Longitudinal study of symptom botheration in Multiple Sclerosis

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Disclosures:

Dr. Kister has received personal compensation for consulting or serving on a scientific advisory board for Biogen and Genentech. Dr. Kister has received research support from Biogen, Sanofi Genzyme, and Genentech. Ms. Bacon has nothing to disclose Ms. Wang has nothing to disclose Dr. Cutter has received personal compensation for consulting, serving on a scientific advisory board, speaking, or other activities with AMO Pharmaceuticals, Biolinerx, Horizon Pharmaceuticals, Hisun Pharmaceuticals, Merck, Merck/Pfizer, Opko Biologics, Neurim, Novartis, Ophazyme, Sanofi-Aventis, Reata Pharmaceuticals, Receptos/Celgene, Teva pharmaceuticals, NHLBI, NICHD, Atara Biotherapeutics, Axon, Biogen, Argenix, Brainstorm Cell Therapeutics, Charleston Labs Inc, Click Therapeutics, Genzyme, Genentech, GW Pharma, Klein-Buendel Incorporated, Medimmune, Medday, Novartis, Roche, Scifluor, Somahlution, Teva pharmaceuticals, TG Therapeutics, UT Houston. Dr. Cutter has received personal compensation in an editorial capacity for Statistical editor for the Journal of the American Society of Nephrology. Dr. Cutter has received research support from Via MGFA.

The project was supported by unrestricted, investigator-initiated grant from Genentech (RO-IIS-2017-10210).

Background:

- Little is known about the longitudinal changes of symptom botheration in MS.
- SymptoMScreen is a validated, patient-reported outcome measure for assessing symptom severity in 12 domains commonly affected by MS (Green et al, 2016).

Please circle **one number that best describes how each MS symptom has affected your everyday life activities.** For example, if it takes you longer to type or text, your hand function may have a 'mild limitation' (circle '2'), but if you gave up typing or texting completely, your hand function may have a 'severe limitation' (circle '4').

	0 – not affected at all	1 – very mild limitation/ I make minor adjustments	2 – mild limitation/ I make frequent adjustments	3 – moderate limitation/ I reduced my daily activities	4 – severe limitation/ I gave up some activities	5 – very severe limitation/ I'm unable to do many daily activities	6 – total limitation/ I'm unable to do most daily activities
Walking	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Hand function/Dexterity Poor hand coordination, tremors	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Spasticity & Stiffness Muscle cramping or muscle tightness	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Bodily pain Achiness, tenderness	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Sensory Numbness, tingling, or burning	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Bladder control Urinary urgency, urinary frequency	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Fatigue	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Vision Blurry vision, double vision	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Dizziness Feeling off balance, 'spinning'/vertigo	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Cognitive function Memory, concentration problems	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Depression Depressed thoughts, low mood	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Anxiety Feelings of stress, panic attacks	**0**	**1**	**2**	**3**	**4**	**5**	**6**

Objectives:

1. To report longitudinal changes in SyMS scores in MS patients followed in two large, multi-ethnic MS centers for >1 year

2. To assess predictors of change in SyMS score

N	1014
% Female	74%
Age in years at first visit, average (SD)	44.7 (12.4)
Follow up in months, average (SD), range	21.0 (5.5) [12-38.1]
Initial PDDS median, average (SD), range	1, 2.0 (2.0), [0-8]
Ambulatory assistance (PDDS >3) at first visit, %	31%
Initial Disease type, %	
Relapsing	87%
Progressive	13%
Race, %	
White	60.4%
AA	18.6%
HA	13.5%
Other	7.5%

SyMS Domain Scores at Baseline

	walking	hand	spasticity	pain	sensory	bladder	fatigue	vision	dizzy	cognitive	depression	anxiety	
6	4%	1%	2%	3%	2%	3%	3%	1%	0%	1%	2%	2%	0%
5	5%	2%	4%	5%	4%	3%	8%	2%	4%	4%	4%	3%	10%
4	10%	4%	8%	8%	8%	7%	14%	3%	6%	8%	5%	5%	20%
3	14%	9%	14%	12%	14%	11%	18%	10%	11%	13%	12%	15%	30%
2	11%	14%	17%	13%	18%	18%	18%	14%	10%	17%	11%	14%	40%
1	24%	24%	20%	17%	25%	19%	21%	23%	21%	25%	21%	22%	50%
0	32%	46%	34%	43%	29%	39%	18%	47%	48%	32%	46%	39%	

Baseline Domain SyMS scores

Domain	Baseline domain SyMS, average (SD)
Walking	1.8 (1.8)
Dexterity	1.1 (1.4)
Spasticity	1.6 (1.6)
Pain	1.5 (1.7)
Sensory	1.7 (1.6)
Bladder/bowel	1.5 (1.6)
Fatigue	2.2 (1.7)
Vision	1.1 (1.3)
Dizziness	1.2 (1.5)
Cognition	1.6 (1.5)
Depression	1.3 (1.6)
Anxiety	1.4 (1.5)

- Highest average domain SyMS score was in **fatigue** domain 2.2 (±1.7)
- Lowest average domain SyMS scores were in **vision** 1.1 (±1.3), **dexterity** 1.1 (±1.4)
- **Walking** domain score was 1.8 (±1.8)

