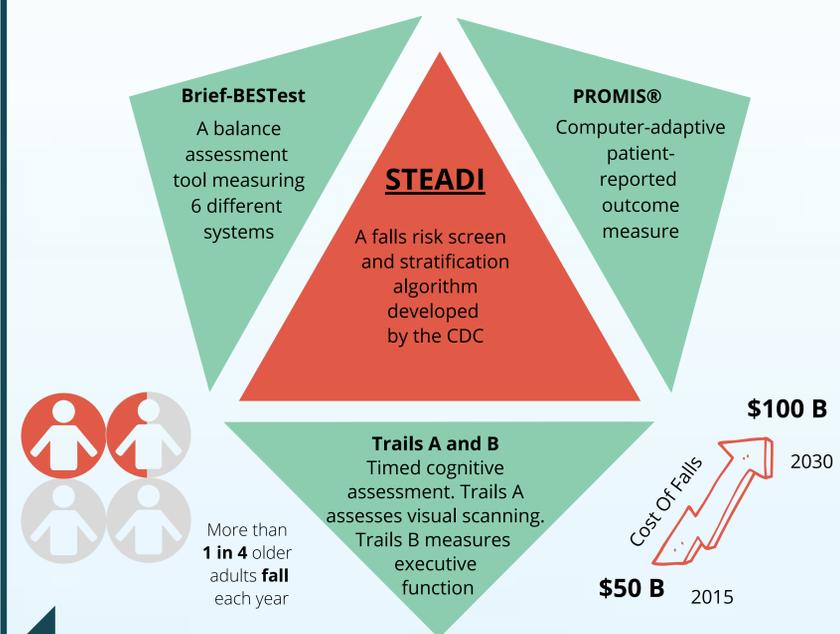# Falls Risk Screening in Community-Dwelling Older Adults

Austyn Byasse, SPT, Kevin Joines, SPT, Rachel Cundy, SPT, Carlos Navia, SPT, Virginia Edwards, SPT, Rachel Lineback, SPT, Cindy Zablotny, PT, DPT, NCS, Theresea Raudsepp, PT, MS, GCS, CEEAA, Jeff Houck, PT, PhD

Background

Brief-BESTest
A balance assessment tool measuring 6 different systems

PROMIS®
Computer-adaptive patient-reported outcome measure

STEADI
A falls risk screen and stratification algorithm developed by the CDC

Trails A and B
Timed cognitive assessment. Trails A assesses visual scanning. Trails B measures executive function

More than **1 in 4** older adults **fall** each year

Cost Of Falls
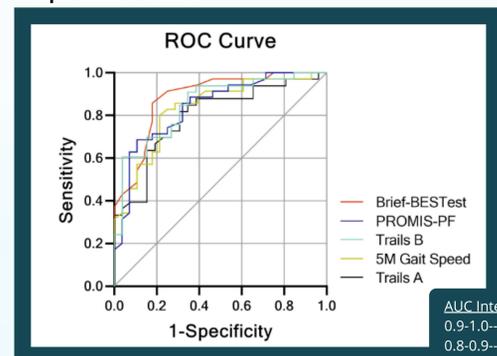$100 B — 2030
$50 B — 2015

Purpose: To determine a way to reduce clinician burden in the identification of individuals at risk for falls

Hypothesis: PROMIS-PF, Brief-BESTest and Trails A and B will have direct correlations to STEADI falls risk classification in predicting individuals at risk for falling.

Results

Graph 1: ROC Curve

Graph 1: A receiver operating characteristics (ROC) curve comparing Trails A, Trails B, PROMIS- PF, 5m gait speed, and Brief-BEST to STEADI classification.

AUC Interpretation
0.9-1.0------ Excellent
0.8-0.9------ Good
0.7-0.8------ Fair
0.6-0.7------ Poor

Table 1: ROC Curve Data

	AUC (95% CI)	Sensitivity	Specificity	Threshold for Fall Risk
Trails A	0.798 (0.681-0.911)	81.8	69.2	≥ 42.6 seconds
Trails B	0.85 (0.751-0.948)	84.8	69.2	≥ 112 seconds
PROMIS-PF	0.841 (0.742-0.938)	68.6	89.3	≤ 39.7
PROMIS-SS	0.592 (0.447-0.737)	60	53.6	≤ 50.6
FES-I	0.762 (0.64-0.884)	75.8	73.1	≥ 21.5
5M Gait Speed	0.833 (0.732-0.934)	80	78.6	≤ 1.0 m/s
Brief-BEST	0.885 (0.801-0.969)	85.7	82.1	≤ 14
30s-STS	0.829 (0.727-0.931)	77.1	75	≤ 11
TUG	0.866 (0.776-0.956)	79.4	82.1	≥ 11.12 seconds

