Database of Knowledge Translation Tools
Assessment Summary

Mini-Balance Evaluation Systems Test (Mini-BESTest)

Summary Authors: Anna Apelman, Marie Berg, Kjetil Bjerke, Elisabeth Troøyen Gundersen, Egil Hovland, Lene Kristiansen, Julia Mbalilaki, Jennifer Moore, Jan Nordvik, Grethe Tveit Pettersen, Siri Solberg

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2. Instrument Description and Administration Instructions

Purpose of the assessment: Multi-task balance assessment that identifies the following postural control problems:

- External perturbations
- Anticipatory postural adjustments
- Sensory orientation
- Dynamic balance during gait

Type of assessment:

- Performance based, clinician rated measure
- Predicts fall risk, assesses balance impairment, measures change over time

Administration instructions: Full testing instructions are located http://www.bestest.us/files/7413/6380/7277/MiniBEST_revised_final_3_8_13.pdf

- Patient performs 14 tasks
- Each task is rated on an ordinal scale of 0 to 2
- Maximum score is 28, minimum score is 0
- Standing on one leg (item 3) and Compensatory stepping correction in lateral direction (item 6) were assessed on both sides. The lower score of the two should be used in the total score calculation.

Standardization procedures: Follow the instructions on the testing form. English standardization videos are available at: http://www.bestest.us/ind/miniBESTest/index/Task1.html
The Norwegian translation and standardization procedures are available at:
http://bestest.us/files/5414/5651/1621/Mini-BESTest_Norwegian_version.pdf

ICF Domain: Body Function

Measurement Area: Balance

Several articles cited in this summary were originally extracted from Di Carlo et al, 2016

3. Considerations for Clinical Use

Indications for use: Can be used in many patient populations as a measure to assess:

- balance impairment
- predict falls (with caution)
- assess a patient's change in balance function over time

Considerations:

- Has been tested in many patient populations and performs consistently well across the diagnoses
- The cut-off for fall risk is generally between 16 and 20, indicating patients who score less than this score should be considered at risk for falls. *However, the sensitivity of the measure varies between 52% and 88%, indicating that it is correctly identifying 52% – 88% of fallers. Because some fallers may be missed, it is important to also use your clinical judgment to determine fall risk when a patient scores above the cut-off score.*
- Poor reliability was noted on items 5 (compensatory stepping backward), 6 (compensatory stepping lateral), and 8 (foam eyes closed), additional standardization may be needed on these items (Tsang et al, 2013)
- During a pilot of the Mini-BESTest in practice in Norway, many clinicians reported discomfort with administering the reactive postural control items (4, 5, 6; compensatory stepping forward, backward, lateral). Therefore, additional training and experience with these items may be needed before using the Mini-BESTest in routine practice.

The Knowledge Experts piloted the Mini-BESTest in clinical practice for 6 months at 3 rehabilitation facilities (n= 134).

- Sample: Parkinson Disease (n=88), Stroke (n=27), and other diagnoses (degenerative disease, polyneuropathy, other neurologic conditions, and musculoskeletal conditions, n=19).
- Mean Admission scores = 20.5 points
- Mean discharge score = 23.2 points
- Mean change = 2.7 points
- Mean time between test administrations = 2.75 weeks
- 62% demonstrated a meaningful change (score change of > 3), including 44% of patients with Parkinson disease and 63% of patients with stroke
- A comparison with outcomes achieved in research studies in Parkinson disease patients revealed that despite a short amount of time between testing periods, changes seen were similar to those seen in much longer research studies. For example, in a study that compared intensive cycle ergometer to treadmill for 2, 30-minute sessions per day, 5 days per week, for 3 weeks resulted in mean changes of 2.3 points (ergometer group) and 3.3 points (treadmill group).(Arcolin, Pisano et al. 2015) A highly challenging balance program delivered in 60-minute sessions, 3 x week, for 10 weeks resulted in a change of 3 points.(Conradsson, Lofgren et al. 2015) These are just two of many studies that tested patients with similar levels of balance impairment and achieved similar results with a much higher dose of therapy than in the Norwegian clinics.