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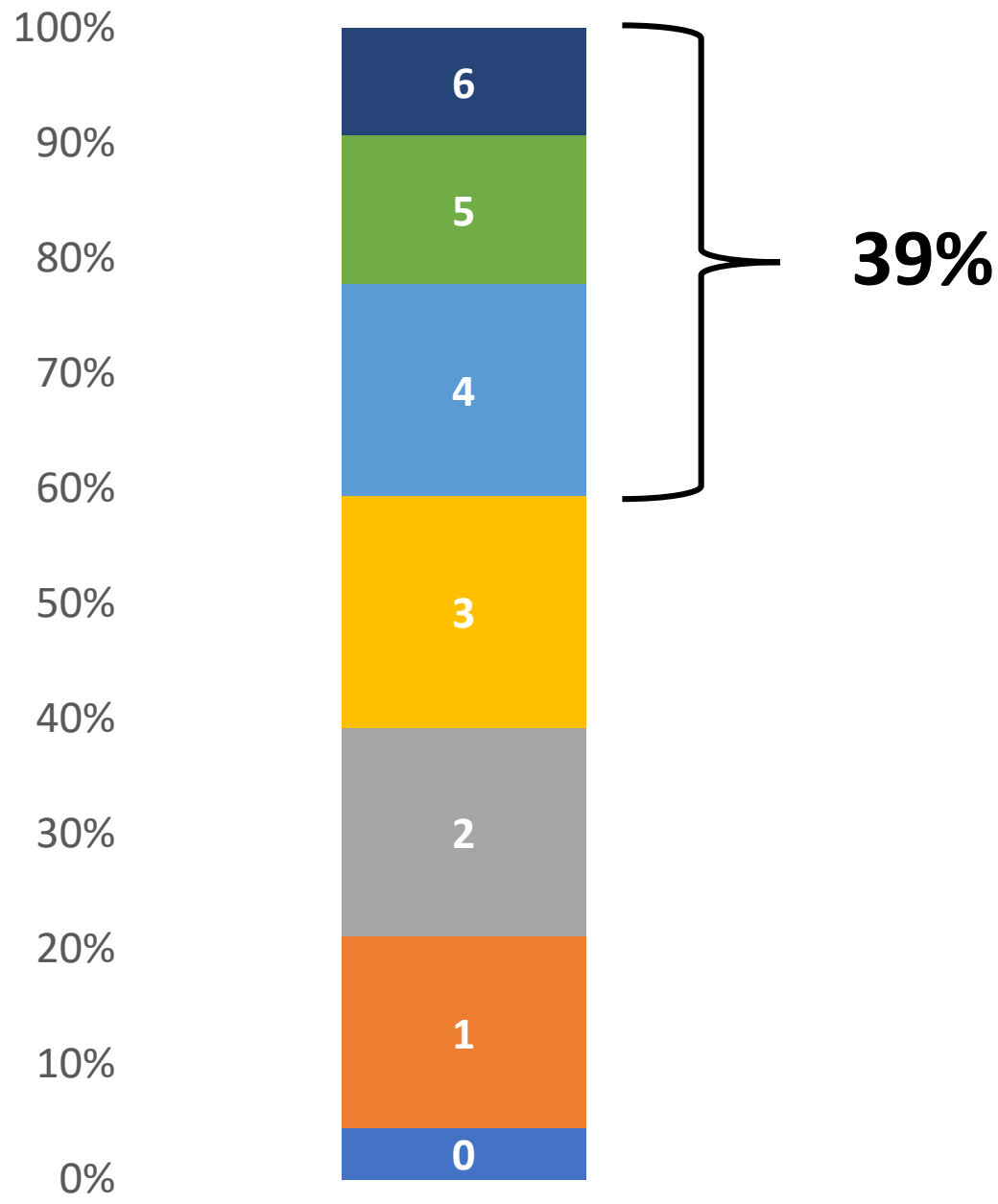
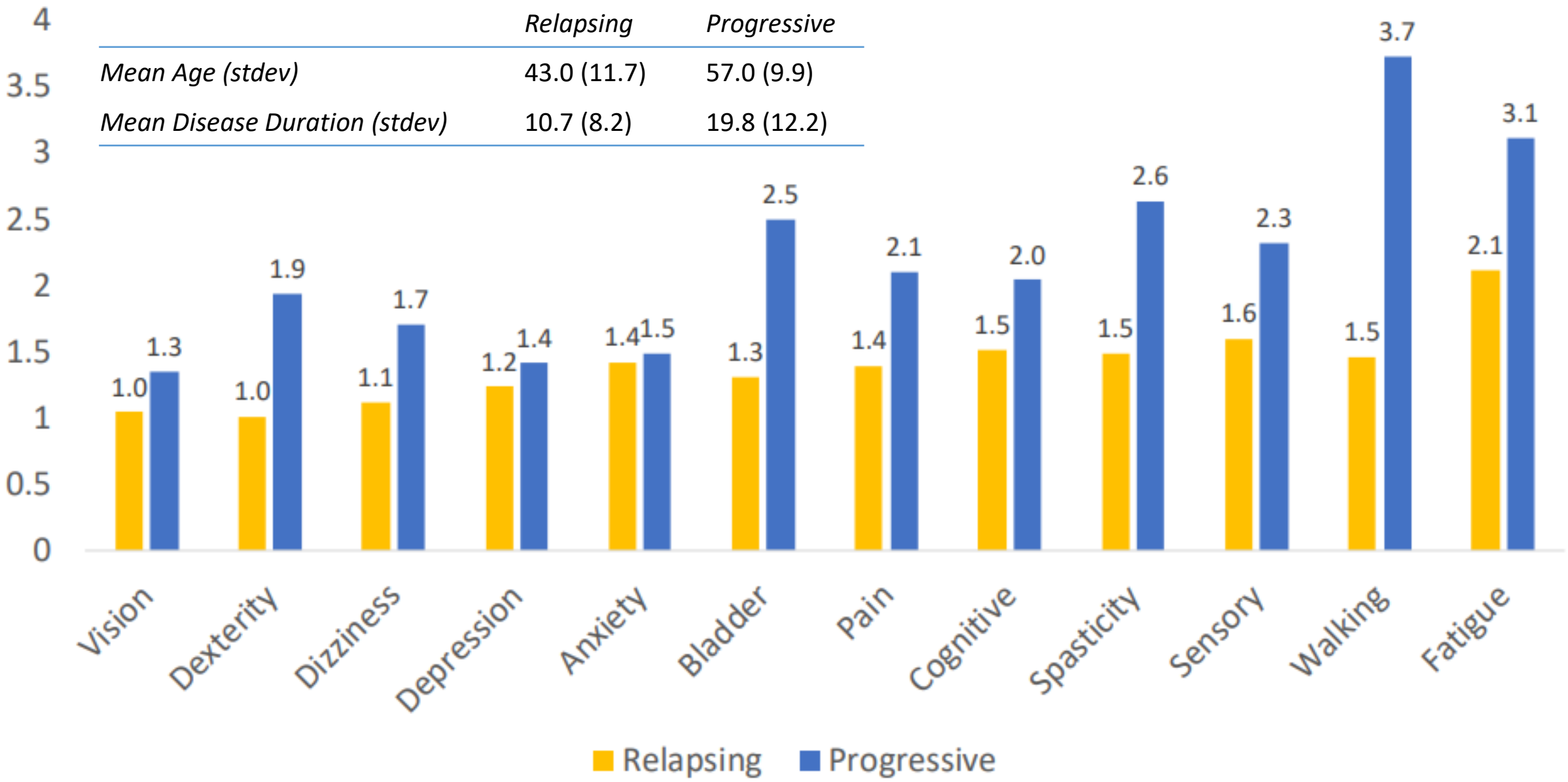
Vision	1.1 (1.3)
Dizziness	1.2 (1.5)
Cognition	1.6 (1.5)
Depression	1.3 (1.6)
Anxiety	1.4 (1.5)

