

Effect of Depression on Work Productivity Costs and Employment

Oliver Will, PhD¹; Lulu Lee, PhD¹; Wing Chow, PharmD, MPH²

¹Kantar, Horsham, PA; ²Janssen Scientific Affairs, LLC, Titusville, NJ.

INTRODUCTION

- The estimated 1-year prevalence rate of major depressive episodes in the United States is 7.1% of all adults¹
- Depression is associated with substantial economic burden
 - The incremental direct costs associated with health care services have been estimated to be \$5,988 per year among patients with a depression diagnosis compared with those without a depression diagnosis²
 - Approximately 50% of the \$210.5 billion in annual costs associated with major depressive disorder (MDD) in the United States are indirect costs related to decreased work productivity, such as presenteeism (\$78.7 billion) and absenteeism (\$23.3 billion)³
 - Those with treatment-resistant depression (TRD), who have limited effective treatment options, are the most severely disabled and burdened among those with depression⁴
 - Across multiple studies, patients with TRD, compared with those with non-TRD MDD, have higher annual costs due to health care costs and lost work productivity^{5,6}
- While depression has been consistently linked with greater economic burden, as measured by greater health care resource use (HRU) and reduced work productivity,^{2,7} less is known about how burden differs across depression severity levels and among patients living with non-TRD MDD or TRD relative to the general population
- This study examined differences in economic burden across different subgroups of US adults affected by MDD and TRD

OBJECTIVE

- To compare differences in economic burden between patients with TRD and those with non-TRD MDD to the US adult general population, and to describe economic burden among those who self-rated at different depression severity levels

METHODS

Data Source

- Data from the 2017 US National Health and Wellness Survey (NHWS) were examined (N=75,004). The NHWS is a proprietary database of self-administered, cross-sectional, internet-based general health survey responses from US adults (aged ≥18 years)
 - A stratified random sampling procedure was used to ensure that the demographic composition of the NHWS sample was representative of the US adult population in 2017 with respect to age, sex, and ethnicity
 - NHWS respondents were recruited from an existing, general purpose, internet-based consumer panel. Patients living with a clinician diagnosis of depression completed the depression-specific module as part of the NHWS
- ### Study Sample
- Defined as having MDD:
 - Those who self-reported a clinician diagnosis of depression
 - Patients who reported a clinician diagnosis of bipolar disorder and/or schizophrenia, as well as patients who screened positive for a mood disorder (Mood Disorder Questionnaire) were excluded to minimize misclassification due to bipolar disorder
 - Among those with MDD, a subset of patients with non-TRD MDD was included
 - Defined as having TRD:
 - Those who met MDD eligibility criteria and received treatment with ≥2 medications (ie, ≥2 antidepressants, or ≥1 antidepressant and ≥1 antipsychotic indicated for adjunctive treatment of depression) for ≥3 months

Measures

- Independent variable
 - The Patient Health Questionnaire-9 (PHQ-9) is a widely used, validated tool to screen for and evaluate treatment effect among MDD patients
 - The measure has a Likert-type ordinal scale (ie, scores 0-27)
 - In this study, interval scores reflecting severity of depression were used for analysis: no-to-minimal depression (0-4), mild depression (5-9), moderate depression (10-14), moderately severe depression (15-19), and most severe depression (20-27)

Outcomes

- Direct costs
 - Average unit costs for HRU were obtained from the 2016 Medical Expenditure Panel Survey (MEPS)
 - The number of each type of visit (ie, outpatient visit, hospitalization, and emergency room visit) reported in the prior 6 months was multiplied by 2 to arrive at an annual per-patient HRU
 - Annual HRU for each type of visit was then multiplied by the corresponding MEPS unit cost to estimate annual direct cost for that HRU measure
 - Annual direct costs for each type of HRU were summed to calculate the total per-patient per-year (PPPY) direct cost
 - Direct costs are reported in 2016 US dollars
- Indirect costs (presenteeism- and absenteeism-related costs)
 - Indirect costs were calculated for patients who were currently employed at the time of survey completion
 - Indirect costs were calculated based on responses to the Work Productivity and Activity Impairment Questionnaire: General Health, using the 2016 Bureau of Labor Statistics' median weekly income data to estimate hourly wages
 - Income data were stratified by sex and age to account for demographic differences in income
 - The percentages of absenteeism and presenteeism in the last 7 days were converted into raw work hours missed, annualized, and then multiplied by estimated wage rates to estimate total lost wages
 - Costs represent a PPPY indirect cost estimate
 - Indirect costs are reported in 2016 US dollars
- Employment rate
 - Employment rate was based on a self-reported employment status of full time, part time, or self-employed

