,856	\$31,928
Bachelors	\$50,856	\$25,428
High School Diploma	\$30,732	\$15,366
General Educational Development (GED)	\$30,732	\$15,366
No Degree	\$22,152	\$11,076
Other Degree	\$38,272	\$19,136

Based on 2008 median annual wage by education level from Bureau of Labor Statistics, Current Population Survey (www.bls.gov)

- Associations between sociodemographic characteristics and work productivity were evaluated using analysis of variance models (ANOVA)
- Associations between MS disease severity, indirect social costs and work productivity were evaluated using Spearman correlation coefficients

Results

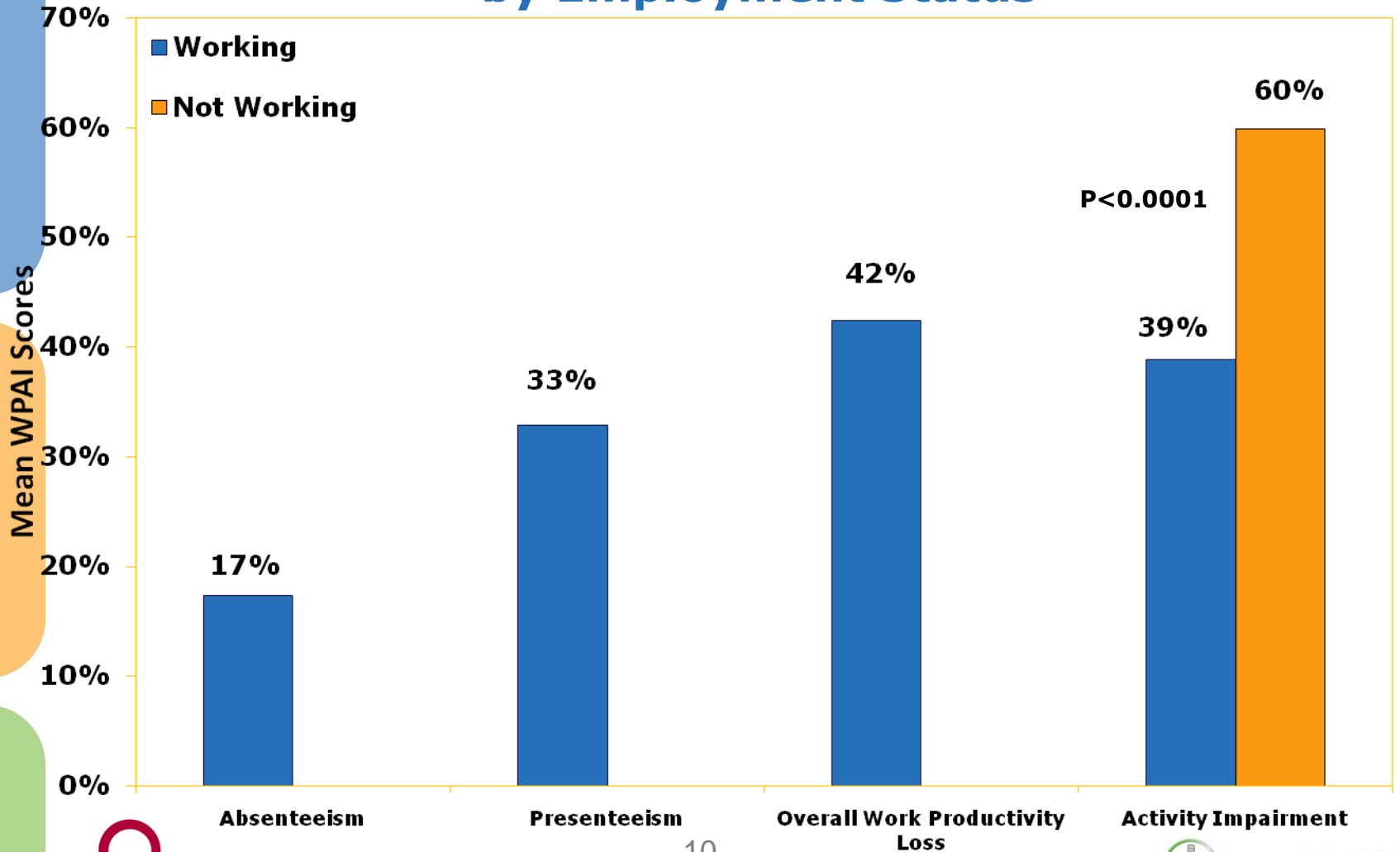
Participant Characteristics

Participant Characteristics		Patients Working (Full-time or Part-time) (N=118)	Patients Not Working (N=75)	All Patients (N=193)
Gender	Female	75.4%	89.3%	80.8%
Race	White	88.9%	83.8%	86.9%
	Other	11.1%	16.2%	13.1%
Age in years (SD)		41.4 (9.7)	42.3 (12.0)	41.8 (10.6)
Age Category	18-29	14.3%	19.4%	15.6%
	30-49	64.3%	51.4%	56.8%
	≥50	21.4%	29.2%	27.6%
Number of Dependents	0	30.8%	36.5%	33.0%
	1	23.9%	24.3%	24.1%
	2-3	37.6%	32.4%	35.6%
	4 or more	7.7%	6.8%	7.3%
Health Insurance	Yes	97.5%	94.7%	96.4%
	No	1.7%	4.0%	2.6%
	Not Sure	0.8%	1.3%	1.0%

