

## The *postmodern* $p = 1.0$

Sirs,

The signal for the verdict of statistical significance, the  $p$ -value, is commonly misinterpreted and used incorrectly and/or inappropriately.

On the one hand, investigators frequently, admitting as I have also done on occasion in the past, use any value less than 0.05 as supporting their positive findings, without realising that this low  $p$ -value is very unstable unless the statistical power of their study is very high, perhaps around 95%. Thus our dear  $p$  has recently been, and very aptly, called the “fickle  $p$ ” (1). As has been pointed out, this variability of the  $p$ -value is “rarely mentioned in statistics textbooks or statistics courses” (1). On the other hand, there is also the not uncommon misinterpretation of the *non-significant*  $p$ . When I had started to learn quantitative medicine some decades ago, I would not dare to give the actual probability of my data supporting the null hypothesis, if it happened to be close to unity. Nowadays, on the other hand, a  $p=1.0$  can, not infrequently, be seen in our best journals as we have also recently again underlined (2). I think it is almost *post-modern* to try to convince your reader that something that happens in 25/100 in one group and 24/100 (even on occasions 25/100) in the other, does not represent a significant difference.

I have recently noted two such postmodern  $p=1.0$ s where the authors were comparing the efficacy of rituximab with that of cyclophosphamide in the management of ANCA-associated renal vasculitis (3). The first  $p=1.0$  the authors gave was when the authors were comparing the composite primary outcome of death, end-stage renal disease or relapse between the two treatment groups at 24 months. It turned out that at least one of these events occurred in 14/33 patients (42%) in the rituximab and 4/11 patients (36%) in the cyclophosphamide group. As stated, the authors gave a  $p=1.0$  for this difference. The second comparison was that of the relapses observed. Apparently 7/33 (21%) of the patients in the rituximab and 2/11 (18%) of the patients in the cyclophosphamide group had relapses. Again the postmodern  $p=1.0$  was there.

So what was the issue? Leaving aside any discussion of the obviously low, and hence prone to a type II error, statistical power of this study, the cynic, like me, cannot help but get the impression that the authors were trying to impress the readership with  $p$ -values of unity, heavily underlining non-significance, in line with the main trust of their article that rituximab was as good as cyclophosphamide in managing ANCA-associated vasculitis. I would much have preferred, although I am fully aware that some statisticians would not agree with me, to see the design

nation that those ‘ $p$ ’s were NS (not significant) rather than they represented unity. By the way, I would have totally welcomed, and agreed with, the main trust of this article had it not been for those two *postmodern* ‘ $p$ ’s.

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## References

1. HALSEY LG, CURRAN-EVERETT D, VOWLER SL, DRUMMOND GB: The fickle  $p$ -value generates irreproducible results. *Nat Methods* 2015; 12: 179-85.
2. YAZICI H, LESAFFRE E, YAZICI Y: Ethical Issues in Study Design and Reporting. In: YAZICI H, YAZICI Y, LESAFFRE (Eds.) *Understanding Evidence Based Rheumatology*. Springer, 2014: 259.
3. JONES RB, FURUTA SF, COHEN TERVAERT JW et al.: Rituximab versus cyclophosphamide in ANCA-associated renal vasculitis: 2-year results of a randomized trial. *Ann Rheum Dis* 2015; 74: 1178-82.