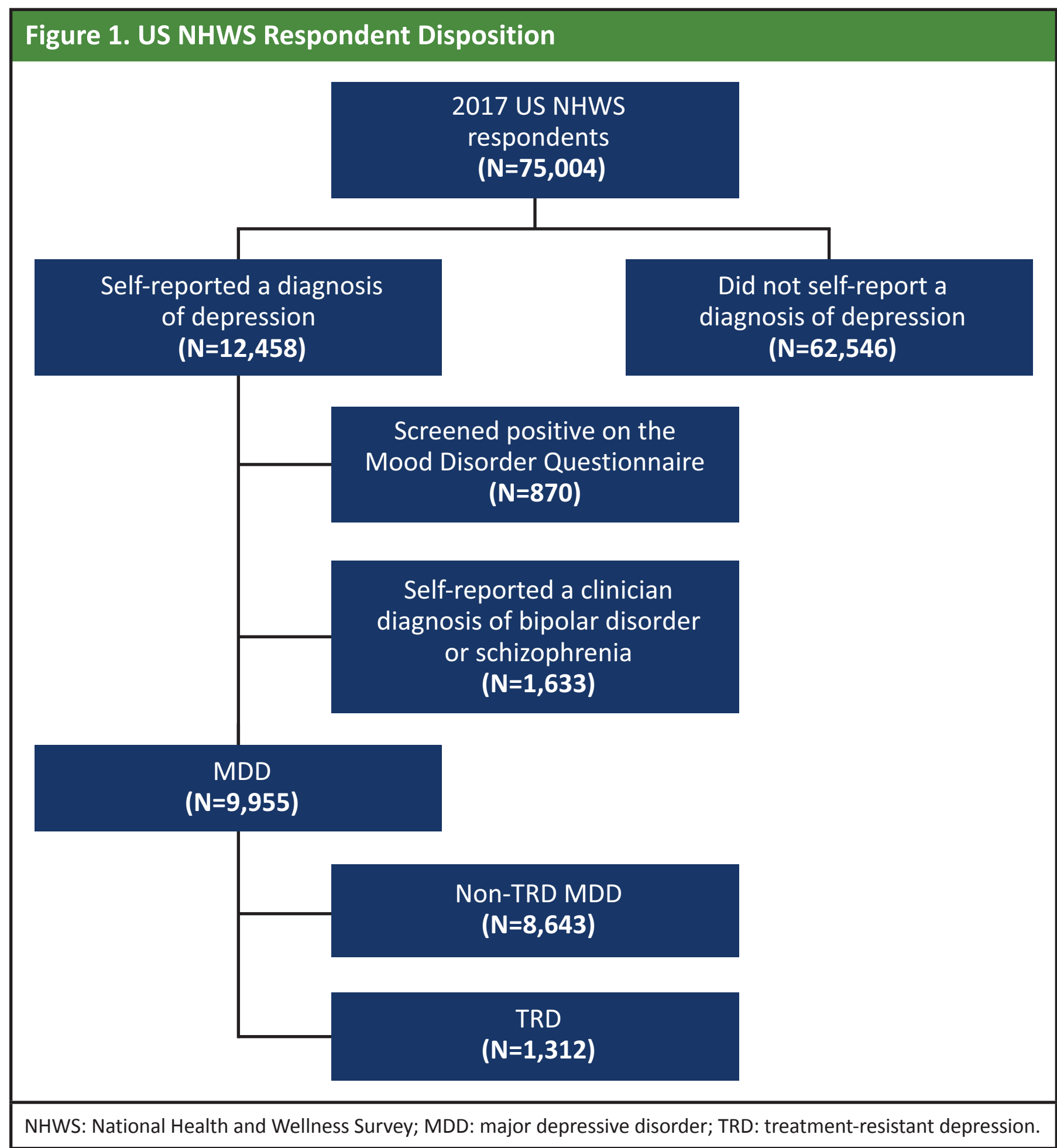
Statistical Analyses

- Patient demographics and clinical characteristics were assessed using frequencies and percentages for categorical variables, and means and standard deviations (SDs) for continuous variables
- Propensity score (PS) matching was applied to improve cohort comparability. Gender, age, race, body mass index category, Charlson comorbidity index (CCI), and annual household income were considered as independent variables in the PS model. The non-TRD MDD and TRD patients were matched (1:1) to nondepressed respondents (controls) with similar predicted probability
- Economic outcomes were compared between PS-matched populations by insurance type using multivariable regression models. Confounders not balanced by PS matching were controlled in the multivariable models as a covariate. A negative binomial model was fit for direct and indirect costs, and a logistic model was fit for employment rate. Adjusted means based on the regression models were computed⁸

RESULTS

Analysis Sample

- A total of 9,955 MDD and 1,312 TRD patients met the study criteria; among those with MDD, a subset (N=8,643) had non-TRD MDD (Figure 1)



Demographics and Clinical Characteristics

- Among the 2017 NHWS population
 - Respondents with PHQ-9 scores of 20-27 (N=2,506) were more often female (61.4%) than respondents with PHQ-9 scores of 0-4 (N=48,991; 47.5%); $P < 0.001$ for difference in proportion
 - Respondents with PHQ-9 scores of 20-27 were younger (mean age, 36.3 years; SD, 13.7) than respondents with PHQ-9 scores of 0-4 (mean age, 50.8 years; SD, 17.2); $P < 0.001$ for difference in mean
