# ASSESSMENT OF THE FEASIBILITY OF USING WEARABLE TECHNOLOGY AS AN INNOVATIVE TOOL FOR TELESTROKE SERVICES: INITIAL RESULTS OF GOOGLE GLASS EVALUATION

**Warach SJ[12], King BT[23], Chandler KV[3], Hartman AG[4], Milling TJ[24]**

[1]Neurology, University of Texas Southwestern; [2]Seton Healthcare, Seton Clinical Research Institute of Austin; [3]Seton Healthcare, Research Enterprise; [4]School of Medicine, University of Texas Medical Branch; Austin, TX, USA.

## INTRODUCTION

The use of telemedicine for the acute management of cerebrovascular accidents ("telestroke") is based on a growing disparity between demand for neurology services and the supply of neurologists.[1] It is generally held that the use of teleneurology and telestroke in particular will only continue to grow and expand coverage as the field of neurology adjusts to the new healthcare landscape.[1,2,3] Further, the use of the service has been demonstrated to be cost-effective from both the telemedicine network[4] and the societal[5] perspectives in most financial modeling scenarios.

This study focused solely on the feasibility of a novel device platform: mobile, wearable, camera with HIPAA-compliant video-streaming capability, for use in telestroke. This evaluation began with simple assessment of providers' impressions and confidence in the office setting, using exams of mock stroke patients. Two vendors were identified with software that fit the use-case of interest for feasibility testing (referred to as Vendor 1 and Vendor 2).

## METHODS

A survey was administered to both the provider wearing the device and the provider viewing the video stream, with prompts for quantitative and qualitative assessment of the feasibility for using the device for the purpose of assessing a patient for stroke symptoms and making a treatment decision accordingly. A Likert-scale (5) was used to prompt providers regarding their confidence in assessing specific neurological exam components, overall ability to assess the NIH Stroke Score (NIHSS) and make a treatment decision, and three measures of global satisfaction.

Three different vascular neurologists participated and assessed at least 10 mock stroke assessments each. A fourth vascular neurologist evaluated the final 10 assessments simultaneously. One Emergency Physician investigator wore the device and performed all mock stroke assessments in this study.

## ACKNOWLEDGEMENTS

This study was funded by a grant from Genentech Foundation.

## RESULTS

Table 1: Provider assessment of video, by vendor; Confidence rated by Likert scale (1-5)

| Table 1 | Vendor 1 (n=26) | Vendor 2 (n=25) | p |
|---|---|---|---|
| Connection attempts required | 1.38 | 1.32 | - |
| Connection breaks during 5 minute assessment | 4 (15.4%) | 0 | 0.0418 |
| Video lag length (sec) | 1.42 | 6.78 | <0.0001 |
| Pupil dilation | 2.81 | 2.36 | - |
| Eye movement | 3.62 | 3.0 | - |
| Rapid alternating movement | 2.23 | 3.04 | 0.046 |
| Speech /language | 3.81 | 3.32 | - |
| Facial palsy | 3.12 | 3.56 | - |
| Ability to assess NIHSS | 2.27 | 2.6 | - |
| Ability to make a treatment decision | 2.35 | 2.68 | - |
| Video impairments problematic | 4.04 | 3.76 | - |
| Ease of use | 2.96 | 2.96 | - |
| Overall satisfaction | 2.36 | 2.8 | - |

## CONCLUSIONS

Overall, the quality of video-streaming using Google Glass may be adequate for remote assessment of patients, but connectivity limitations may affect the quality, reliability and duration of the assessment. Limitations of the hardware platform required that assessments be performed and connections be discontinued after approximately 5 minutes of streaming. The device battery would become hot and cause discomfort and video quality would further degrade if sessions were continued beyond the 5-10 minute range.

The devices provided by the different vendors did perform differently, indicating some vendor-dependent influences on quality. The lag time was significantly longer for one vendor's device and the other one was more prone to connection disruptions.

The quality of video-streaming using Google Glass was satisfactory for remote assessment in approximately 50% of instances. Connectivity limitations may affect the quality, reliability and duration of the assessment. Improvements are required before this device can be routinely recommended.

## REFERENCES

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