Maximum Domain SyMS scores

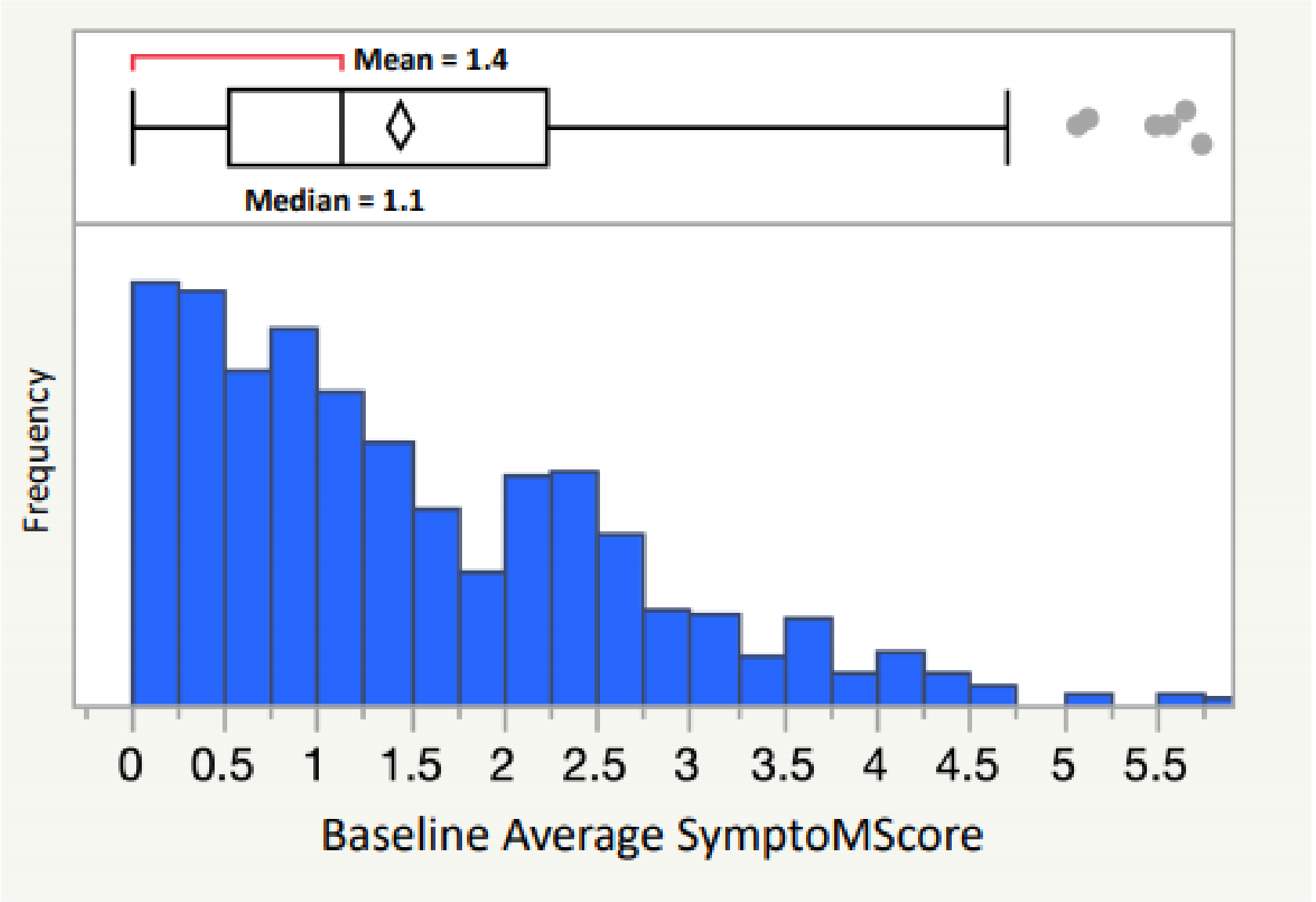


Baseline SymtpoMScreen Domain scores for Relapsing and Progressive MS patients

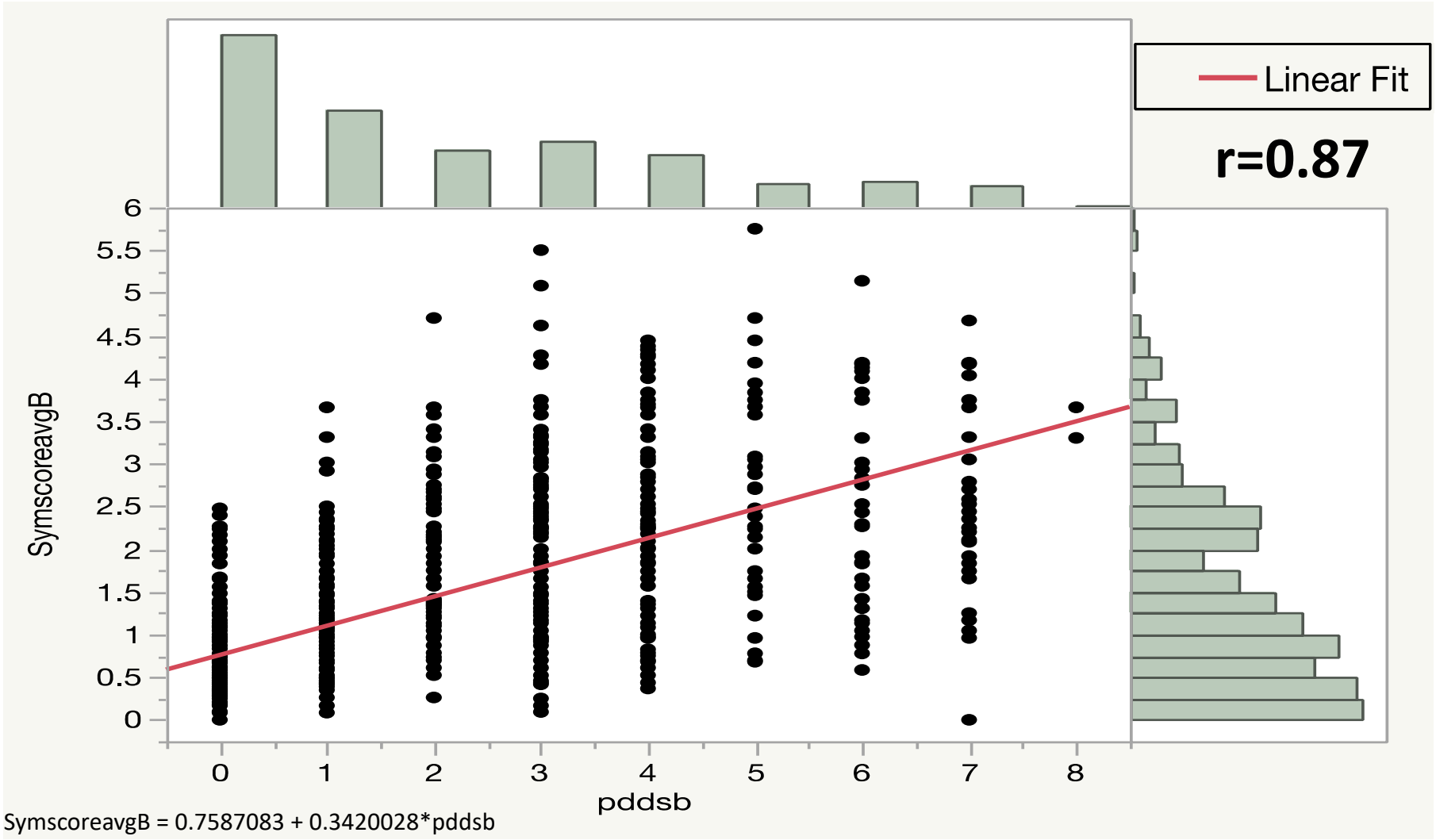
	Relapsing	*Progressive*
Mean Age (stdev)	43.0 (11.7)	57.0 (9.9)
Mean Disease Duration (stdev)	10.7 (8.2)	19.8 (12.2)