 - The subgroups with the highest PHQ-9 scores were more often Hispanic or African American, had lower income, were more likely to have had health issues, and were more likely to be overweight
- Matched non-TRD MDD/control and matched TRD/control (Tables 1A and 1B):
 - Demographics and clinical characteristics were balanced between groups
 - Compared with non-TRD MDD, those with TRD tended to be older. Moreover, higher proportions of those with TRD were non-Hispanic white, were overweight or obese, and had greater comorbidity burden

Table 1A. Demographics and Clinical Characteristics of Matched Non-TRD MDD/Control		
	Matched control (N=8,643)	Matched non-TRD MDD (N=8,643)
Sex, %		
Male	31.1	31.7
Female	68.9	68.3
Age, years, %		
18-24	16.7	16.2
25-34	23.5	22.3
35-44	15.8	15.7
45-54	14.0	15.1
55-64	17.1	18.5
≥65	12.9	12.2
Race, %		
Hispanic	13.2	12.6
Non-Hispanic black	9.0	8.9
Non-Hispanic white	67.4	67.3
Other	10.4	11.2
Household income, %		
Low (<\$35,000)	36.9	37.3
Medium (\$35,000-\$74,999)	34.0	33.8
High (≥\$75,000)	24.4	24.2
Declined to answer	4.8	4.8
BMI, %		
Underweight (<18.5 kg/m ²)	2.7	2.7
Normal weight (18.5-25.0 kg/m ²)	29.4	28.8
Overweight (25.0-30.0 kg/m ²)	26.0	26.3
Obese (≥30.0 kg/m ²)	39.2	39.0
Declined to answer	2.7	3.1
CCI category, %		
0	67.8	65.4
1	17.5	19.1
≥2	14.7	15.5
Insurance, %		
Currently has health insurance	89.3	91.0
Insurance coverage through an employer	30.8	27.5
Insurance coverage through a spouse's employer	10.4	10.3
Insurance coverage through a parent or legal guardian's employer	7.0	7.2
Individual/family insurance plans	10.7	10.3
Medicaid/Medi-Cal	9.4	12.2
Medicare	15.4	18.3
VA/CHAMPUS	1.1	1.8
TRICARE	2.0	1.5
Not sure	2.4	1.9

TRD: treatment-resistant depression; MDD: major depressive disorder; BMI: body mass index; CCI: Charlson comorbidity index; VA: Veterans Affairs.