Knowledge Expert group recommendation:

- The Mini-BESTest can be used in inpatient and outpatient rehabilitation to assess:
    - Fall risk
    - Change in balance over time
- Administration instructions:
    - Fall risk:
        - Administer once, at any point in patient's care when falls need to be assessed
    - Change over time:
        - Need a minimum of 2 administrations to assess change over time, but > 2 points would be better when rehabilitation episode is > 4 weeks.
        - Within 2 days (or sessions) of admission and discharge
        - Follow Norwegian standardization (see clinical utility section)
- Appropriate patients include:

    - Adult patients with neurologic conditions and lung disease; also appropriate for community dwelling older adults
    - Ambulatory patients (with or without assistive device)
- Potential facilitators
    - Assessment results can motivate patients, therefore it may help to educate patient on the reason for testing and the test results
    - Dedicated equipment and testing area for the Mini-BESTest
    - Weekly reporting of results in team meetings
    - If possible, create a form in the electronic medical record for documentation
    - See Mini-BESTest Implementation package
- Sustainability strategies:
    - Ensure clinicians understand how to use the results to guide decision-making
    - Discuss test results often with each other, and when with patients (For example, the patient obtained an 18 on the test, what interventions might be best?)
    - Reporting of Mini-BESTest data in clinical practice
    - Journal club on Mini-BEST studies
    - Add Mini-BESTest or measurement education, training, and administration as a part of the Medarbeidersamtale

Clinical Utility

Cost: Free
Equipment required: standard height chair
Number of items: 14 items
Time to administer: 10 minutes – 15 minutes
Training required: Free training available in English available at:
http://www.bestest.us/ind/miniBESTest/index/Task1.html
Norwegian translation and standardization procedures are available at:
http://bestest.us/files/5414/5651/1621/Mini-BESTest_Norwegian_version.pdf

5. Interpretation of the Results

Standard Error of Measurement (SEM):
Chronic Stroke: 1.08 points (Tsang et al, 2013)

Mixed Neurologic: 1.26 points (Godi et al, 2013)

Older Cancer Survivors: .86 points (Huang et al, 2015)

Community Dwelling Older Adults: 1.4 points (Marques et al, 2016)

Minimum Detectable Change (MDC):
Chronic Stroke:
- MDC_{95} = 3.0 points (Tsang et al, 2013)

Mixed Neurologic:
- MDC_{95} = 3.5 points (Godi et al, 2013)

Parkinson Disease:
- MDC_{95} = 3.4 to 4.1 points (Lofgren et al, 2014)

Older Cancer Survivors:

- MDC_{95} = 2.39 points (Huang et al, 2015)

Community Dwelling Older Adults: 3.8 points or 16.3% (Marques et al, 2016)

Minimal Clinical Important Difference (MCID):
Mixed Neurologic: 4 points (Godi et al, 2013)

Normative Values: Not established

Cut-off scores:
Elderly:
- < 16/28 indicates patient is at risk for falling (Adequate area under the curve = .84; sensitivity 85%, specificity 75%; Yingyongyudha et al, 2015)
- <19.5 / 32 indicates patient is at risk for falls (Adequate area under the curve = .76; sensitivity 74%; specificity 71%; positive likelihood ratio 2.49; negative likelihood ratio .38; Marques et al, 2016)

Parkinson Disease:
- < 20/32 indicates patient is at risk for falling (Adequate area under the curve = .86; sensitivity 88%, specificity 78%; Leddy et al, 2011)
- < 20/32 indicates patient is at risk for falling (Adequate area under the curve = .87; sensitivity 86%, specificity 78%; Duncan et al, 2012)
- < 16/32 indicates patient is at risk for falling (Adequate area under the curve = .80; sensitivity 75%, specificity 79%; Duncan and Earhart et al, 2012)
- < 20/32 indicates patient is at risk for falling (Adequate area under the curve = .77/.87; sensitivity 62%/82%, specificity 74%/78%; Duncan et al, 2013)
- < 19/32 indicates patient is at risk for falling (Adequate area under the curve = .75; sensitivity 79%, specificity 67%; Mak and Auyeung et al, 2013)
- <19/28* indicates patient is at risk for falling (Adequate area under the curve =.65, specificity 70 %, sensitivity 52 %; Schlenstedt et al, 2015; used original scoring of 28)

Stroke:

Chronic Stroke (Tsang et al, 2013):
- Limited association between score and fall history Area under the curve = .64, .7 to .8 is acceptable), <17.5 indicates a patient is at risk for falls (Area under the curve = .64; sensitivity 64%, specificity 64.2%; likelihood ratios were 1.8 and 1.6, respectively)
    - Significantly smaller area under then curve than the Berg Balance Scale, but not significantly different than the Timed Up and Go, or One Leg Stance)

Subacute Stroke:
- Score of > 9/28 indicates a patient has a “high level of functional ability” (Area under the curve = .85; Chinsongkram et al, 2014)