Baseline SymptoMScreen Scores

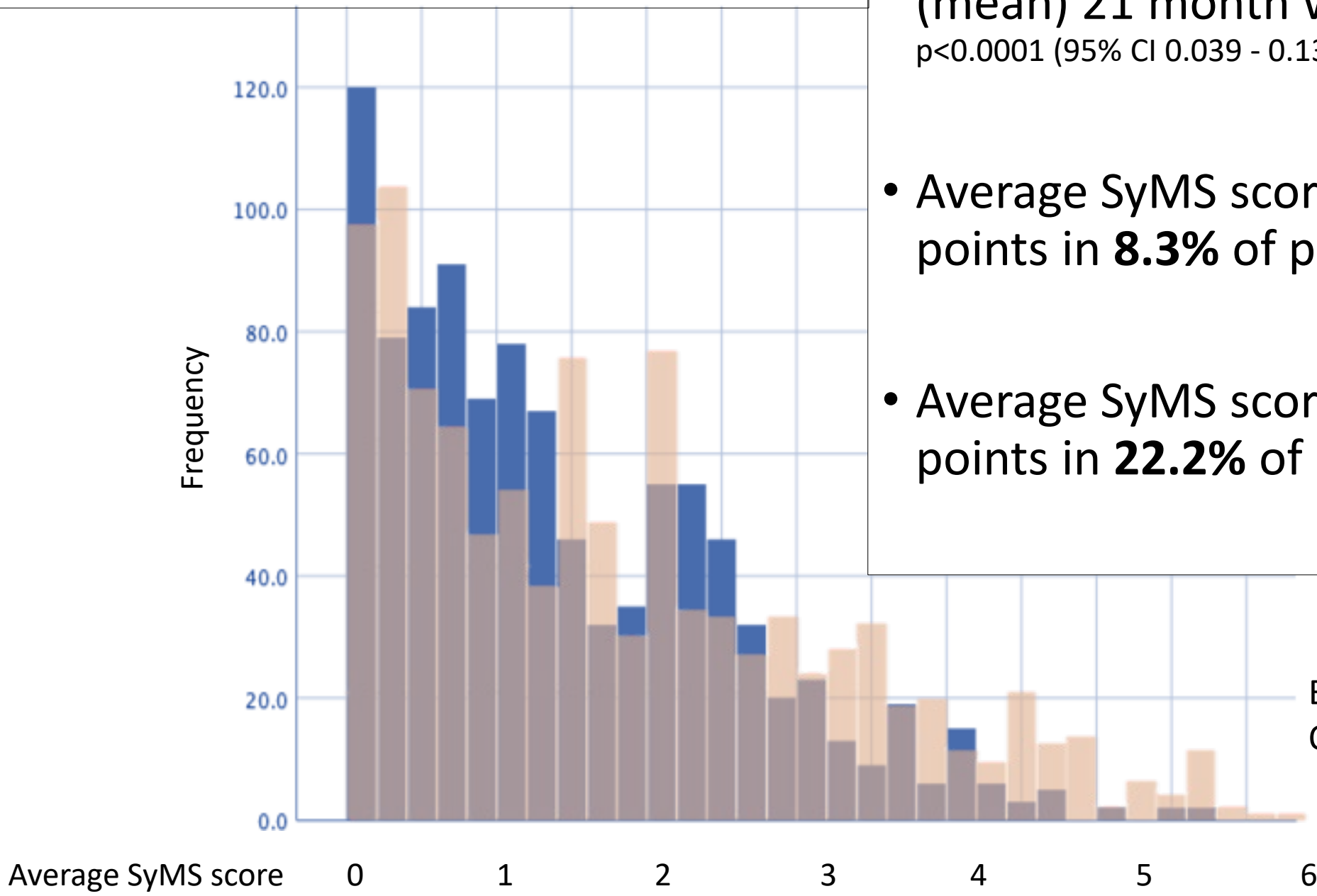


Correlation between **Average SymptoMScreen Score** and **Patient-rated Disability** at Baseline



Change in Average SyMS Score

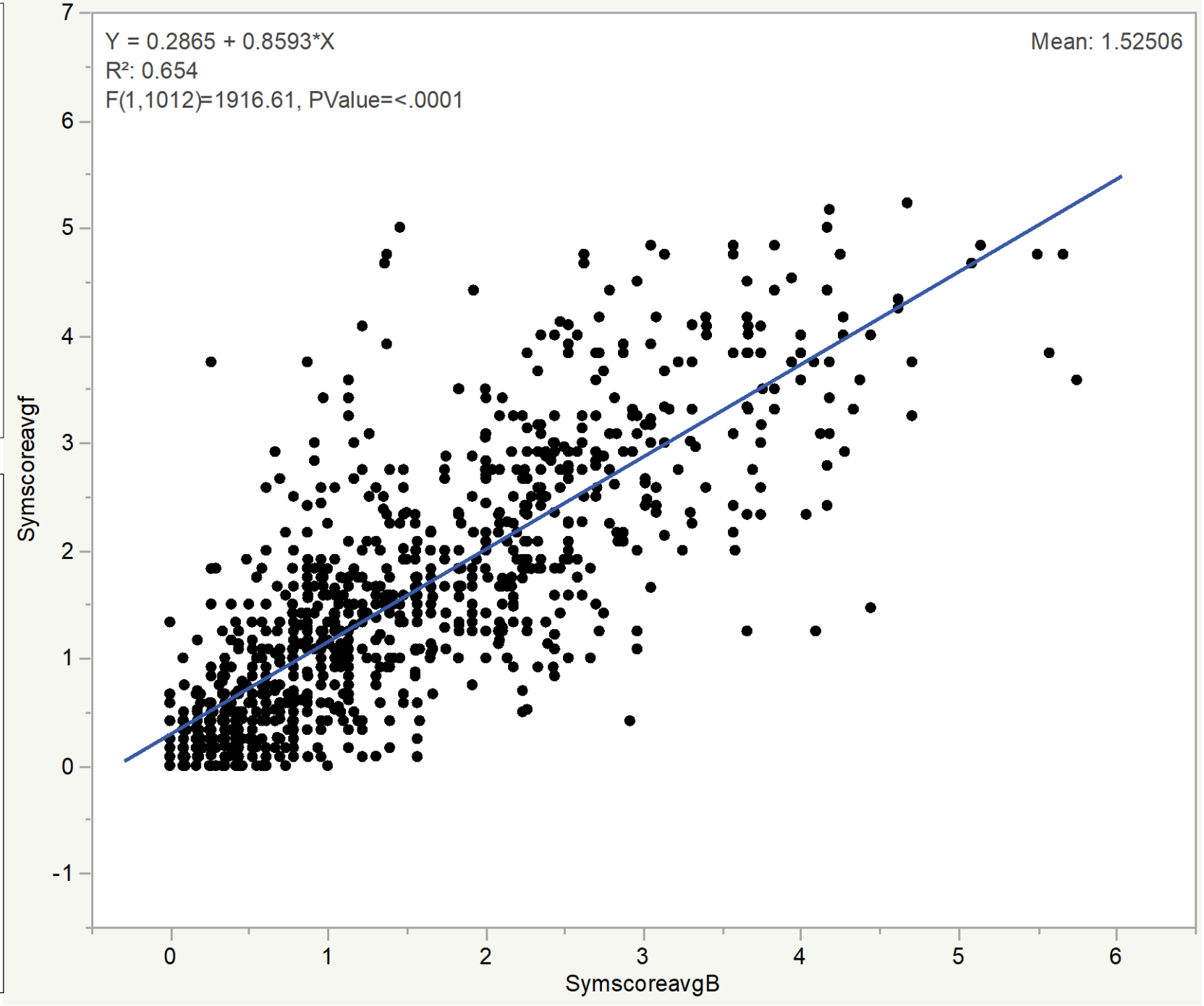
- Change in Average SyMS score over (mean) 21 month was **+0.084** (±0.73), p<0.0001 (95% CI 0.039 - 0.13)
- Average SyMS score changed by ≥1 points in **8.3%** of patients
- Average SyMS score changed by ≥0.5 points in **22.2%** of patients