Table 1B. Demographics and Clinical Characteristics of Matched TRD/Control		
	Matched control (N=1,312)	Matched TRD (N=1,312)
Sex, %		
Male	33.9	34.2
Female	66.1	65.8
Age, years, %		
18-24	10.5	11.7
25-34	15.6	14.6
35-44	13.5	14.3
45-54	19.5	21.0
55-64	25.5	24.7
≥65	15.3	13.8
Race, %		
Hispanic	8.0	9.5
Non-Hispanic black	8.5	8.0
Non-Hispanic white	76.0	73.2
Other	7.5	9.4
Household income, %		
Low (<\$35,000)	35.7	37.5
Medium (\$35,000-\$74,999)	34.1	33.0
High (≥\$75,000)	27.5	25.5
Declined to answer	2.7	4.0
BMI, %		
Underweight (<18.5 kg/m ²)	2.0	2.5
Normal weight (18.5-25.0 kg/m ²)	21.7	21.8
Overweight (25.0-30.0 kg/m ²)	28.0	27.3
Obese (≥30.0 kg/m ²)	46.9	46.6
Declined to answer	1.4	1.8
CCI category, %		
0	57.2	55.0
1	24.3	24.6
≥2	18.4	20.4
Insurance, %		
Currently has health insurance	89.9	96.4
Insurance coverage through an employer	33.4	23.1
Insurance coverage through a spouse's employer	11.9	10.6
Insurance coverage through a parent or legal guardian's employer	5.3	6.6
Individual/family insurance plans	9.7	10.0
Medicaid/Medi-Cal	8.7	13.1
Medicare	17.8	26.3
VA/CHAMPUS	0.5	4.0
TRICARE	1.4	1.8
Not sure	1.4	1.1

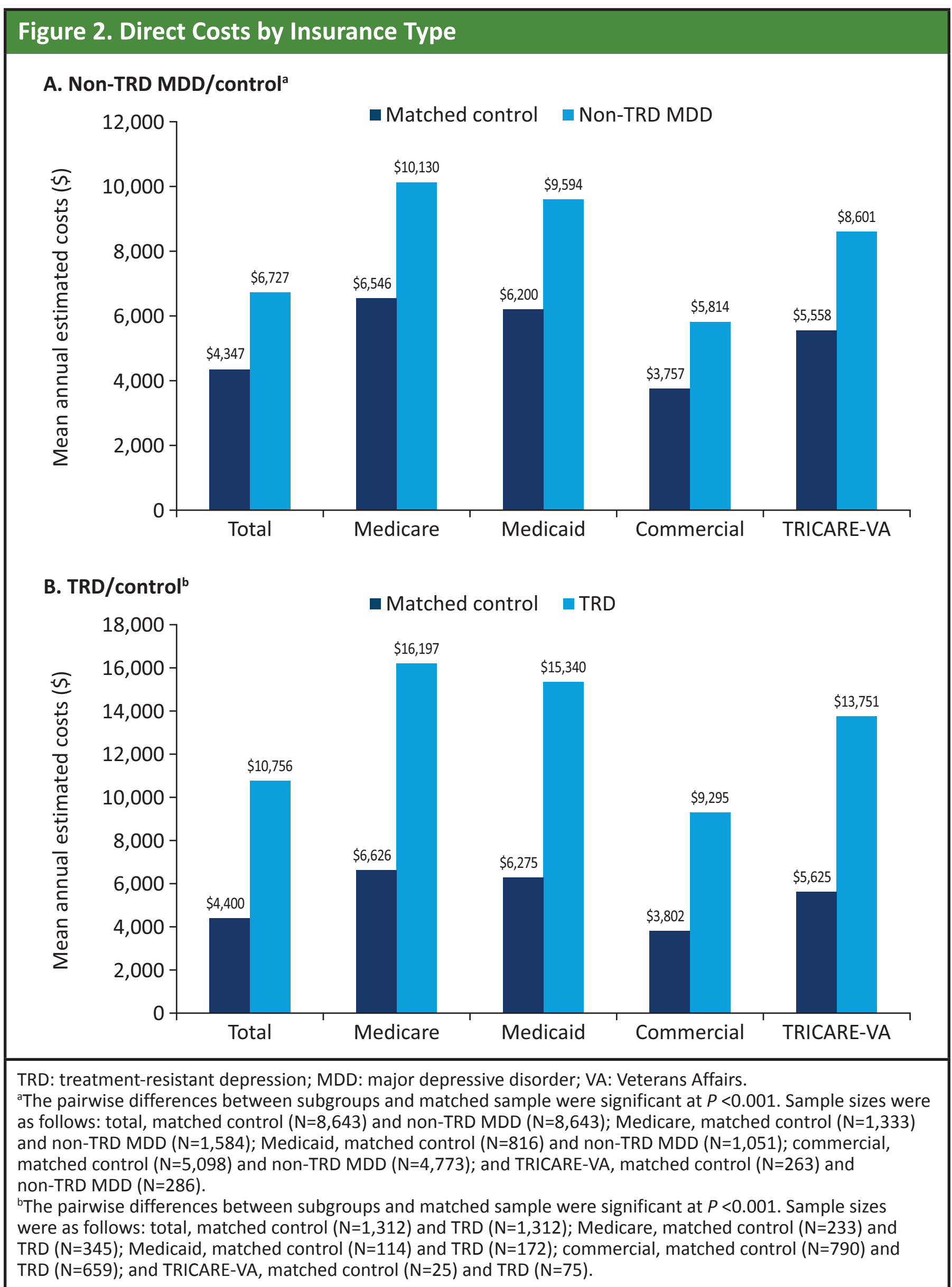
TRD: treatment-resistant depression; BMI: body mass index; CCI: Charlson comorbidity index; VA: Veterans Affairs.