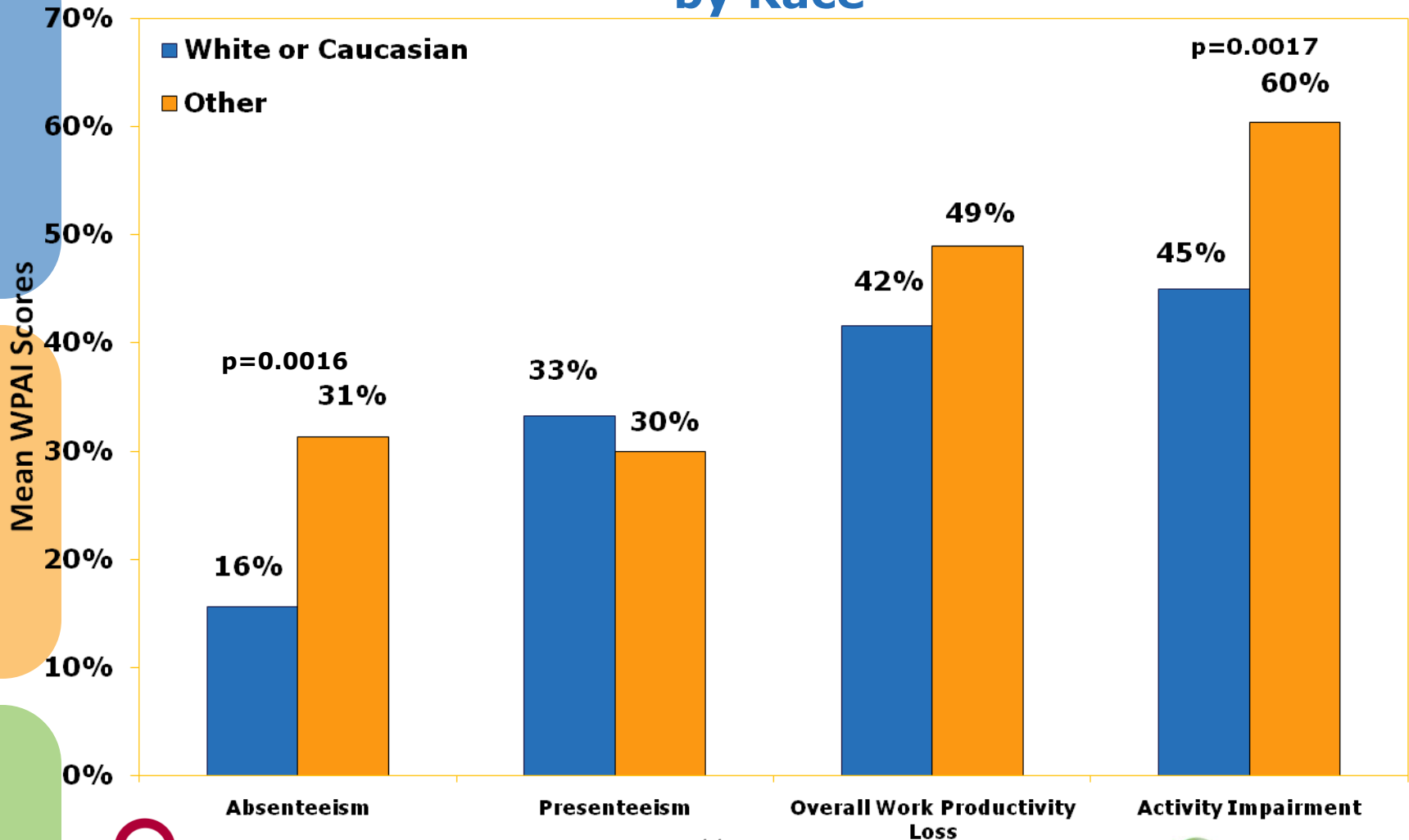
Participant Characteristics, cont'd

Participant Characteristics	Patients Working (Full-time or Part-time) (N=118)	Patients Not Working (N=75)	All Patients (N=193)
Means of Health Insurance			
Patient's employer	57.0%	13.8%	39.8%
Patient's spouse employer	30.6%	38.8%	33.8%
Purchased at own expense	7.4%	10.0%	8.5%
Other	6.0%	37.4%	17.9%
Education			
No degree	1.7%	10.8%	5.2%
General Educational Development	4.3%	1.4%	3.1%
High school diploma	37.6%	44.6%	40.3%
Bachelor's degree	27.4%	20.3%	24.6%
Master's degree	12.8%	5.4%	9.9%
Doctoral degree	1.7%	0.0%	1.0%
Other degree	14.5%	17.6%	15.7%

