

# Validating the Time-Use Algorithm to Estimate Productivity Loss in Persons With Multiple Sclerosis

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## BACKGROUND

- Multiple sclerosis (MS) significantly impacts patient productivity, and value assessments that exclude patient productivity loss undervalue the total disease burden<sup>1</sup>
- Patient productivity loss is a crucial, yet under researched, societal cost that is difficult to incorporate into value assessments
- As of 2023, the Institute for Clinical and Economic Review will be using a proxy productivity algorithm<sup>2</sup> to estimate and incorporate productivity loss into future value assessments when direct data are lacking<sup>3</sup>
- The productivity algorithm estimates changes in productivity based on US national trends in age and quality of life but has not yet been validated<sup>2</sup>

## OBJECTIVE

- We compared market US productivity loss estimates for people with multiple sclerosis (pwMS) generated by the time-use algorithm vs empirical estimates from real-world evidence

## METHODS

- Using a US employment survey of 3870 people with either relapsing remitting or secondary progressive MS, we estimated productivity loss across severity as measured by Expanded Disability Status Scale (EDSS) score<sup>4</sup>
- Leveraging the reported ages in the survey data set and quality-of-life estimates from the literature,<sup>1</sup> we produced proxy estimates using the productivity algorithm
- Estimates were compared by percent and absolute difference for each EDSS severity level

## RESULTS

- Survey results estimated a range of annual market productivity loss in pwMS with EDSS scores of 0 to 9 ranging from \$1754 to \$50,480, respectively (USD 2023; **Table 1**)
- The productivity algorithm generated a range of \$0 to \$66,999, respectively, across the same EDSS scores
- Overall, the percent difference between these findings ranges from -91.57% to 100%
- The average difference across all EDSS scores is 5.03%, and differences are larger in mild and severe disease stages compared with middle EDSS scores

**Table 1.** Total Annual Market Productivity Loss

Severity	Total annual market loss		Difference	Absolute difference
	Survey-based estimates	Jiao estimates		
EDSS 0	\$1754.47	\$0	100.00%	\$1754.47
EDSS 1	\$1754.47	\$3361	-91.57%	\$1606.53
EDSS 2	\$10,502.93	\$8941	14.87%	\$1561.93
EDSS 3	\$35,309.79	\$17,023	51.79%	\$18,286.79
EDSS 4	\$25,310.57	\$21,884	13.54%	\$3426.57
EDSS 5	\$32,724.30	\$27,466	16.07%	\$5258.30
EDSS 6	\$34,466.19	\$32,757	4.96%	\$1709.19
EDSS 7	\$41,973.27	\$39,410	6.11%	\$2563.27
EDSS 8	\$50,480.12	\$66,999	-32.72%	\$16,518.88
EDSS 9	\$50,480.12	\$66,999	-32.72%	\$16,518.88

EDSS, Expanded Disability Status Scale.

## LIMITATIONS

- We assumed that those unemployed due to MS would have previously been working the average annual number of hours worked by American workers (approximately 1790 hours)<sup>5</sup>
- Our analysis was limited to market productivity; no direct data were available for nonmarket productivity

## CONCLUSIONS

- The productivity algorithm allows for inclusion of non-zero productivity costs when major data gaps exist, thereby allowing for more routine use of societal perspective in cost-effectiveness analyses
- When applied to existing data from the literature on quality of life across EDSS severity states, the algorithm produced, on average, only marginally different estimates generated from a disease-specific survey in pwMS
- However, additional research is needed to understand the impact of observed differences across disease severity levels when estimating the lifetime burden of productivity losses in value assessment

## REFERENCES

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## DISCLOSURES

J Fox, ES Mearns, KL Rosettie, T Majda, N Win and SL Kowal are employees of Genentech, Inc. ES Mearns, KL Rosettie, T Majda, N Win and SL Kowal are shareholders of F. Hoffmann-La Roche Ltd. N Win also owns stock with Amgen.

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