Estimated Annual Direct and Indirect Costs and Employment Rates, Unadjusted

- 5-category PHQ-9 summary:
 - Increased depression severity (PHQ-9 scores) was associated with higher direct and indirect costs and lower employment rates
 - Respondents with PHQ-9 scores of 20-27 had higher unadjusted direct costs (\$28,658) than respondents with PHQ-9 scores of 0-4 (\$3,655); $P < 0.001$
 - Respondents with PHQ-9 scores of 20-27 had higher unadjusted indirect costs (\$17,954) than respondents with PHQ-9 scores of 0-4 (\$4,052); $P < 0.001$
 - Respondents with PHQ-9 scores of 20-27 had a lower unadjusted employment rate (55.2%) than respondents with PHQ-9 scores of 0-4 (58.4%); $P < 0.001$

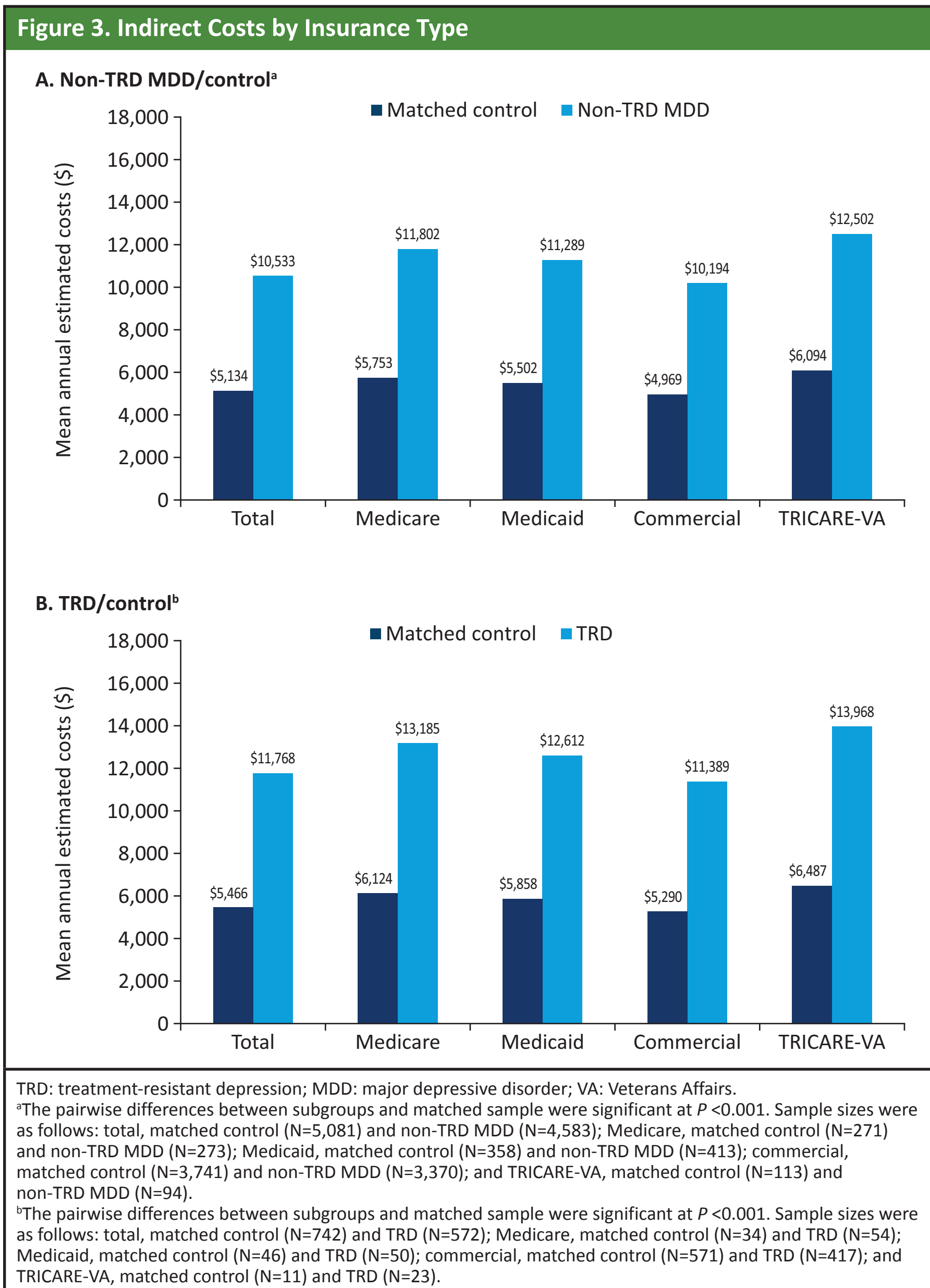
Adjusted Direct Costs by Insurance Type, Among Matched Pairs (Figures 2A and B)