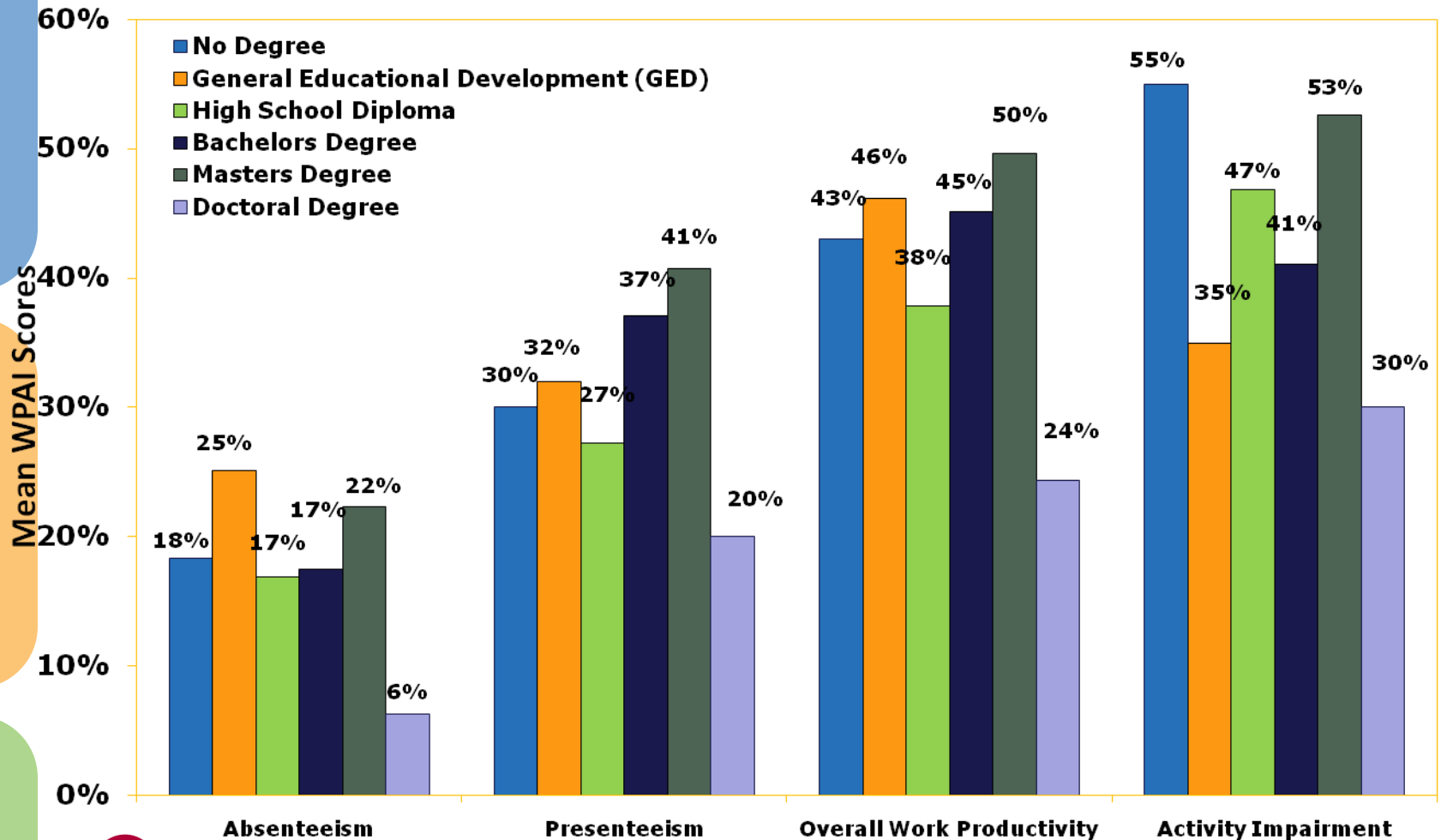
Work Productivity & Activity Impairment (WPAI) by Employment Status



