A recent article in the *American Journal of Epidemiology* by Whelton et al. (Am J Epidemiol. 2013;178(7):1076–1084) prompted this commentary about the use of the word “elevated” in medical reports. We believe that the word used in that particular report should have been “higher.” The exposure variable was not actually elevated according to what we understand the word to mean in epidemiologic research. Consistent with the elimination of the inappropriate use of elevated and according to correct clinical chemistry usage, we suggest that the word “level” should also have been avoided in that context. We discuss the specific example of C-reactive protein in the article by Whelton et al. Appropriate word selection underpinning accurate reporting should avoid unnecessarily misleading readers about the meaning of epidemiologic findings.

**Commentary**

**Attention to Detail in the Selection of Words in Epidemiologic Research Reports**

Philip Greenland* and Mark Pepys

* Correspondence to Dr. Philip Greenland, Department of Preventive Medicine, Northwestern University Feinberg School of Medicine, 680 North Lake Shore Drive, Suite 1400, Chicago, IL 60611 (e-mail: p-greenland@northwestern.edu).

Initially submitted October 29, 2013; accepted for publication November 20, 2013.

A recent article in the *Journal* by Whelton et al. (Am J Epidemiol. 2013;178(7):1076–1084) prompted this commentary about the use of the word “elevated” in medical reports. We believe that the word used in that particular report should have been “higher.” The exposure variable was not actually elevated according to what we understand the word to mean in epidemiologic research. Consistent with the elimination of the inappropriate use of elevated and according to correct clinical chemistry usage, we suggest that the word “level” should also have been avoided in that context. We discuss the specific example of C-reactive protein in the article by Whelton et al. Appropriate word selection underpinning accurate reporting should avoid unnecessarily misleading readers about the meaning of epidemiologic findings.

accuracy in reporting; C-reactive protein; medical publishing

C-reactive protein is a particular case in point. Concentrations in the plasma or serum of healthy individuals and those with diseases range from approximately 50 µg/L to more than 500 mg/L (10,000-fold higher), but the median value in healthy US and European adults is 1–2 mg/L. In 90% of healthy subjects, the plasma C-reactive protein concentration is less than 3 mg/L, and this value has been frequently considered the cutpoint between normal and elevated. However, there is no actual threshold at the concentration of 3 mg/L, and the use of the term elevated creates confusion as to nature of the relationship of acute inflammation and infection and/or tissue damage with high values of C-reactive protein that still fall within the normal range versus that with truly increased concentrations.

Kohli and Cannon (3) recently emphasized the importance of matching language to the type of research (e.g., higher values versus increased values or higher risk versus increased risk) so as not to mislead the reader of an observational study into thinking that the data derive from an interventional study. Similarly, authors need to use precise language to describe increased concentrations; for example, they must distinguish between values of C-reactive protein that fall within the upper limits of the reference range for healthy subjects and the much higher values in subjects who are mounting an acute phase response to a clinically significant pathological process. By striving for improved accuracy in reporting, we may avoid unnecessarily misleading the reader as to the meaning of the findings.
ACKNOWLEDGMENTS

Author affiliations: Department of Preventive Medicine, Northwestern University Feinberg School of Medicine, Chicago, Illinois (Philip Greenland); Department of Medicine, Northwestern University Feinberg School of Medicine, Chicago, Illinois (Philip Greenland); and Wolfson Drug Discovery Unit, Centre for Amyloidosis and Acute Phase Proteins, University College London, Division of Medicine, London (Mark Pepys).

P.G. received research grant support from the National Heart, Lung, and Blood Institute and from the European Commission (FP7 Mechanism). M.P. received grant support from the United Kingdom Medical Research Council, the Wolfson Foundation, and the United Kingdom National Institute for Health Research Biomedical Research Centre and Unit Funding Scheme.

The views expressed in this article are those of the authors and not necessarily those of the United Kingdom National Health Service, the United Kingdom National Institute for Health Research, the United Kingdom Department of Health, or the US National Institutes of Health.

Conflict of interest: none declared.

REFERENCES