- Non-TRD MDD and TRD had higher direct costs than matched control groups regardless of insurance type
- The differences in direct costs by insurance type were greater between TRD/control relative to non-TRD MDD/control



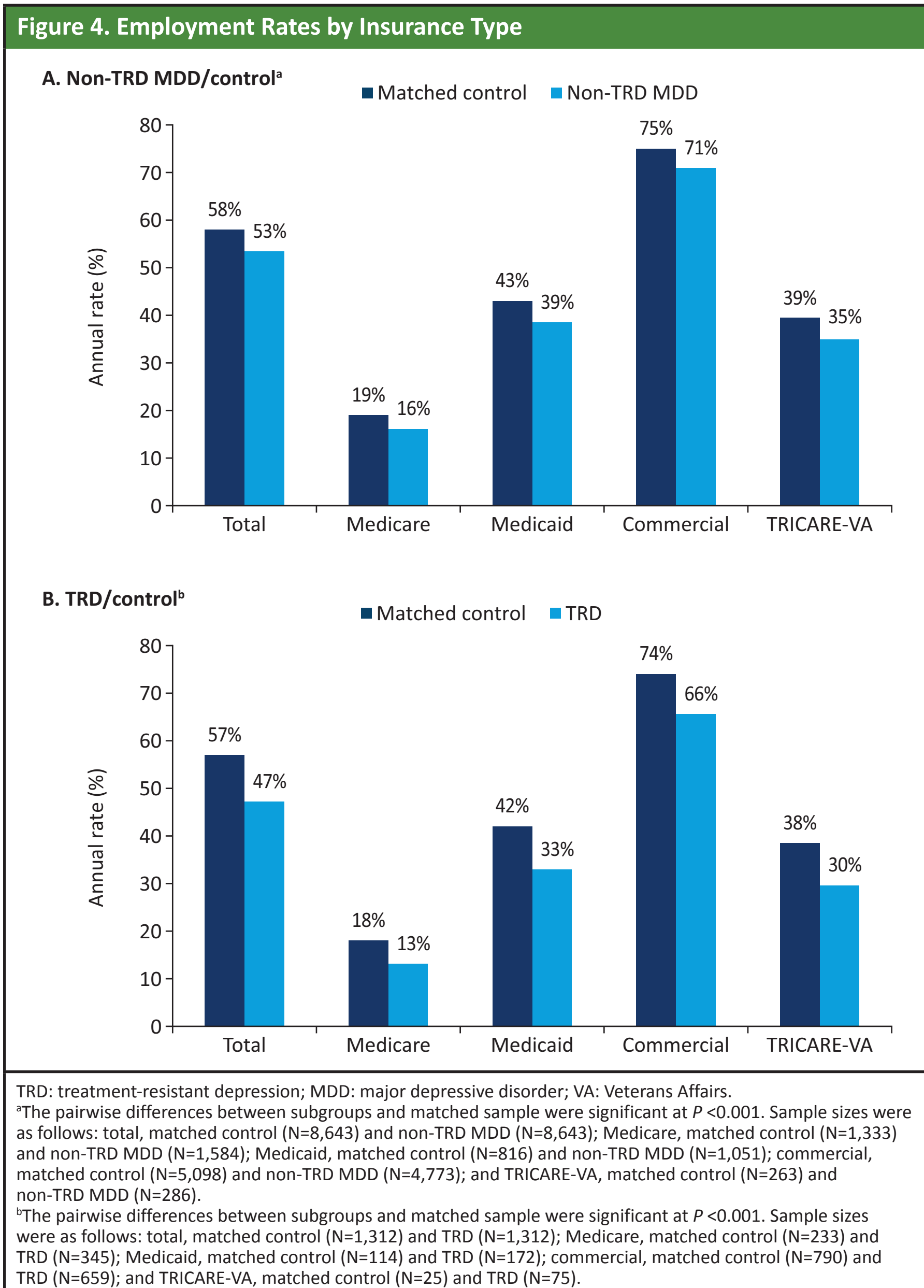
Adjusted Indirect Costs by Insurance Type, Among Matched Pairs (Figures 3A and B)

