

# A novel approach: Collaboration between speech therapists, clinicians, and translation teams to generate global assessments for stroke patients



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## Objectives

- The NIH Stroke Scale is a clinician-administered instrument that includes patient-facing exercises measuring the impact of the stroke on speech. The scale asks patients to repeat words which, when spoken audibly, test the patient's use of their tongue and lips.
- While the scale can be used in global clinical trials, translating these words into other languages literally would not maintain key characteristics associated with the speech and pronunciation tests. As a result, our team was asked to establish a process which allowed new language translations to be developed via identification of equivalent words that test the same difficulties in articulation and replicate similar phonological characteristics, while conveying the same length, complexity and syllable use.



## Methods

- A total of 20 new translations were required (Figure 1). These languages came from multiple families including Indo European, Indo-Aryan, Turkic and Austronesian, with a mix of Latin, Cyrillic, logographic and Indian scripts.
- For each language, a translation team consistent with ClinRO linguistic validation standards<sup>[1]</sup> (two forward translators, lead translator, one back-translator, one clinician specializing in the treatment of stroke patients) was recruited to ensure that the translations were linguistically suitable and culturally appropriate. To ensure that the translations were able to effectively capture the intended complexity and phonological characteristics, the translation team was supplemented by a speech therapist in each country who participated in the translation process as an additional reviewer and subject matter expert.
- Prior to initiation of the translation, a detailed concept definition guide was created which included information for the translation team regarding key concepts, translation guidance, and instructions regarding strategies for replicating phonological characteristics.



## Results

- Finding suitable equivalents in some languages was challenging, due to the different alphabets and spoken sounds. Many global languages do not use sounds that mimic the English use of tongue and teeth when speaking. For example, one of the source English phrases is 'FIFTY-FIFTY' using the fricative 'f' which is not commonly found in Indian languages and had to be replaced. In several languages, the 'th' [θ] sound used in 'THANKS' does not exist and there is no word that can replicate the articulation. The 'f' sound is similar, but the place of articulation is labiodental rather than dental. The linguistic exercises used in the source to test patient's speech could not be replicated identically in many languages, but in all cases the translation team was able to develop suitable language-appropriate solutions.
- Upon review of the project data, it is clear that the inclusion of the speech therapist review in addition to the clinician review led to an improvement in the functionality and cultural appropriateness of the translation output. In some cases, they made suggestions based on functional requirements of the source terms, and in others, they made positive contributions by identifying more appropriate or commonly used alternatives. A sample of these inputs is included in Figure 2.



## Conclusions

- Standard practice for the translation and validation of clinician-reported outcome measures includes a rigorous translation process supplemented by a clinician review. While this process aligns with best practices overall, in this case our team found that the addition of a speech therapist to the linguistic team for each language was essential to the success of the translation project. The linguistic team including the IQVIA PM, specialist Linguistic Validation (LV) linguists, clinician and speech pathologist worked together for each language-country combination to ensure the best equivalent for the source to ensure consistency in COA administration across the translations.

Figure 1. Languages and countries in scope

Language	Country	Language	Country	Language	Country
Spanish	Argentina	Tamil	India	Malay	Malaysia
Bulgarian	Bulgaria	Gujarati	India	Norwegian	Norway
Greek	Greece	Punjabi	India	Romanian	Romania
Hindi	India	Assamese	India	Thai	Thailand
Bengali	India	Indonesian	Indonesia	Traditional Chinese	Taiwan
Kannada	India	Russian	Kazakhstan	Vietnamese	Vietnam
Malayalam	India	Kazakh	Kazakhstan		

Figure 2. Examples of speech therapist making useful modifications

Source term	Functional requirement	Language (Country)	Initial translation	Issue	Resolution
Incredible	This work tests lips (B, L) and tongue (hard C/k/).	Bengali (India)	বকলম (pronunciation = Bakalama), meaning "proxy"	Functional needs met, but Speech Therapist noted the term is not commonly used	Clinician and Speech Therapist suggested কবল (pronunciation = Kabala), meaning "seizure", a commonly used word fulfilling phonetic requirements
Tip-Top	This word tests the lips (P) and the tongue (T).	Malayalam (India)	അടിപിടി (pronunciation = adipidi), meaning "beating"	Functional needs not entirely met with inclusion of/D/sounds; "beating" has negative connotations	Clinician and Speech Therapist recommended transliteration ടിപ്പ്-ടോപ്പ്, noting common usage in Malayalam
Thanks	In this word, the weakness of the tongue is measured: The tongue should come from the front to the back of the mouth	Malay (Malaysia)	Terima kasih (pronunciation = Te-ree-mah ka-see), meaning "thank you"	Speech Therapist noted that the [θ] sound that requires representation does not exist in Malay	Clinician and Speech Therapist recommended 'Tangan' (meaning "hand") as it involves "t- tongue tip to dental" and moving the tongue to the back of the oral cavity as a close approximation of the desired [θ] effect
Thanks	As above	Bengali (India)	নমস্কার (pronunciation = Namaskāra), meaning "greetings"	Speech Therapist noted that the term lacked [θ] because Bengali does not have dental fricatives in its native sound inventory	Speech Therapist recommended ধন্যবাদ (pronunciation = Dhan'yabāda), meaning "Thank you", as the closest substitute  While it uses a voiced aspirated dental plosive /dʰ/ instead of [θ], it provides anterior tongue articulation and is the closest functional substitute available

<sup>1</sup>McKown S, Acquadro C, Anfray C, Arnold B, Eremenco S, Giroudet C, Martin M, Weiss D. Good practices for the translation, cultural adaptation, and linguistic validation of clinician-reported outcome, observer-reported outcome, and performance outcome measures. J Patient Rep Outcomes. 2020 Nov 4;4(1):89. doi: 10.1186/s41687-020-00248-z. PMID: 33146755; PMCID: PMC7642163