# Center-level variation in Treatment Satisfaction Questionnaire for Medication (TSQM) scores in patients with MS from the Multiple Sclerosis Continuous Quality Improvement (MS-CQI) research collaborative study (2017-2020).

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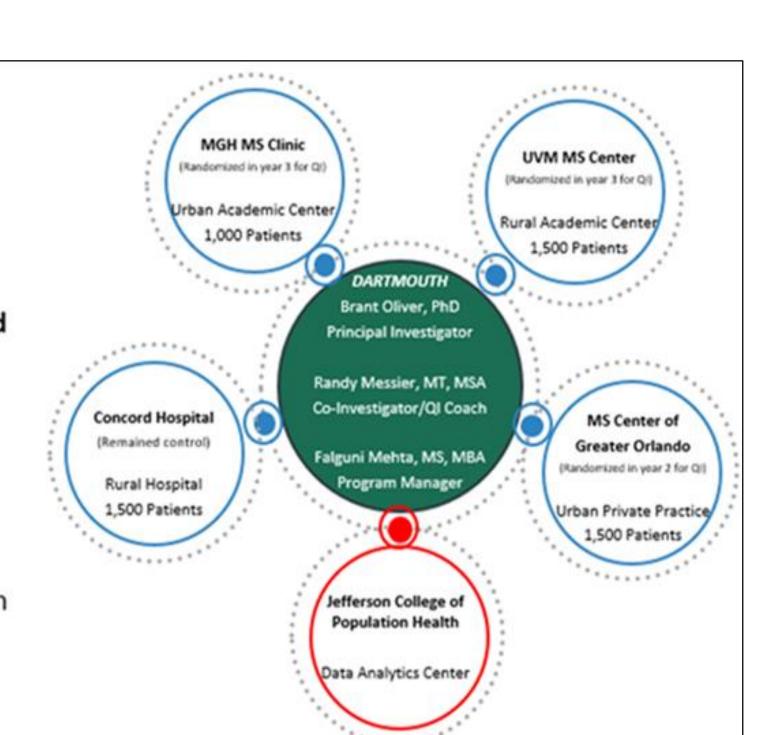


## Introduction

- The 1st multi-center MS improvement research collaborative with four MS centers (N=5,000).
- Aims: (1) benchmark priority performance indicators and study variation across sites; (2) provide feedback to inform improvement; and (3) test the comparative effectiveness of a coach-supported QI Intervention vs. usual practice (control) on outcomes using a step-wedge randomized design.
- MS centers contribute de-identified data abstracted from Electronic Health Record (EHR)
- Patients interested in contributing PRO data complete informed consent and answer online questionnaires for 19 PRO measures (PROMs).

#### Figure 1. MSCQI Infrastructure

- The first multicenter Quality Improvement (QI) research collaborative for multiple sclerosis (MS).
- System-level quarterly benchmarking analyses of MS care variation, quality and value.
- Randomized national multi-center controlled study (N=5,000) comparing QI vs. control on treatment, MRI utilization, and other outcomes.
- Learning Health System Co-Production
   Model: Electronic medical record (EMR) and patient reported data (PRO/PROM/PREM).
- Independent Data Analytics Center (Jefferson College of Population Health at Philadelphia University & Thomas Jefferson University)



# Background

The initial MS-CQI study (2017-2020) sought to evaluate system-level variation and use quality improvement (QI) methods to improve real world MS outcomes in four MS centers in the United States following approximately 5,000 persons with MS (PwMS). Assessing Patient Reported Outcomes (PROs), such as satisfaction to medication treatment, is important in complex, chronic, and costly ("3C") diseases like MS where people with MS (PwMS) commonly suffer from mental health problems that impact quality of life (QoL) and MS related outcomes.

