*In a recent issue (*MJA *April 7, 2003) we published a series of articles on management of acute stroke in Australia. These have provoked a flurry of vigorous viewpoints. (For editorial comment see* page 333.*)*

## Evidence-based care and outcomes of acute stroke managed in hospital specialty units

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TO THE EDITOR: We comment on the report by Duffy and colleagues of a study of evidence-based care and outcomes of acute stroke.[1] The Royal Brisbane Hospital contributed 300 patients to this study between September 1999 and May 2001. As our hospital's geographically separate stroke unit did not open until February 2001, it is likely that most, and perhaps all, of these patients were cared for in the Department of Internal Medicine, a general medical service. The study compared 1664 patients treated in four types of unit — stroke, neurological, general medical or geriatric units — and found statistical differences between these units. The authors acknowledged that patients in the stroke units were younger than those in other types of unit and also that there "may be differences . . . in complexity and severity of cases that we did not assess . . .".

Our own experience at the Royal Brisbane Hospital may help readers to interpret this study. Our stroke unit has a defined number of beds and resources. While it tries to accommodate as many patients as possible, it often cannot serve all patients with stroke who come to the hospital. Patients of extreme age or with severe illness, caused by either the stroke or comorbidities, or those with adverse cognitive, social or residential status, are often not accepted into the stroke unit and remain in the general medical service. Thus, baseline characteristics differ markedly between patients in our general medical unit and the stroke unit. We are concerned that similar differences exist at the other institutions that provided data for this study. We see little point in publishing 20 separate $\chi^2$ tests that contrast differences between the four types of services looking after these patients, unless the baseline characteristics of the patients were very similar and statistically identical. In addition, one could also argue that with this number of statistical tests there would be a good chance of a type 1 error.

There is no doubt that stroke units improve outcomes. This makes sense for any acute condition with likely long-term sequelae, as specialty units can provide more resources and a dedicated team of nurses and allied health professionals. However, in our opinion, this study does not provide convincing evidence for the superiority of stroke units over any other type of medical unit, as it is likely that the patients differed significantly between these units.

1. Duffy BK, Phillips PA, Davis SM, et al. Evidence-based care and outcomes of acute stroke managed in hospital specialty units. *Med J Aust* 2003; 178: 318-323. ❑

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*IN REPLY:* We agree with Denaro and Ferrier that there is selection pressure for admission of different types of patients to different units. This was clearly apparent in our study, with stroke units caring for significantly younger patients.[1] We discussed in our report that, as this study was not a randomised controlled trial, differences in age and other undocumented factors have potential to bias the results.

However, our primary aim was to determine whether current care of patients with stroke in major Australian hospitals accorded with evidence-based strategies. We showed major variations in the use of proven evidence-based strategies in different hospitals and by different specialty units in the real world of Australian healthcare. There were also major and significant variations in outcomes. We believe that all patients with stroke should be cared for in accord with the best evidence available, clinical expertise and their own values[2] to produce the best possible outcomes.

1. Duffy BK, Phillips PA, Davis SM, et al. Evidence-based care and outcomes of acute stroke managed in hospital specialty units. *Med J Aust* 2003; 178: 318-323.
2. Sackett DL, Straus SE, Richardson WS, et al. Evidence-based medicine: how to practise and teach EBM. 2nd ed. Edinburgh: Churchill Livingstone, 2000. ❑

## Thrombolysis for acute ischaemic stroke: revisiting the evidence

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TO THE EDITOR: The recent article by Szoeke and colleagues on stroke management expressed the hope that thrombolytic therapy will be licensed for use by specialist units in Australia, based on the "proof" of its benefit demonstrated by the National Institute of Neurological Disorders and Stroke (NINDS) trial.[1]

The NINDS trial was a small, flawed study in which 312 patients received thrombolytic therapy with tissue plasminogen activator (tPA) for stroke.[2] Higher scores for stroke severity in the placebo group could themselves explain the improved outcome attributed to thrombolysis. Further clarification has been thwarted by the investigators' refusal to release the raw data and allow clarification of uncertainty surrounding the results whereby benefit appears confined to those treated at 0–90 minutes after onset, with no benefit in those treated at 90–180 minutes.[2]

Reports of the introduction of thrombolysis with tPA into clinical practice consistently document substantial protocol violations and worse outcomes than without thrombolysis. The study by Szoeke et al documents mortality attributed to thrombolysis given when protocol criteria were not met, as well as a 23% protocol violation rate in a presumed "best practice" setting. It should be highlighted that their finding in an audit of 30 patients that outcomes were