Multiple Sclerosis (Ross et al, 2016):
- <19.5/28 indicates patient requires mobility aid (Adequate area under the curve = .88; LR+4.53; LR- 0.18)
- < 22.5/28 associated with a history of near falls (adequate area under the curve = 0.77; LR + 2.86; LR-= 0.19)
- Association with history of falls is poor (area under the curve = 0.65)

6. Application to specific patient diagnoses

Populations reviewed in this summary: Subacute stroke, chronic stroke, mixed neurologic populations, Parkinson Disease, Cancer survivors, Knee Arthroplasty, Elderly, Multiple Sclerosis

7. Psychometric Properties:

Reliability:

- Test-Retest Reliability
  - Parkinson Disease:
    - Excellent test-retest reliability (ICC = .92; Leddy et al, 2011)
    - Excellent test-retest reliability (ICC = .98; Schlenstedt et al, 2015)
    - Excellent inter-rater reliability (ICC = .80; Lofgren et al, 2014)
  - Mixed Neurologic: Excellent test-retest reliability (ICC = .96; Godi et al, 2013)
  - Older Cancer Survivors: Excellent test-retest reliability (ICC = .90; Huang et al, 2015)
  - Knee arthroplasty: Excellent test-retest reliability (ICC > .90; Chan and Pang, 2015)
  - Community dwelling older adults: Adequate test-retest reliability (ICC = .73)

- Inter-rater Reliability
  - Chronic Stroke (Tsang et al, 2013):
    - Excellent inter-rater reliability (ICC = .96, p <.001)
    - When each item was analyzed for reliability separately, adequate to excellent inter-rater reliability was noted for each item EXCEPT items 5 (compensatory stepping backward), 6 (compensatory stepping lateral), and 8 (foam eyes closed)
  - Parkinson Disease:
    - Excellent inter-rater reliability (ICC = .91; Leddy et al, 2011)
    - Excellent inter-rater reliability (ICC = .98; Schlenstedt et al, 2015)
    - Adequate inter-rater reliability (ICC = .72; Lofgren et al, 2014)
  - Mixed Neurologic: Excellent inter-rater reliability (ICC = .98; Godi et al, 2013)
  - Older Cancer Survivors: Excellent inter-rater reliability (ICC = .86; Huang et al, 2015)
  - Knee arthroplasty: Excellent inter-rater reliability (ICC > .90; Chan and Pang, 2015)
  - Community dwelling older adults: Adequate inter-rater reliability (ICC = .71; Marques et al, 2016)

- Intra-rater Reliability
  - Chronic Stroke: Excellent intra-rater reliability (ICC = .97, p <.001; Tsang et al, 2013)

- Internal Consistency
  - Chronic stroke: Excellent internal consistency (Cronbach's alpha ranged from .89 to .94 depending on rater; Tsang et al, 2013)
  - Mixed Neurologic: Excellent internal consistency (Cronbach's alpha = .90; Godi et al, 2013)
  - Knee arthroplasty: Excellent internal consistency (Cronbach's alpha > .95; Chan and Pang, 2015)

Rasch Reliability

- Person reliability
  - Mixed Neurologic Populations (Franchignoni et al, 2010): Excellent person reliability (.86)
  - Elderly and Parkinson Disease (Maia et al, 2013): Excellent person reliability (.91)
  - Mixed Neurologic Populations (Franchignoni et al, 2015): Excellent person reliability (.91)

- Person separation index
    - Mixed Neurologic Populations (Franchignoni et al, 2010): 2.5
    - Elderly and Parkinson Disease (Maia et al, 2013): 3.16
    - Mixed Neurologic Populations (Franchignoni et al, 2015): 3.24

- Item reliability
    - Mixed Neurologic Populations (Franchignoni et al, 2010): Excellent item reliability (.98)
    - Elderly and Parkinson Disease (Maia et al, 2013): Excellent item reliability (.98)
    - Mixed Neurologic Populations (Franchignoni et al, 2015): Excellent item reliability (.99)

- Item separation index
    - Mixed Neurologic Populations (Franchignoni et al, 2010): 7.4
    - Elderly and Parkinson Disease (Maia et al, 2013): 6.41
    - Mixed Neurologic Populations (Franchignoni et al, 2015): 1.2

Validity: Enter the results from each type of validity study, if available. Include the actual validity coefficient and the description of the strength of the statistics (excellent > .6; adequate is .31 to .59; poor < .30)