Table 1:
-PROMIS-PF has an 89.3% specificity for identifying moderate-high risk fallers with a cutoff score of ≤ 39.7
-Trails A has an 81.8% sensitivity for identifying moderate-high risk fallers with a cutoff score of ≥ 42.6 seconds
-Brief-BEST has an 85.7% sensitivity for identifying moderate-high risk fallers with a cutoff score of ≤ 14
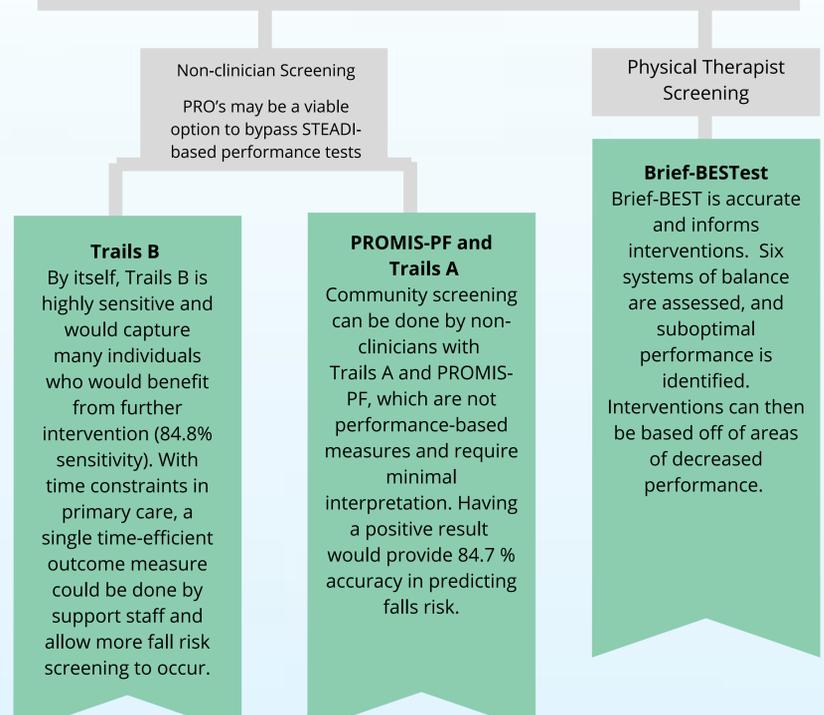
Table 2: Combined use of PROMIS-PF and Trails A to predict STEADI Classification

	Observed High/Mod Classification	Observed Low Classification	Total Predictive Accuracy
Predicted High/Mod Classification	32	8	
Predicted Low Classification	1	18	
Percentage Correct	97.00%	69.20%	84.70%

Table 2:
When PROMIS-PF and Trails A are combined, they can predict STEADI moderate-high risk classification with 84.7% accuracy. This combination also has a 97% sensitivity.

Table 3: PROMIS-PF Spearman Correlations

Measure	Correlation	Significance
PROMIS-PF		
30s-STS	ϱ = 0.713	p < 0.001***
Brief-BEST	ϱ = 0.705	p < 0.001***
TUG	ϱ = -0.678	p < 0.001***
5m Gait Speed	ϱ = 0.649	p < 0.001***
4SBT	ϱ = 0.585	p < 0.001***
Trails B	ϱ = -0.479	p < 0.001***
PROMIS-SS	ϱ = 0.425	p < 0.001***
Trails A	ϱ = -0.347	p < 0.001***
Fall Frequency	ϱ = -0.302	p < 0.016*

