

# 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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