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Use of the Capture-Recapture Method for Determining the Prevalence of Neurological Parasitic Diseases

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Fleury et al. [1] reported that the prevalence of human neurocysticercosis (NC) caused by *Taenia solium*, pork tapeworm, in Tepetzintla, Mexico, was 6.5–9.1%. NC is caused by the encysted larval stage (cysticercus) occurring in the brain. The prevalence of NC has not been very well established and is likely higher than reported estimates. Studies determining the prevalence of NC are difficult to perform, with a likely large undercount.

To obtain a better estimate of the prevalence of this neurological disease, as well as others, especially those that are rare, the capture-recapture method (CRM) can be employed [2, 3]. CRM is a common procedure used by population biologists [4] and more recently by epidemiologists [2, 3], including for neurological epidemiology [5]. This method can use lists that have been previously generated or generate a list that can be compared to a previous list. This has been referred to as the two-source method [3]. There are certain requirements of the lists in employing the CRM [6]. Comparison lists allow for matching of similar items, such as people appearing on both lists, with a statistical analysis to determine the estimate of cases along with a confidence interval [3]. CRM can be used to estimate both incidence and prevalence in epidemiological studies [3]. For example, by obtaining cases from hospital records and the health department, two independent lists may exist for use by the CRM. If only a hospital list exists, the same method of evaluation for NC can be conducted in the geographical area served by the hospital to generate the second list.

This is a low-cost and effective method for performing counts. It is suggested that researchers in neurological epidemiology use this method when conducting incidence and prevalence studies [7]. In many ways, the CRM may actually be the 'gold standard' for estimating the number of cases as well as providing an estimate of the undercount of the lists [8].

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Use of the Capture-Recapture Method for Determining the Prevalence of Neurological Parasitic Diseases: A Reply

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The commentary of Lange et al. [1] proposing the utilization of the capture-recapture method for the determination of the prevalence of neurocysticercosis (NC) is not appropriate. First, we must clarify one point in their letter. Lange et al. [1] mention that we found an NC prevalence of 6.5–9.1% in our study of NC prevalence in a rural village in Mexico [2]. This is an incorrect interpretation of our data, as 6.5% was the seroprevalence and 9.1% represented the NC prevalence detected by tomography. Seropositivity represents a recent contact with *Taenia solium* but does not imply success of the infection, while the presence of cysticercotic lesions on computed tomography is the only valid proof for NC diagnosis.

We have had experience with capture-recapture methodology in tropical countries, in particular in epilepsy [3]. This method could be of great interest in studying certain diseases, but requires several conditions for application, often difficult to achieve in the particular context of developing countries (e.g. variation of identity criteria, open populations, dependency between sources).

In regard to the use of the capture-recapture method to determine NC prevalence, we do not think that it is appropriate in our case. The main reason is that, as we show in our study, the great majority of NC cases are asymptomatic and the performance of a computed tomography is the only way to diagnose them. In our study, many cases would not have been diagnosed had we not carried out the tomography. For this reason, many cases are not registered in hospitals or health departments.

The method of capture-recapture could be useful if, for example, our objective was the determination of the prevalence of symptomatic NC in a population. In this case, the comparison of lists of cases registered in different health institutions could be possible and could permit a better approximation of the prevalence.

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