### Methods

- TSQM surveys were collected from 327 adults aged >18 years participating in the MS-CQI research collaborative study between 2017-2020.
- TSQM surveys are included in the MS-CQI study to assess PwMS satisfaction to treatment in 3 key dimensions including: medication effectiveness, convenience and global satisfaction.
- Descriptive statistics were evaluated for each center, as well as significance testing across and between centers.
- Continuous variables were analyzed using ANOVA, and categorical variables were analyzed using Chi-Square tests.

# Objective

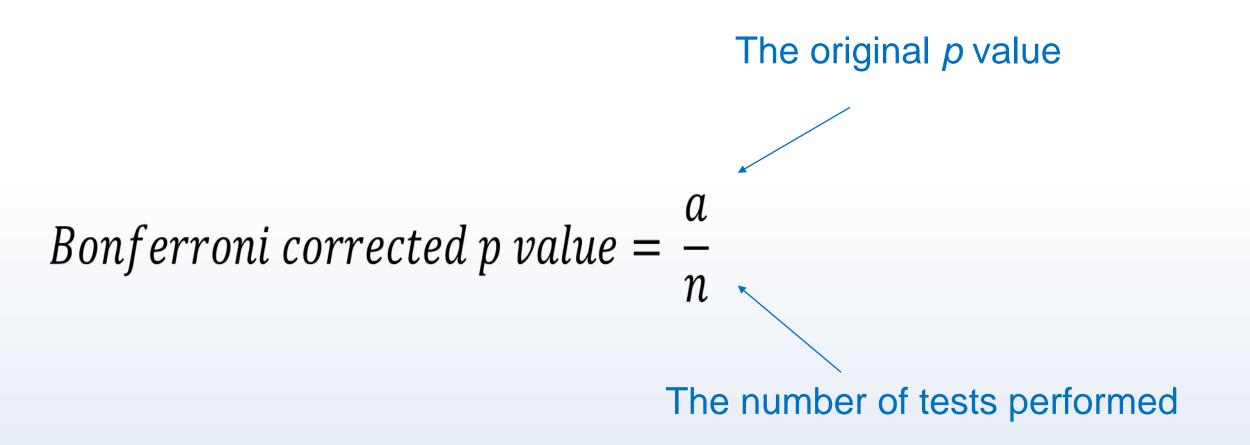
To describe center-level variation in TSQM-9 scores across four MS centers over a three-year period.