Blue: more at Baseline
Orange: more at Follow-up

Initial SyMS score was highly correlated with final SyMS score (R^2=0.65) r=0.81

In multivariable regression model, only baseline PDDS (weakly) predicted change in SyMS score



Limitations

- Patients who attend clinic more frequently may be more symptomatic, while the most disabled patients maybe lost to follow up (selection biases)

- Patients do not always recognize whether particular symptom is due to MS or an another health problem
  - e.g. impaired walking due to arthritis

- Change in symptom severity may reflect effects of DMT or symptomatic therapy, rather than disease itself
  - treatment not accounted for in our analyses

Conclusions

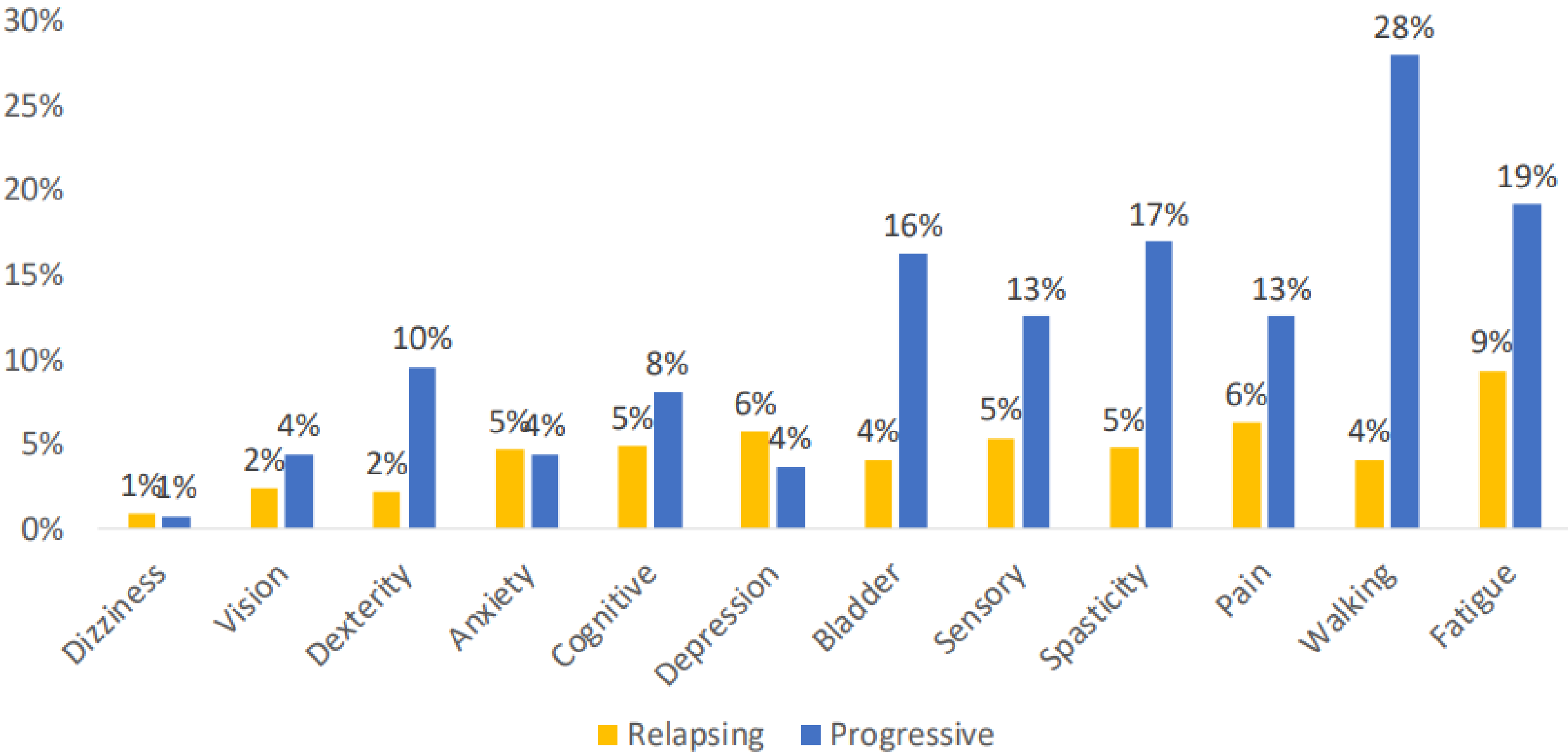
- While baseline *average SyMS* and *domain SyMS* were in the ‘very mild-to-mild’ range, 39% of patients had *at least one* domain SyMS score of 4 or more
  - ‘Spinal domains’, pain and fatigue SyMS scores were significantly higher in Progressive MS patients, while depression and anxiety domain scores were similar