- Non-TRD MDD and TRD had higher indirect costs than matched control groups by insurance type
- The differences in indirect costs by insurance type were greater between TRD/control relative to non-TRD MDD/control



Adjusted Employment Rates by Insurance Type, Among Matched Pairs (Figures 4A and B)

- Non-TRD MDD and TRD had lower employment rates than matched control groups by insurance type



LIMITATIONS

- All data in this study came from a self-reported patient survey; therefore, responses were subject to recall bias and could not be validated using claims or medical chart data
 - This limitation was addressed, in part, through the utilization of short recall periods to reduce the degree to which recall bias influenced results
- Direct costs were estimated by extrapolating 6-month HRU to annualized direct costs, though this approach may have overestimated the differences in the context of chronic episodic illness
- Results from these data may not be generalizable to the US MDD patient population, although the sampling methodology utilized in the NHWS is designed to generate a representative sample for the US general population
- Due to the cross-sectional nature of the data, causality could not be inferred

CONCLUSIONS

- MDD has a significant burden in terms of direct and indirect costs, as well as impact on employment rates
 - Specifically, this study quantified the increase at 2-3 times for direct and indirect costs and 10%-20% for employment rate for patients with MDD alone or TRD, each compared with matched controls
- Findings suggest substantial unmet needs among patients with MDD alone and TRD, particularly among those with severe depression

REFERENCES

- Substance Abuse and Mental Health Services Administration. *Key Substance Use and Mental Health Indicators in the United States: Results From the 2018 National Survey on Drug Use and Health*. Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration; 2019.
- Egede LE, et al. *J Affect Disord*. 2016;195:119-126.
- Greenberg PE, et al. *J Clin Psychiatry*. 2015;76(2):155-162.
- Rush AJ, et al. *Am J Psychiatry*. 2006;163(11):1905-1917.
- Amos TB, et al. *J Clin Psychiatry*. 2018;79(2):17m11725.
- Shrestha A, et al. *Psychiatr Serv*. 2020. Epub ahead of print.
- Hawley CJ, et al. *Hum Psychopharmacol*. 2013;28(6):544-551.
- Goodnight JH, Harvey WR. Technical Report R-103. SAS Institute Inc. 1978.

ACKNOWLEDGMENTS

This study was sponsored by Janssen Scientific Affairs, LLC. Editorial support was provided by Courtney St. Amour, PhD, of MedErgy, and was funded by Janssen Scientific Affairs, LLC.

DISCLOSURES

O. Will and L. Lee are employees of Kantar, which received funding from Janssen Scientific Affairs, LLC, to conduct this study. W. Chow is an employee of Janssen Scientific Affairs, LLC, and a stockholder in Johnson & Johnson.



An electronic version of the poster can be viewed by scanning the QR code. The QR code is intended to provide scientific information for individual reference. The PDF should not be altered or reproduced in any way.