- Criterion Validity:
    - Predictive Validity (see cut-off scores above)
    - Concurrent Validity:
        - Parkinson Disease:
            - Excellent correlation with the BesTest (r = .96; Leddy et al, 2011)
            - Excellent correlation with the Berg Balance Scale (r=.79; King et al, 2012)
            - Excellent correlation with the Brief BesTest (r=.94; Duncan et al, 2013)
            - Excellent correlation with the Berg Balance Scale (rho = .85; Schlenstedt et al, 2015)
            - Excellent correlation with the Functional Activity Balance Scale (rho = .87; Schlenstedt et al, 2015)
        - Parkinson Disease and Stroke:
            - Excellent correlation with the Berg Balance Scale (r=.94; Bergstrom et al, 2012)
        - Mixed Neurological:
            - Excellent correlation with the Berg Balance Scale (r=.85; Godi et al, 2014)
        - Subacute Stroke:
            - Excellent correlation with the BesTest (rho =.96; Chinsongkram et al, 2014)
        - Chronic Stroke (Tsang et al, 2013):
            - Excellent correlation with the BBS (rho=.83, p <.001)
            - Adequate correlation with the Function Reach Test (rho=.55, p <.001)
            - Excellent correlation with one leg standing on paretic side (rho=.83, p <.001)
            - Adequate correlation with one leg standing on the nonparetic side (rho = .54, p <.001)
            - Excellent correlation with the Timed Up and Go (rho=-.82, p <.001)
        - Multiple Sclerosis (Ross et al, 2016):
            - Excellent correlation with the Berg Balance Scale (Rho = .788)
            - Excellent correlation with MSIS-29 Phys (Rho =.643)
            - Excellent correlation with MSWS-12 (Rho =.766)
            - Excellent correlation with 6MWT (Rho =.810)

        - Adequate correlation with MFIS (Rho = .495)
        - Adequate correlation with MSIS-29 Psyc (Rho =.390)
    - Community Dwelling Older Adults: excellent correlation with the BBS, BESTest and Mini-BESTest (rho = .83 to .96; Marques et al, 2016)

- Construct validity:
    - Discriminant Validity
        - Chronic Stroke:
            - Poor correlation with the Modified Ashworth Scale (rho=-.22, p=.02; Tsang et al, 2013)
            - Poor correlation with Abbreviated Mental Test (rho = .08, p=.42; Tsang et al, 2013)
            - Poor correlation with the Geriatric Depression Scale (rho=-.17, p=.08; Tsang et al, 2013)
    - Convergent Validity:
        - Parkinson Disease:
            - Excellent correlation with the Timed Up and Go (r = -.81; Bergstrom et al, 2012)
            - Adequate correlation with the Activities Specific Balance Confidence Scale (r=.53; Combs et al, 2014)
            - Excellent correlation with the Timed Up and Go (rho = -.76; Schlenstedt et al, 2015)
        - Parkinson Disease and Elderly: Excellent correlation with the Activities Specific Balance Confidence Scale (r = .66; McNeely et al, 2012)
        - Parkinson Disease and Stroke:
            - Poor correlation with the Falls Efficacy Scale (r = -.89; Bergstrom et al, 2012)
            - Poor correlation with the Activities Specific Balance Confidence Scale (r = .26; Bergstrom et al, 2012)
        - Chronic Stroke:
            - Excellent correlation with the Timed Up and Go (r = -.81; Bergstrom et al, 2012)
            - Adequate correlation with the Chedoke-McMaster Stroke Assessment leg score (rho=.53, p <.001; Tsang et al, 2013)
            - Excellent correlation with the Chedoke-McMaster Stroke Assessment foot score (rho=.64, p <.001; Tsang et al, 2013)
            - Adequate correlation with Activities Specific Balance Confidence (rho=.50, p <.001; Tsang et al, 2013)
            -
        - Older Cancer Survivors: Adequate correlation with the Activities Specific Balance Confidence Scale (rho = .52; Huang et al, 2015)
        - Community Dwelling Older Adults: adequate correlation with the Activities Specific Balance Confidence (Rho = .61; Marques et al, 2016)
        - Adults and elderly:
            - Excellent correlation with the one leg stance (r = .68; O'Holski et al, 2015)
            - Excellent correlation with the Timed up and go (r = -.66; O'Holski et al, 2015)
            - Excellent correlation with the Activities Specific Balance Confidence Scale (r = .62; O'Holski et al, 2015)
        - COPD:
            - Adequate correlation with the Mini-BesTest (r=.55; Jacome et al, 2016)