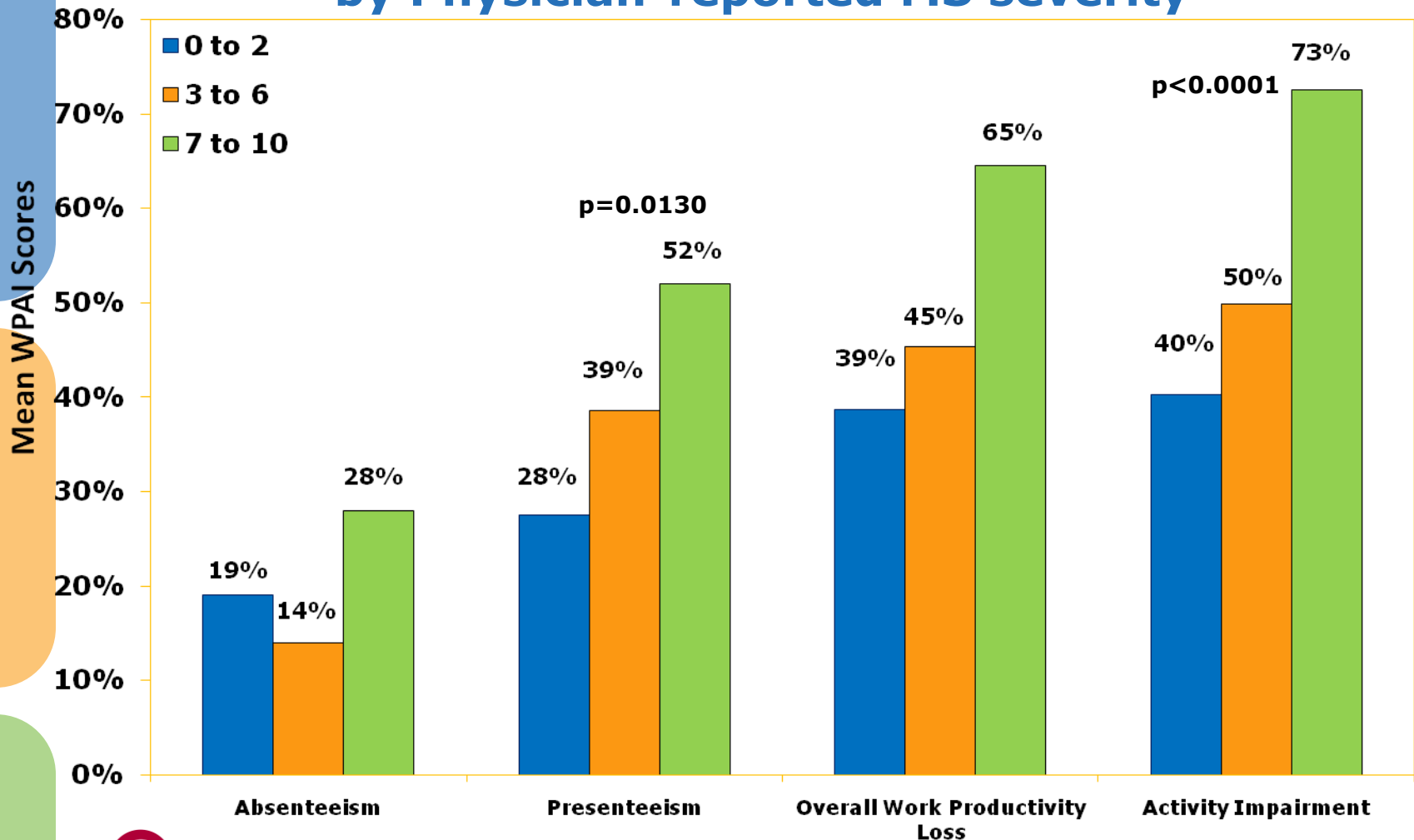
Work Productivity & Activity Impairment (WPAI) by Race