Table 1. Patient Population Characteristics by Center and Overall

	Concord (A)	MGH (B)	UVM (C)	Orlando (D)	MS-CQI (Total)
Patients: n (%)	125 (38.2%)	67 (20.5%)	59 (18.04 %)	76 (23.24%)	327 (100%)
Gender % Female	86.40	88.06	81.36	78.95	84.10
Primary Language English (n, %)	123 (98.40)	65 (97.01)	59 (100)	76 (100)	323 (98.78)
Payer Employer Health Plan Individual Health Plan Medicaid Medicare Veteran's Affairs Uninsured	86 (68.80)	43 (64.18)	42 (71.19)	53 (69.74)	224 (68.50)
	8 (6.40)	1 (1.49)	8 (15.25)	5 (6.58)	23 (7.03)
	5 (4.00)	2 (2.99)	0 (0)	0 (0)	7 (2.14)
	26 (20.80)	21 (31.34)	7 (11.86)	16 (21.05)	70 (21.41)
	0 (0)	0 (0)	0 (0)	2 (2.63)	2 (0.61)
	0 (0)	0 (0)	1 (1.69)	0 (0)	1 (0.31)
Marital Status Divorced Domestic Partnership Married Single Widowed	11 (8.80)	2 (2.99)	1 (1.69)	8 (10.53)	22 (6.73)
	5 (4.00)	0 (0)	3 (5.08)	1 (1.32)	9 (2.75)
	87 (69.60)	42 (62.60)	44 (75.48)	55 (72.37)	228 (69.72)
	19 (15.20)	12 (17.91)	9 (15.25)	12 (15.79)	52 (15.90)
	3 (2.40)	11 (16.42)	2 (3.39)	0 (0)	16 (4.89)
Income Less than \$15,000 \$15,000-\$29,999 \$30,000-\$49,999 \$50,000-\$99,999 \$100,000-\$149,999 Over \$150,000	7 (5.60)	0 (0)	2 (3.39)	1 (1.32)	10 (3.06)
	12 (9.60)	1 (1.49)	4 (6.78)	7 (9.21)	24 (7.34)
	18 (14.40)	12 (17.91)	8 (13.56)	15 (19.74)	53 (16.21)
	40 (32.00)	24 (35.82)	31 (52.54)	31 (40.79)	126 (38.53)
	30 (24.00)	14 (20.90)	10 (16.95)	17 (22.37)	71 (21.71)
	18 (14.40)	16 (23.88)	4 (6.78)	5 (6.58)	43 (13.15)
Education Some High School High School Diploma Bachelors Post-Graduate Degree GED Some College Some Post-Graduate	0 (0)	0 (0)	1 (1.69)	0 (0)	1 (0.31)
	15 (12.00)	5 (7.46)	3 (5.08)	9 (11.84)	32 (9.79)
	39 (31.20)	20 (29.85)	18 (30.51)	18 (23.68)	95 (29.05)
	28 (22.40)	16 (23.88)	13 (22.03)	24 (31.58)	81 (24.77)
	4 (3.20)	2 (2.99)	0 (0)	0 (0)	6 (1.83)
	36 (28.80)	21 (31.34)	22 (37.29)	18 (23.68)	97 (29.66)
	3 (2.40)	3 (4.48)	2 (3.39)	7 (9.21)	15 (4.59)

#### Bonferroni Test

- Bonferroni test is a post hoc series of t-tests performed on each pair of groups to determine where the difference comes from.
- It is used to compensate for Type I errors using a corrected p-value.



#### Table 2. Center Level and Socioeconomic Variation In TSQM Scores

	F	P value	Values/Bonferroni Test		
Convenience:	2.66	0.0483	Comparisons Significant at the 0.05 level are indicated by ***	Comparisons Significant at the 0.05 level are indicated by ***	Comparisons Significant at the 0.05 level are indicated by ***
Center			Center Comparison	Difference Between Means	Simultaneous 95% Confidence Limits
Concord (A) MGH (B) UVM (C) Orlando (D)			A-B***	8.403	(0.415 – 16.392)
			A-C	1.722	(-6.612 – 10.602)
			A-D	2.927	(-4.748 – 10.602)
			B-C	-6.682	(-16.101 – 2.738)
			B-D	-5.476	(-14.318 – 3.366)
			C-D	1.205	(-7.950 – 10360)
Global Satisfaction:	3.45	0.0168			
Center Concord (A) MGH (B) UVM (C) Orlando (D)				No significant result	S
Global Satisfaction	26.64	0.0457			
Gender Male (1) Female (2)				Females: 75.56 Male: 72.80	
Medication Effectiveness	2.71	0.0301			
Marital Status Divorced (1) Domestic Partnership (2) Married (3) Single (4) Widowed (5)				No significant results	

## Conclusion

- We observed statistically significant differences in center level variation among the convenience (p=0.0483) and global satisfaction (p=0.0168) domains of the TSQM-9 survey.
- Post-hoc analysis showed a statistically significant difference for the convenience domain a rural hospital (center A), and urban academic hospital (center B), (p<0.05) with center A having a mean score of 8.403 higher than center B. Females scored higher than males (75.56 vs. 72.80, respectively) in the global satisfaction domain of the TSQM surveys (p=0.0457).
- Other variance in domains include marital status and survey responses for effectiveness of their medication treatment (p=0.0301) with those who were married scoring higher in this domain compared to those that were single or divorced.
- Further research should analyze the association between treatment satisfaction and geographic variation to optimize medication therapy management and reduce inequities for PwMS.











