

Recommendation for an internationally agreed minimum data set for teleneurology

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In their recent Review¹ article (Teleneurology and mobile technologies: the future of neurological care. *Nat. Rev. Neurol.* **14**, 285–297; 2018), Dorsey and colleagues highlight how teleneurology could address neurologist workforce limitations in a global context of rising chronic neurological disorders. They argue that by leveraging mobile technologies, teleneurology can provide patients with access to neurologists. Teleneurology also extends local clinicians' capacity, which is particularly relevant in low-to-middle-income countries, as has been demonstrated with telestroke.

We agree with the authors' positioning of telestroke as a model for teleneurology, with a similar pattern of uptake and development possibilities. The complexity of making a stroke diagnosis often means that, by default, a teleneurology service is offered. In our experience of providing acute stroke consultations (>3000 consultations across 16 hospitals), approximately one in three calls is not a stroke, and only one in five calls is eligible for thrombolysis, despite presenting within 4.5 hours of symptom onset (Victorian Stroke Telemedicine programme², unpublished observations). An interdisciplinary approach is needed whereby nurses, allied health professionals (such as neuropsychologists and physical therapists) and other medical specialists are involved in care, given the often complex range of comorbidity in these patients. Following the implementation of a teleneurology service at Echuca Regional Health Hospital in Australia, eligible patients post-stroke were able

to have a consultation with a clinical neuropsychologist³. This service had not been available at this rural hospital previously.

One important aspect we seek to highlight is the question of how teleneurology services will be evaluated. Although telestroke has been available for almost 20 years⁴, it is only recently that a set of metrics for monitoring the effects of telestroke has been proposed⁵. With the variety of telestroke models available (for example, drip and ship, hub and spoke, etc.), direct comparisons of results (including patient outcomes) are limited. As such, we are developing an international telestroke minimum data set with colleagues from the United States, Europe and Australasia⁶.

Reliable and valid monitoring of processes of care and patient outcomes for teleneurological models of health care delivery requires standardized metrics that account for multidisciplinary care. An internationally agreed minimum data set (with variables and shared definitions) for teleneurology would support within-country and between-country comparisons for this emerging model of care while maintaining a low data collection burden. In the early period of data collection for teleneurology services, data could be combined at service or country levels, providing larger samples for pooled analyses. This compilation would allow more robust results to be identified more quickly, which would support further investment, if justified. Consistent data collection would facilitate data sharing and

evaluation processes internationally. In turn, any risks or benefits of teleneurology could be more readily identified and alternate models for addressing different aspects of chronic neurological disease management assessed. For example, although teleneurology might be the solution to limited workforce capacity, the impact of incorporating this disruptive innovation model of care should be considered^{7,8}. We must also consider the multiple disciplines that might be involved in delivering health care with teleneurology. By doing so, the trajectory of teleneurology as a viable option for health care delivery in the future could be expedited.

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Competing interests

The authors declare no competing interests.