- Known groups validity:
    - Chronic Stroke:

- Significant difference between the stroke and control groups (median score 19 vs. 27; p<.001; Tsang et al, 2013)
- Significant difference between fallers and nonfallers (median score 16 vs. 19; p = .03; Tsang et al, 2013)

Floor and ceiling effects:
Chronic Stroke:

- Floor effects: Excellent, no floor effects (0%; Tsang et al, 2013)
- Ceiling effects: Excellent, minimal ceiling effects (.9%; Tsang et al, 2013)

Subacute stroke:

- Ceiling effects: excellent, minimal ceiling effects (4.3%; Chinsongkram et al, 2014)
- Floor effects: poor floor effects (34.3%; Chinsongkram et al, 2014)
- Floor effects: poor, floor effects before rehab (32,7%; Chinsongkram et al, 2016)
- Adequate, floor effects in less than 20% of population after rehab (10,2%, Chinsongkram et al, 2016)

Multiple Sclerosis: Excellent, no ceiling effects (0%; Ross et al, 2016)

Internal responsiveness: The standardized response mean (SRM) was used to indicate the internal responsiveness; large change >0.8, moderate change 0.5 > 0.8, small change < 0.2. SRM Improvements in balance after rehabilitation

Subacute stroke:

- Large effect (0,9 (0.6, 1,2): The BESTest showed a significantly higher SRM than the Mini-BESTest (p<.001) Chinsongkram et al, 2016)
- Number of participants with no change 13 (26): The percentage of participants with no change was significantly higher with the Mini-BESTest compared to the BESTest (Chinsongkram et al, 2016)

External responsiveness: Area under the curve (AUC) > 0.9 Excellent
Subacute stroke: :

- Mini-BESTest 0.89 (0.79,0.99) (not significantly different than the BESTest with an AUC of 0.92 Chinsongkram et al, 2016)
- The cut-off score for the Mini-BESTest (> 3 points) was clinically meaningful, LR+ 6.78 (2.3, 19.8) and LR- 0.2 (0.1, 0.8) Chinsongkram et al, 2016)

8. Documentation and Clinical Decision-Making Tips:

Components to include in documentation: Assistive device used during the test

9. Links to other relevant resources:

Websites: *http://www.bestest.us/*
Online presentations: *http://www.bestest.us/ind/miniBESTest/index/Task1.html*
Copy of the instrument: *Provide a link to the instrument whenever it is available.*

10. References and sample:

Arcolin, I., F. Pisano, C. Delconte, M. Godi, M. Schieppati, A. Mezzani, D. Picco, M. Grasso and A. Nardone (2015). "Intensive cycle ergometer training improves gait speed and endurance in patients

with Parkinson's disease: A comparison with treadmill training." Restor Neurol Neurosci 34(1): 125-138.

Chan A & Pang M. Assessing Balance Function in Patients With Total Knee Arthroplasty. Phys Ther. 2015; 95(10)1397-407.

Chinsongkram B, Chaikeeree N, Saengsirisuwan V, Viriyatharakij N, Horak FB, & Boonsinsukh R. Reliability and validity of the Balance Evaluation Systems Test (BESTest) in people with subacute stroke. Phys Ther. 2014; 94(11)1632-43.

Chinsongkram B, Chaikeeree N, Saengsirisuwan V, Horak FB, and Boonsinsukh R. Responsiveness of the Balance Evaluation Systems Test (BESTest) in People with Subacute Stroke. Am Phys Ther 2016, Vol 96 (x).
Study sample: Subacute stroke, mean age 57.8 (11.8), male/female 29/20, Time since stroke 38,7 (36,7) days (range 2 – 120), Type of stroke Ischemia 36, Hemorrhage 13, Affected side right 27, left 22, MMSE score (/30) 28.4 (2.3), BI (/100) 49,8 (21.9), FM-Motor score (/100) 38 (27.4), Time between 2 assessments 13.7 (9,3) days.

Conradsson, D., N. Lofgren, H. Nero, M. Hagstromer, A. Stahle, J. Lokk and E. Franzen (2015). "The Effects of Highly Challenging Balance Training in Elderly With Parkinson's Disease: A Randomized Controlled Trial." Neurorehabil Neural Repair 29(9): 827-836.

Di Carlo S, Bravini E, Vercelli S, Massazza G, & Ferriero G. The Mini-BESTest: a review of psychometric properties. *International Journal of Rehabilitation Research.* 2016 (in press)
Study sample: Systematic review of all studies and populations that assessed psychometric properties of the Mini-BesTest.