- Average SyMS score strongly correlated with patient-rated disability score

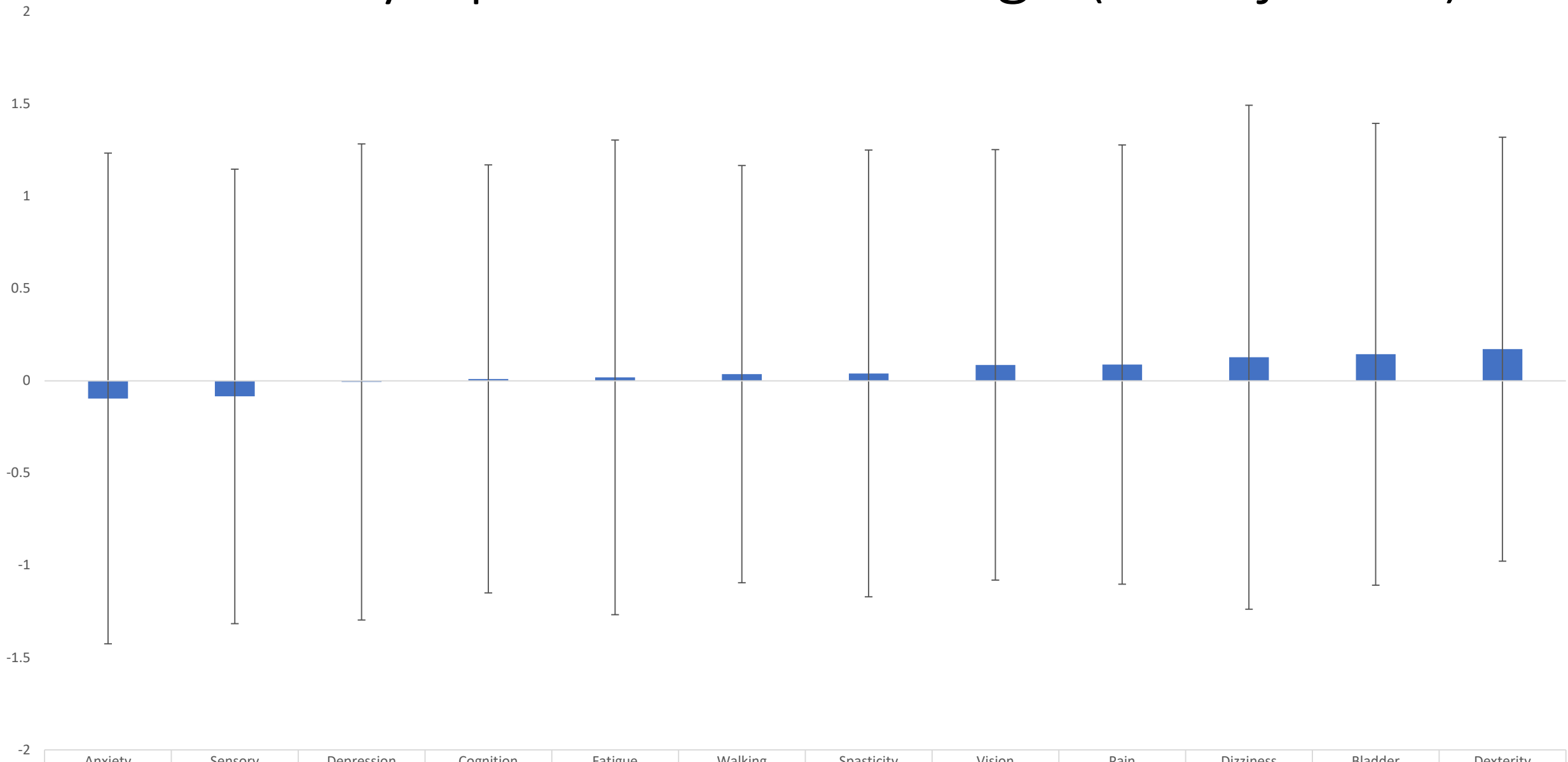
- Over ~21-month period of observation, average SyMS score increased slightly, but significantly
  - Higher baseline disability was a marginal predictor an increase in SyMS score

Additional slides

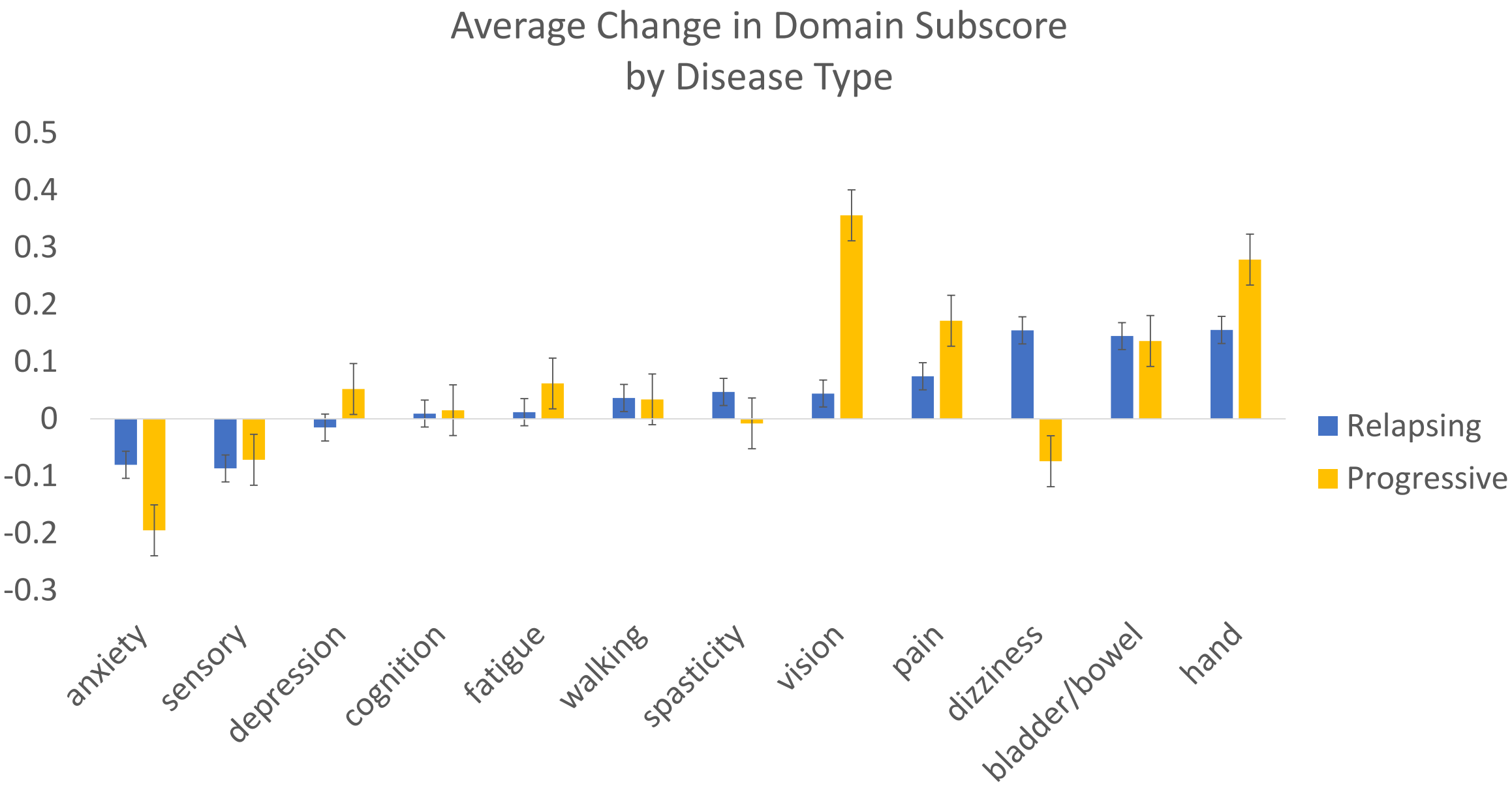
Percent (%) Patients with Relapsing and Progressive MS with ‘very severe’ impairment (≥5)