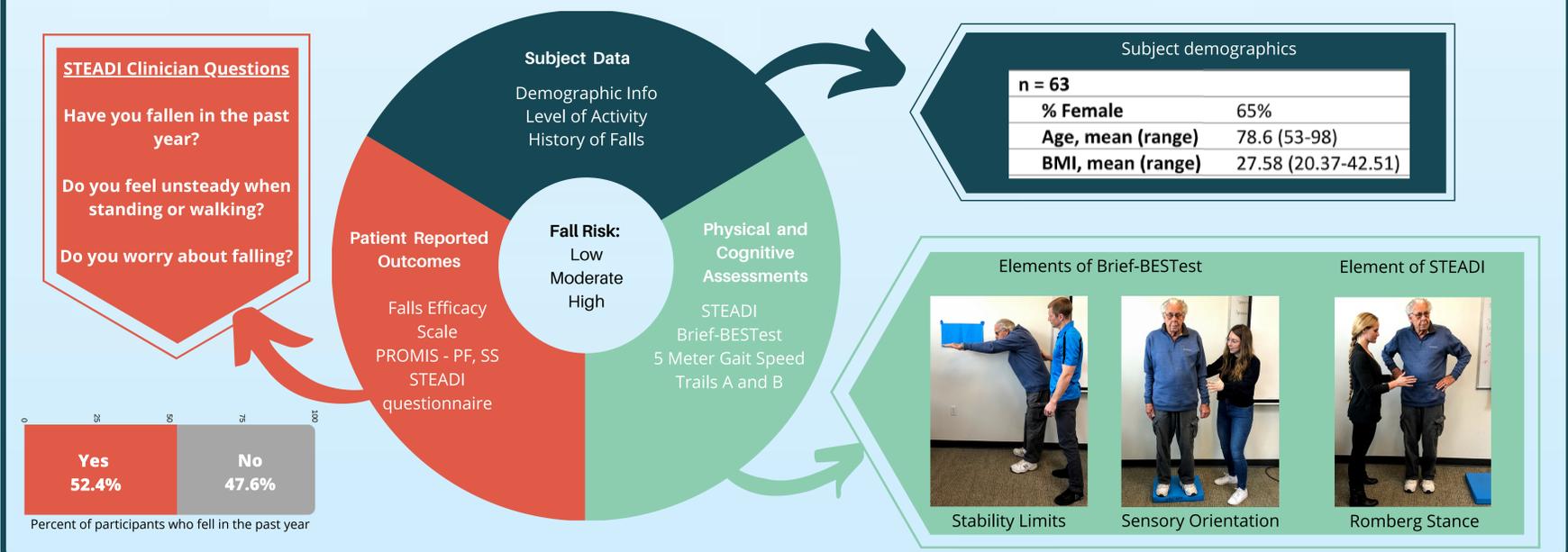Table3:
PROMIS-PF correlates significantly with each of the assessment tools used in this study.
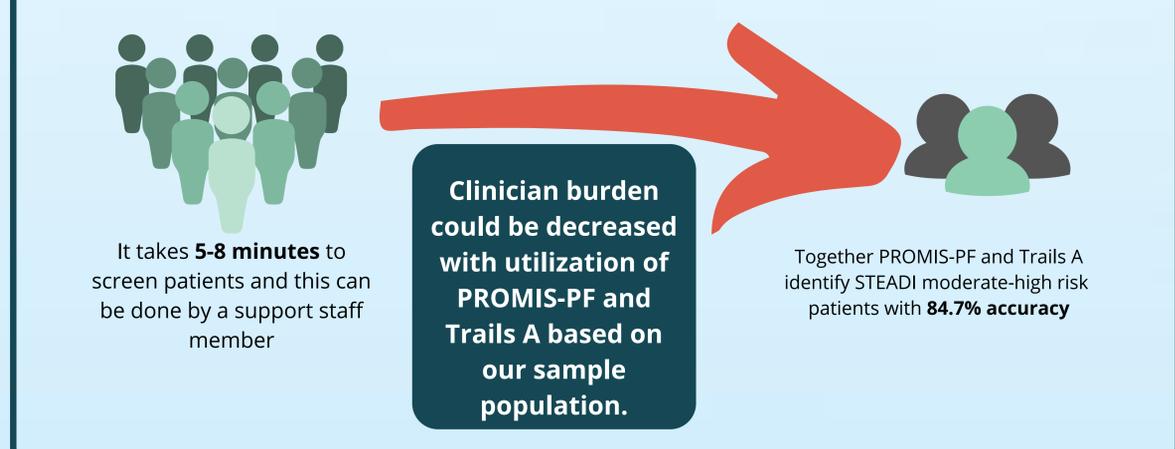
Discussion

Accurate screening for fall risk is possible with multiple outcome measures and could be assessed by various providers and non-clinicians within different settings.

Non-clinician Screening
PRO's may be a viable option to bypass STEADI-based performance tests

Physical Therapist Screening

Trails B
By itself, Trails B is highly sensitive and would capture many individuals who would benefit from further intervention (84.8% sensitivity). With time constraints in primary care, a single time-efficient outcome measure could be done by support staff and allow more fall risk screening to occur.

PROMIS-PF and Trails A
Community screening can be done by non-clinicians with Trails A and PROMIS-PF, which are not performance-based measures and require minimal interpretation. Having a positive result would provide 84.7 % accuracy in predicting falls risk.

Brief-BESTest
Brief-BEST is accurate and informs interventions. Six systems of balance are assessed, and suboptimal performance is identified. Interventions can then be based off of areas of decreased performance.

Methods

STEADI Clinician Questions

Have you fallen in the past year?

Do you feel unsteady when standing or walking?

Do you worry about falling?

Subject Data
Demographic Info
Level of Activity
History of Falls

Fall Risk:
Low
Moderate
High

Patient Reported Outcomes
Falls Efficacy Scale
PROMIS - PF, SS
STEADI questionnaire

Physical and Cognitive Assessments
STEADI
Brief-BESTest
5 Meter Gait Speed
Trails A and B

Subject demographics

n = 63	
% Female	65%
Age, mean (range)	78.6 (53-98)
BMI, mean (range)	27.58 (20.37-42.51)

Elements of Brief-BESTest

Stability Limits

Sensory Orientation

Element of STEADI

Romberg Stance

Yes 52.4%
No 47.6%
Percent of participants who fell in the past year

Conclusion

It takes **5-8 minutes** to screen patients and this can be done by a support staff member

Clinician burden could be decreased with utilization of PROMIS-PF and Trails A based on our sample population.

Together PROMIS-PF and Trails A identify STEADI moderate-high risk patients with **84.7% accuracy**

References

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