Work Productivity & Activity Impairment (WPAI) by Education Level



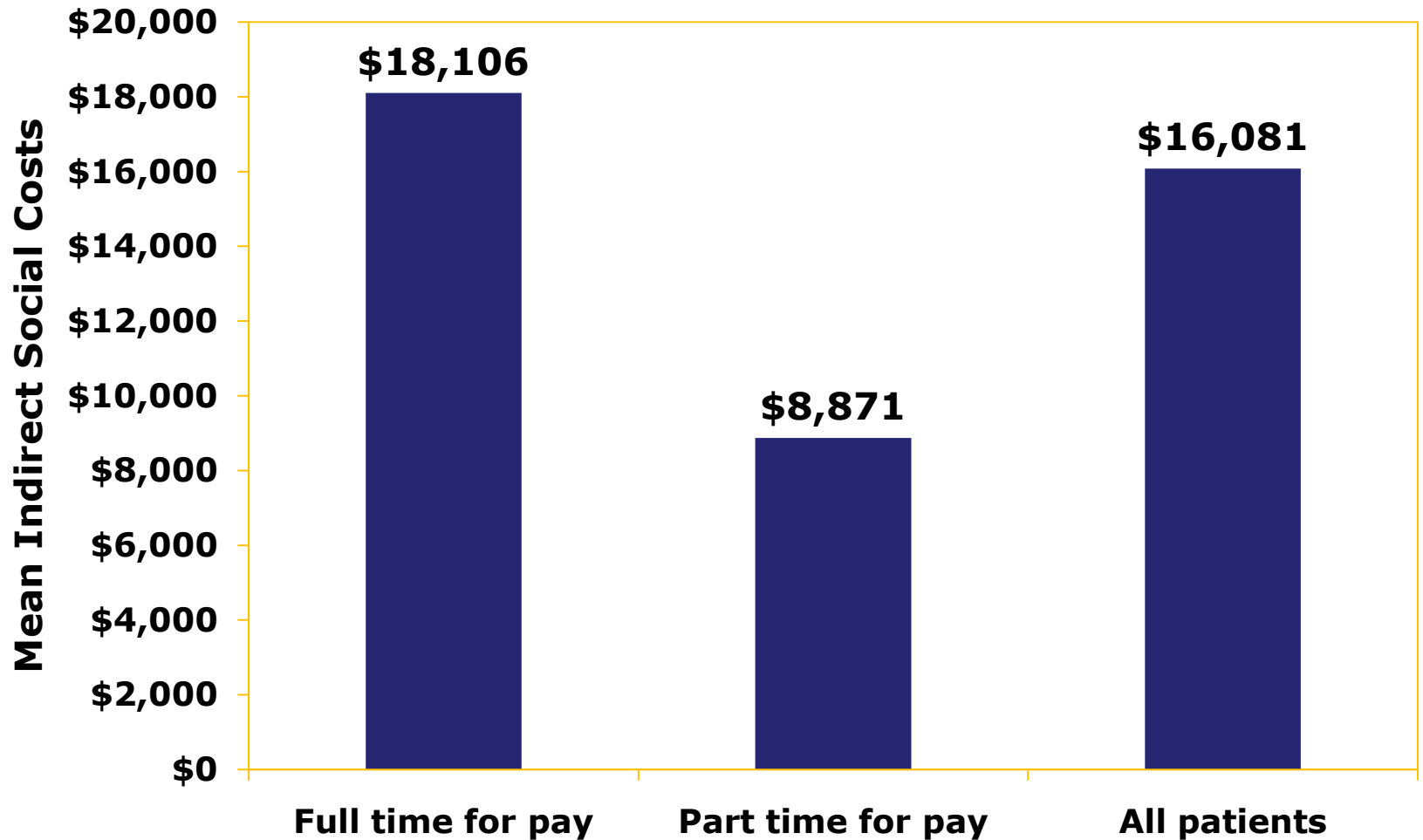
Work Productivity & Activity Impairment (WPAI) by Physician-reported MS severity



