

## Stroke mortality in the Seychelles: methodological issues

In a review of 192 countries, Johnston and colleagues report that stroke mortality (per 100 000) was as low as 24 in the Seychelles (African region).<sup>1</sup> This estimate is in sharp contrast with the fairly high rates previously described in the Seychelles: 143 men and 101 women per 100 000 in 2002, and 92 men and 69 women per 100 000 between 2002 and 2005.<sup>2</sup> The earlier and higher estimates<sup>2</sup> in this country are more likely in view of the high occurrence of hypertension and other risk factors for stroke,<sup>3,4</sup> evidence of high stroke mortality in an ongoing cohort study,<sup>5</sup> and the common observation that stroke is a leading cause of hospital admissions and deaths in the Seychelles.

Why this large difference? In the Seychelles, all deaths are medically certified. Death certificates allow for three possible entries for the “disease or condition directly leading to death” and two “antecedent causes or morbid conditions giving rise to the above cause”. The sequence of these diagnoses is established by the attending doctor, but it is not further validated. For example, if pneumonia appears first on the death certificate and stroke second, pneumonia will be considered as the cause of death, and vice versa. Hence, stroke mortality can be markedly underestimated if based on the first entry in non-validated death certificates, but only slightly overestimated if based on the diagnosis of stroke in any of the three fields (the method used in the earlier estimate<sup>2</sup>).

International comparison of mortality requires proper validation of local certification of death. This step can be difficult to implement in many countries because of limited resources and few coding specialists fully trained to reliably assign causes to deaths. Semi-automatic coding software could be helpful, but its use should

be guided by international standards. More generally, inconsistencies in the published reports highlight the need to interpret mortality data with caution, taking into account variations in epidemiological data and methods.

We have no conflicts of interest.

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### Authors' reply

We thank Bovet, Shamlaye, and Paccaud for their important comments on our Article.<sup>1</sup> Their warning about potential inaccuracies of cause-specific national mortality data should be emphasised. National differences in the methods of assigning causes to deaths is one of many factors that could obscure important trends and mask associations of risk factors with mortality rates. For the Seychelles in particular, we note that the rates of death attributed to hypertensive heart disease are especially high, and we wonder whether some patients with hypertension in the first diagnostic position on the death certificate might have been miscoded as having died from hypertensive heart disease. Automated systems for classifying cause of death from registration records could reduce potential errors of this kind.

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## High-dose paracetamol in stroke: new trials are necessary and feasible

We thank Kasner for his comments on the Paracetamol (Acetaminophen) In Stroke (PAIS) trial.<sup>1</sup> Kasner wondered whether the costs and efforts of a second study—aiming to confirm our post-hoc finding of a potential beneficial effect of high-dose paracetamol in patients with a baseline body temperature of 37.0°C to 39.0°C—will counterbalance the alleged small benefit of this treatment. Furthermore, he noted that there is sufficient evidence to prescribe paracetamol in patients with acute stroke and high body temperatures, and, therefore, this approach does not warrant further study. His remarks deserve a reply.

Adopting the sliding dichotomy approach indeed increases power, as even patients with the worst and best prognosis can contribute to the estimation of the treatment effect.<sup>2</sup> But we also argue that our primary outcome measure “improvement beyond expectation” is more relevant for clinical practice than a dichotomised score on the modified Rankin scale. Most treatment strategies tested in acute stroke trials are not expected to be completely curative, but to lead to improvement. Therefore, it is also informative to show whether treatment moves patients from any category of disability to a less severe one and not only to indicate differences in the