Duncan R, Leddy A, Cavanaugh J, et al. Comparative utility of the BESTest, mini-BESTest, and brief-BESTest for predicting falls in individuals with Parkinson disease: a cohort study. Phys Ther. 2013; 93(4)542-50.

Franchignoni F, Horak F, Godi M, Nardone A, Giordano A. Using psychometric techniques to improve the Balance Evaluation Systems Test: the mini-BESTest. J Rehabil Med. 2010; 42(4) 323-31.

Godi M, Franchignoni F, Caligari M, Giordano A, Turcato A, & Nardone A. Comparison of reliability, validity, and responsiveness of the mini-BESTest and Berg Balance Scale in patients with balance disorders. Phys Ther. 2013; 93(2)158-67.

Leddy A, Crowner, B, & Earhart, G. Utility of the Mini-BESTest, BESTest, and BESTest sections for balance assessments in individuals with Parkinson disease. J Neurol Phys Ther. 2011; 35(2)90-7.

Lofgren N, Lenholm E, Conradsson D, Stahle A, & Franzen E. The Mini-BESTest--a clinically reproducible tool for balance evaluations in mild to moderate Parkinson's disease? BMC Neurol. 2014 (14) 235.

Marques A, Almeida S, Carvalho J, Cruz J, Oliveira A, Jácome C. Balance tests in healthy older people Reliability, validity and ability to identify fall status of the BESTest, Mini-BESTest and Brief-BESTest in older people living in the community. Arch Phys Med Rehabil. 2016 Dec;97(12):2166-2173.

Study sample: 122 older adults, community dwelling, mean age 76 ± 9 yrs; 70.5% women; 13 participants used walking aids (11 used a cane, and 2 used a walker); average Mini-BESTest score 19.8 ± 6.8; average BBS score 47.2 ± 10.

O'Hoski S, Sibley K, Brooks D, & Beauchamp M. Construct validity of the BESTest, mini-BESTest and briefBESTest in adults aged 50 years and older. Gait Posture. 2015;42(3):301-5.

O'Hoski S, Winship B, Herridge L, Agha T, Brooks D, Beauchamp M, & Sibley K. Increasing the clinical utility of the BESTest, mini-BESTest, and brief-BESTest: normative values in Canadian adults who are healthy and aged 50 years or older. Phys Ther. 2014; 94(3):334-42.

Ross E, purtill H, Uszynski M, Hayes S, Casey B, Browne C, Coote S; Cohort study comparing the Berg Balance Scale and the Mini Bestest in people who have multiple sclerosis and are ambulatory. American Physical Therapy Association 2016 Sep;96(9):1448-55
Study Sample: Patients with Multiple Scleroris who are ambulatory, with or without a mobility aid, n= 52 (none walking aid used =32(61,5%)), mean age 45,73, male/female 15/37,mean age since diagnosis 10,87.

Schlenstedt C, Brombacher S, Hartwigsen G, Weisser B, Moller B, & Deuschl G. Comparison of the Fullerton Advanced Balance Scale, Mini-BESTest, and Berg Balance Scale to Predict Falls in Parkinson Disease. Phys Ther. 2016; 96(4)494-501.
Study sample: Parkinsons disease, n=66 (fallers n=33, non-fallers n=33). Mean age fallers 68.1 (7.5), mean age non-fallers 66.0 (11.6). Fallers: male/female 20/13, non-fallers: male/female 25/8. H&Y stage 1-4: fallers 2.5(0.8), non-fallers 2.8 (0.7). Tested in the on-state of medication.

Tsang CS, Liao LR, Chung R, & Pang M. Psychometric properties of the Mini-Balance Evaluation Systems Test (Mini-BESTest) in Community-Dwelling Individuals with Chronic Stroke. *Physical Therapy Journal.* 2013;93:1102-1115.
Study sample: Chronic stroke, mean age 57.1 (11.0), male/female 73/33, Poststroke duration 2.9 years, hemiplegic side left (n=46) right (n=60), median Chedoke McMaster Stroke Assessment Score Leg = 4, Foot = 3; Arm = 3; Hand = 3

Yingyongyudha A, Saengsirisuwan V, Panichaporn W, & Boonsinsukh, R. The Mini-Balance Evaluation Systems Test (Mini-BESTest) Demonstrates Higher Accuracy in Identifying Older Adult Participants With History of Falls Than Do the BESTest, Berg Balance Scale, or Timed Up and Go Test. J Geriatr Phys Ther. 2016; 39(2):64-70.