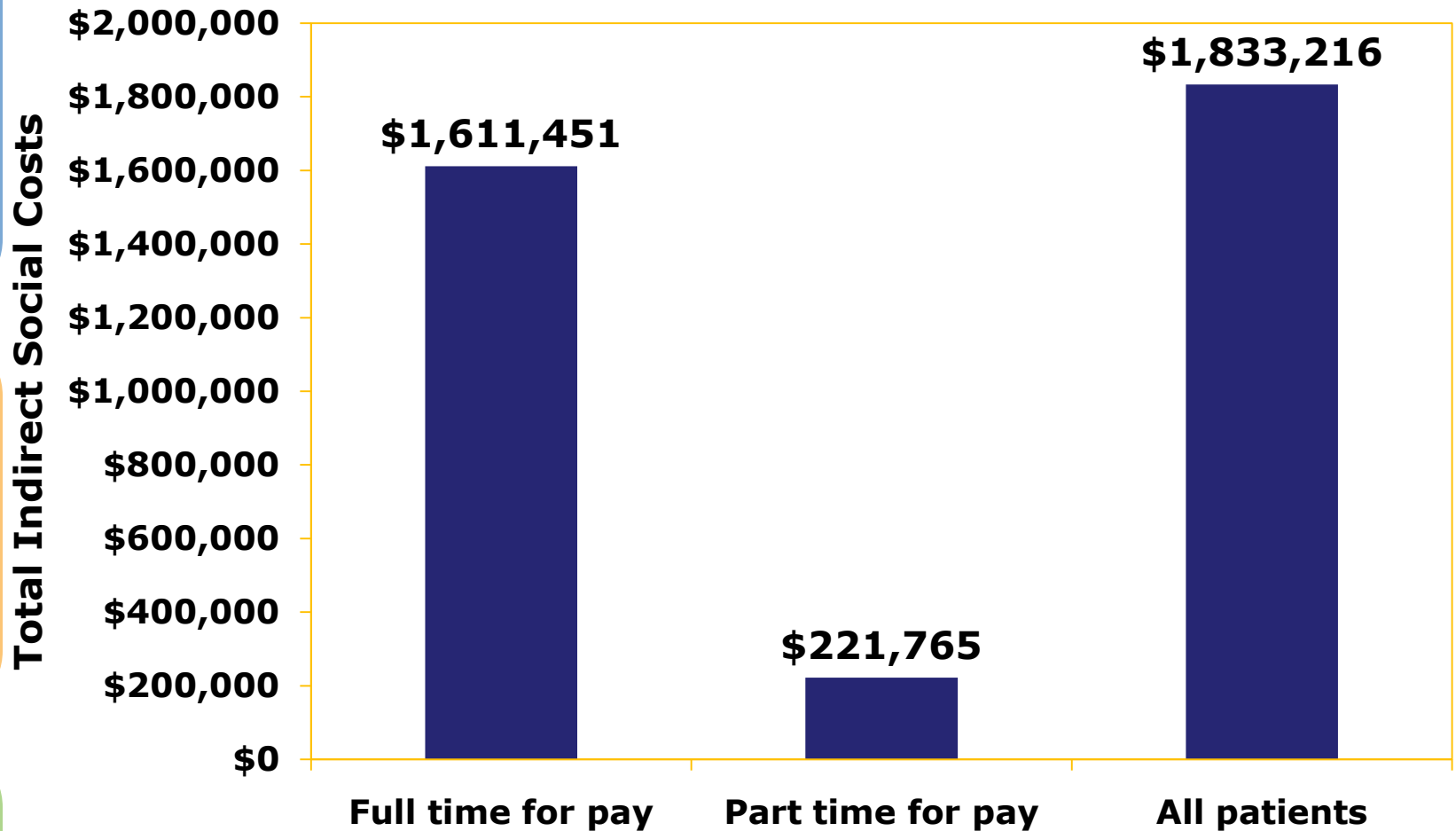
WPAI and Other Sociodemographic Characteristics

- No significant differences in any of the 4 WPAI scores by age
 - Overall work productivity loss ranged from 40% (30-49 years) to 49% (18-29 years)
- No significant differences in any of the 4 WPAI scores by gender
 - Overall work productivity loss ranged from 41% (Male) to 43% (Female)
- No significant differences in any of the 4 WPAI scores by number of dependents
 - Overall work productivity loss ranged from 38% (One dependent) to 47% (4 or more)

Mean Per-Patient Annual Indirect Social Costs by Work Status



Total Annual Indirect Social Costs by Work Status



Work Productivity and Disease Severity

- MS disease severity was assessed using a physician-assessed severity scale from 0 to 10 where 0 is least and 10 is most severe
- Overall work productivity loss was significantly correlated with increasing MS severity ($r=0.29$; $p=0.002$)
- Indirect social costs were also significantly correlated with increasing MS severity ($r=0.21$; $p=0.029$)

Limitations

- Indirect social cost based on human capital approach estimated in this study included costs associated with the lost productivity of the MS patient; however, it did not include other indirect costs such as cost associated with caregivers, which may be significant in the MS population.
- Therefore, the overall social costs may be higher with the cost of caregivers added.
- Direct medical costs associated with delivering care for MS is not included as it was beyond the scope of this analysis.

Conclusions

- Multiple sclerosis results in a substantial loss of work productivity among patients, which collectively results in significant indirect social cost
- MS-related indirect social costs increases with increasing MS severity

Acknowledgements

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Questions or Comments!

