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### Equivalence of electronic and paper administration for four self-report instruments used in prosthetic clinical care

#### Background:

Evidence of mode-of-administration equivalence is needed to demonstrate that scores obtained from different methods of administration (e.g., paper or electronic) are directly comparable.<sup>1</sup> Electronic survey administration offers numerous benefits compared to paper surveys, including automated and accurate scoring and direct import into a medical or research record. Evidence of paper-electronic equivalence would also allow administrators to choose the format most appropriate for the respondent (e.g., patient).

#### Aim:

The purpose of this study was to evaluate equivalence between paper and electronic modes of administration for four self-report outcome instruments: Activities-Specific Balance Confidence Scale (ABC), Prosthetic Evaluation Questionnaire- Mobility Subscale (PEQ-MS), Prosthetic Limb Users Survey of Mobility (PLUS-M), and Socket Comfort Score (SCS).

#### Method:

Mode of administration equivalence was evaluated by administering two surveys to participants via one or both methods (i.e., paper and electronic) over a 48-72 hour period. Participants were randomly assigned to one of three study arms based on modes of administration (i.e., paper, electronic, and mixed). Eligibility criteria included being over 18 years old, having unilateral lower limb loss, access to the internet, and the ability to read, write, and understand English. Intraclass correlation coefficients (ICCs) and 95% confidence intervals (CIs) were estimated and compared across groups differing by mode of administration to evaluate equivalence.<sup>1</sup>

#### Results:

Participants (n=201) were predominantly male (67%), white (91%), and had a mean age of 60 years. Etiology of amputation varied across participants, with most reporting either traumatic causes (60%) or dysvascular (23%) complications. The majority of the sample had an amputation at the transtibial level (65%). ICCs and the 95% CIs by mode for the four measures are reported in Table 1. With the exception of the SCS, ICCs were similar across modes of administration.

**Table 1. Mean scores, ICCs, and 95% CIs for the ABC, PEQ-MS, PLUS-M, and SCS**

Measure	Mode	n	Mean (SD) #1	Mean (SD) #2	ICC (95% CI)
ABC	Mixed mode	65	2.6 (0.9)	2.6 (0.9)	0.94 (0.90, 0.96)
	Paper only	72	2.7 (0.9)	2.7 (0.9)	0.94 (0.91, 0.96)
	Electronic only	64	2.7 (0.9)	2.6 (0.9)	0.96 (0.94, 0.98)
PEQ-MS	Mixed mode	65	2.6 (0.9)	2.6 (0.8)	0.90 (0.84, 0.94)
	Paper only	72	2.8 (0.9)	2.8 (0.9)	0.95 (0.93, 0.97)

	Electronic only	64	2.7 (0.9)	2.7 (0.9)	0.91 (0.86, 0.95)
PLUS-M	Mixed mode	65	51.1 (9.1)	51.1 (9.7)	0.95 (0.92, 0.97)
	Paper only	72	52.7 (9.3)	52.6 (9.5)	0.97 (0.95, 0.98)
	Electronic only	64	51.4 (9.6)	50.9 (9.9)	0.95 (0.92, 0.97)
SCS	Mixed mode	65	7.6 (2.2)	7.7 (2.1)	0.63 (0.45, 0.75)
	Paper only	72	7.1 (2.6)	7.1 (2.5)	0.77 (0.66, 0.85)
	Electronic only	64	6.8 (2.1)	6.8 (2.2)	0.79 (0.67, 0.86)

### Discussion & Conclusion:

Differences in mean scores between modes of administration were small for the ABC, PEQ-MS, PLUS-M, and SCS (less than 2% of the scale range). Comparisons of ICCs and 95% CIs indicate measurement equivalence across paper, electronic, and mixed models of administration for all measures. While all modes appeared to be statistically equivalent for the SCS, clinicians and researchers should use caution when employing mixed modes of administration for this measure due to the lower overall reliability observed in the mixed-mode study group.

### References:

1. Coons, S. Value in Health. 12(4), 419-429, 2009.