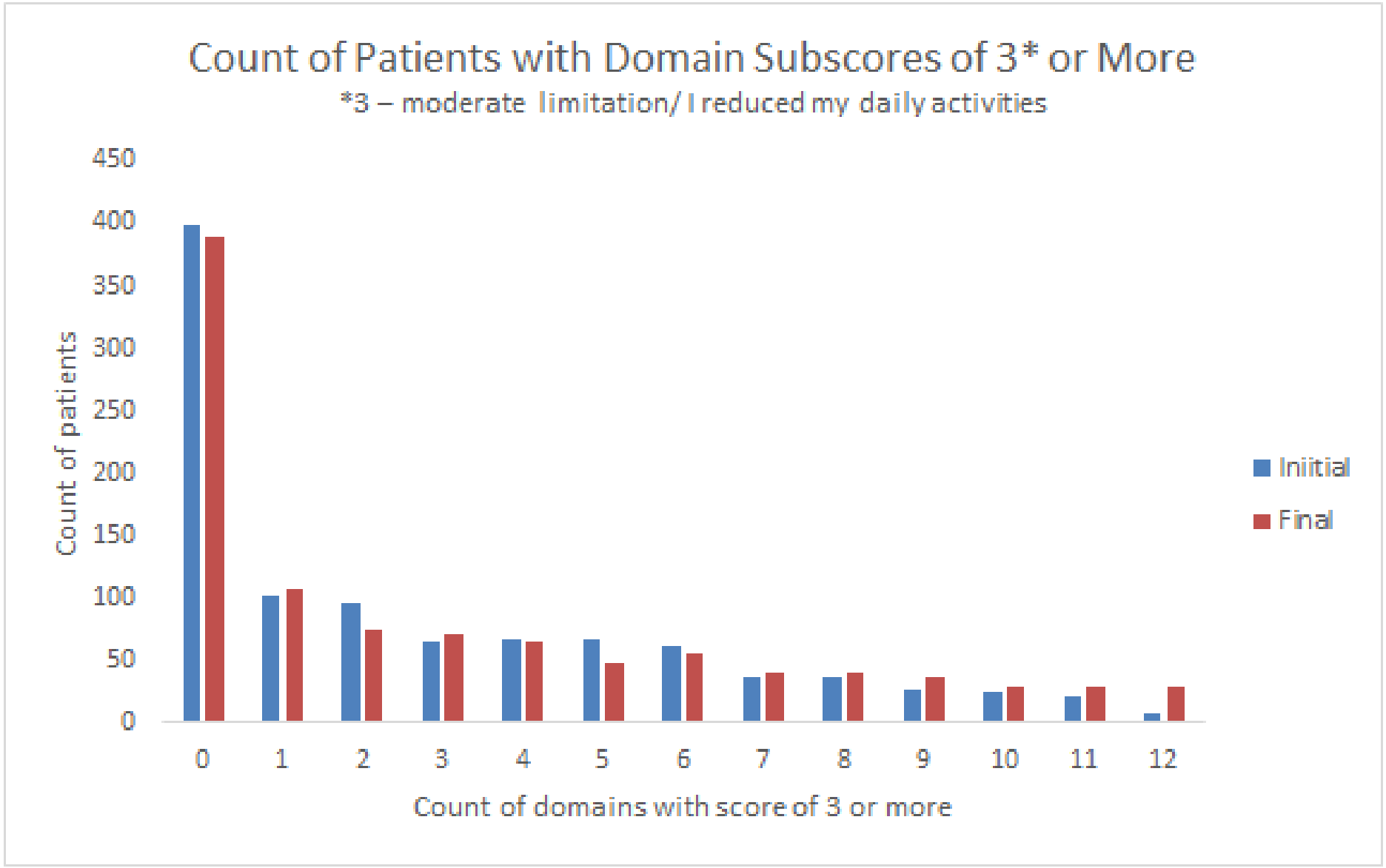


Domain SymptoMScreen change (unadjusted)



	Anxiety	Sensory	Depression	Cognition	Fatigue	Walking	Spasticity	Vision	Pain	Dizziness	Bladder	Dexterity
Avg chg	-0.095781072	-0.084693878	-0.006024096	0.01010101	0.018386108	0.03625731	0.039918117	0.086032389	0.08784474	0.127753304	0.143724696	0.171428571


Average Change in Domain Subscore
by Disease Type
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
anxiety
sensory
depression
cognition
fatigue
walking
spasticity
vision
pain
dizziness
bladder/bowel
hand
Relapsing
Progressive


Count of Patients with Domain Subscores of 3* or More
*3 – moderate limitation/ I reduced my daily activities
Count of patients
450
400
350
300
250
200
150
100
50
0
0
1
2
3
4
5
6
7
8
9
10
11
12
Count of domains with score of 3 or more
Iniitial
Final