

**Supplemental Table 1: PCSI Symptom Inventory By Age with Common Question 13 Common Items Across All Age Groups Highlighted**

Age 5-7	Age 8-12	Age 13-18
<b>Common Elements Included</b>		
Have you had headaches? Has your head hurt?	Have you had headaches? Has your head hurt?	Headache
Have you felt sick to your stomach like you were going to throw up?	Have you felt sick to your stomach or nauseous?	Nausea
Have you felt like you might fall when you walk, run or stand?	Have you had any balance problems or have you felt like you might fall when you walk, run or stand?	Balance problems
Have you felt dizzy? (like things around you were spinning or moving)	Have you felt dizzy? (like things around you were spinning or moving)	Dizziness
Have you felt more tired than usual?	Have you felt more tired than usual?	Fatigue
Have bright lights bothered you more than usual? (like when you were in the sunlight, when you looked at lights, or watched TV)	Have bright lights bothered you more than usual? (like when you were in the sunlight, when you looked at lights, or watched TV)	Sensitivity to light
Have loud noises bothered you more than usual? (like when people were talking, when you heard sounds, watched TV or listened to loud music)	Have loud noises bothered you more than usual (like when people were talking, when you heard sounds, watched TV or listened to loud music)	Sensitivity to noise
Have you felt grumpy? (like you were in a bad mood)	Have you felt grumpy or irritable? (like you were in a bad mood)	Irritability
Have you felt sad?	Have you felt sad?	Sadness
Have you felt nervous or worried?	Have you felt nervous or worried?	Nervousness
Has it been hard for you to pay attention to what you are doing? (like homework or chores, listening to someone, or playing a game)	Has it been hard for you to pay attention to what you are doing? (like homework or chores, listening to someone, or playing a game)	Difficulty concentrating
Has it been hard for you to remember things? (like things you heard or saw, or places you have gone)	Has it been hard for you to remember things? (like things you heard or saw, or places you have gone)	Difficulty remembering
Have things looked fuzzy or blurry?	Have things looked blurry?	Vision problems
<b>Uncommon Elements Not Included</b>		
Do you feel "different than usual?"	Do you feel "different" than usual?	Feeling more emotional
	Have you felt like you are moving more slowly	Feeling slowed down
	Have you felt like you are thinking more slowly?	Feeling mentally foggy
	Has it been hard to think clearly?	Get confused with directions or tasks
	Have you felt more drowsy or sleepy than usual?	Move in a clumsy manner
		Answer questions more slowly than usual
		In general, to what degree do you feel "differently" than before the injury (not feeling yourself)

**Supplemental Table 2:** Comparison of patients included in heatmap vs. those missing data who were excluded from heatmap.

Characteristic	Included Patients N=2533	Excluded Patients N=708	p
Age, median (IQR)	12.0 (9.3-14.6)	12.1 (8.9-14.9)	0.77
Male Sex, n/total (%)	1416/2354 (60.2%)	441/708 (62.3%)	0.31
Time from Injury to ED Triage (hours), median (IQR)	3.0 (1.5-12.6)	2.7 (1.4-8.3)	0.04
Mechanism of Injury, n/total (%)			0.60
Sports/Recreation	1614/2353 (68.6%)	461/696 (66.2%)	
Fall	659 (28.0%)	212 (30.5%)	
Motor Vehicle Crash	45 (1.9%)	12 (1.7%)	
Assault	32 (1.4%)	11 (1.6%)	
Other	3 (0.1%)	0 (0%)	
Loss of Consciousness, n/total (%)	304/2084 (14.6%)	91/628 (14.5)	0.95
Post Injury Seizure, n/total (%)	41/2348 (1.7%)	16/693 (2.3%)	0.34
Glasgow Coma Score, median (IQR)	15 (15-15)	15 (15-15)	0.47
Past History, n/total (%)			
Prior Treatment for Headache	400/2353 (17.0%)	118/696 (17.0%)	0.98
Personal History of Migraine	310/2342 (13.2%)	82/696 (11.8%)	0.32
Learning Disability	179/2347 (7.6%)	64/692 (9.2%)	0.17
Attention Deficit Hyperactivity Disorder	195/2345 (8.3%)	73/691 (10.6%)	0.07
Anxiety	188/2349 (8.0%)	49/696 (7.0%)	0.41
Depression	62/2350 (2.6%)	25/697 (3.6%)	0.19
Sleep Disorder	47/2348 (2.0%)	15/692 (2.2%)	0.79
Other Psychiatric Disorders	24/2327 (1.0%)	8/689 (1.2%)	0.77
Family History of Migraine, n/total (%)	310/2342 (13.2%)	82/696 (11.8%)	0.32
BESS Number of Tandem Stance Errors, median (IQR)	3 (1-8)	3 (1-10)	0.03
BESS Number of Double Leg Stand Errors, median (IQR)	0 (0-1)	0 (0-1)	0.25
PCSI Scores at Index ED Visit, median (IQR)			
Physical	1.50 (0.88-2.38)	1.62 (0.88-2.62)	0.07
Fatigue	2.00 (0.67-3.67)	2.00 (1.00-3.67)	0.30
Emotional	0.50 (0.00-1.50)	0.75 (0.00-1.75)	0.15
Cognitive	0.60 (0.00-2.00)	0.80 (0.00-2.00)	0.12

Abbreviations: Balance Error Scoring System (BESS), Post-Concussion Symptom Inventory (PCSI)