Summary points

Journals and institutions should take allegations of plagiarism more seriously

Journals should use systematic reviews for editorial peer review, as well as considering using software designed to detect plagiarism

To reduce the numbers of new as well as recurrent plagiarists, journals, institutions, and professional associations need to expose very publicly those found guilty of plagiarism

considering using software designed to detect plagiarism. Lastly, to reduce the numbers of new as well as recurrent plagiarists, journals, institutions, and professional associations need to expose very publicly those found guilty of this form of scientific misconduct.

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Commentary: Ethical writing should be taught

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Iain Chalmers describes a case of scientific misconduct in which an author plagiarised both text and data on two separate instances.¹ Although he took the proper steps after detecting the plagiarism, Chalmers seems to have been unsuccessful in resolving the matter. This and other similar failures of our scientific system of justice leads me to support his recommendations for dealing with plagiarism, particularly his call to publicly expose those who have been found guilty of misconduct.

Public exposure of plagiarists, and the consequent embarrassment and ostracism that these offenders should experience, not only satisfies our intrinsic need for social justice but can also serve as a deterrent. Unfortunately, many scientific journals, professional organisations, and academic institutions lack the necessary resources and, apparently in some cases, even the will to investigate misconduct allegations.

What constitutes plagiarism?

To make matters worse, plagiarism can be an ill defined and complex concept. For example, some evidence suggests that many health educators do not consider self plagiarism to be unethical.² Other evidence shows that doctors do not always agree about whether certain forms of writing constitute plagiarism.³ Consider the practice of paraphrasing. When asked to paraphrase easy to read text without committing plagiarism most students and professors have little difficulty rewriting the material and providing adequate paraphrases.^{4 5} However, when asked to paraphrase complex technical

text, many students,⁴ and some professors,⁵ tend to simply change a word here or there, a practice that some journal editors interpret as plagiarism.⁶

Writing scholarly or scientific journal articles can be demanding. Manuscripts are expected to be not only technically sound but concise and clear while incorporating appropriate terminology. Many scientists will take several years to develop the appropriate writing style and, even when they master it, still find writing an arduous task. Thus, the allure of misappropriating portions of others' text with little or no modifications can be quite strong for some authors, especially those with less than a full command of written English.

Perhaps because much scientific writing uses unique terminology and phraseology, some definitions of plagiarism allow for minor copying of methods sections.⁷ When rewriting a description of a highly technical, detailed procedure authors run the risk of altering the meaning in a way that may make replication of an experiment difficult or impossible. Such an outcome would be highly undesirable in the sciences. On the other hand, over-reliance on copying and pasting of methods sections has its own risks, such as the omission of important new details or the inclusion of minor subtleties that are not applicable in the new context. Some evidence exists that copying and pasting can lead to errors in electronic medical charts.⁸ Perhaps for similar reasons, at least one journal has cautioned against copying and pasting methods sections.⁹

Prevention is better than cure

Given the above considerations, plagiarism is better dealt with by concentrating on an instructional system of prevention. Many institutions have begun to implement courses on the responsible conduct of research, exploring a range of research integrity issues. Although this is a step in the right direction, such instruction benefits mainly students. Legions of seasoned researchers continue to operate without such instruction. Clearly, research integrity needs to be incorporated into continuing education targeted at this group.

Training on responsible conduct of research must go beyond the "high crimes" of fabrication, falsification, and plagiarism, all three of which are thankfully still relatively rare in science. Zigmond and Fischer have argued that misdemeanours make up the bulk of the ethical transgressions.¹⁰ Instruction on plagiarism should focus on the principles of ethical writing.¹¹ This approach assumes that each of our written works represents an implicit contract between us and our readers in which the reader assumes that, unless otherwise noted, we are the sole authors of the work, the words and ideas are our own, and the ideas, concepts and theories described are accurately and objectively represented to the best of our ability.

Since it is doubtful that we will ever eliminate plagiarism or other forms of intentional misconduct, we need to increase our ability to detect these transgressions and effectively prosecute and punish

offenders. Instruction in ethical writing indirectly touches on several other traditional forms of misconduct. Consequently, I believe that when we internalise and apply its basic principles they will significantly reduce plagiarism and generalise to other areas of scientific research and personal conduct.

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Evidence based medicine

The case of the misleading funnel plot

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Evidence based medicine insists on rigorous standards to appraise clinical interventions. Failure to apply the same rules to its own tools could be equally damaging

The advent of evidence based medicine has generated considerable interest in developing and applying methods that can improve the appraisal and synthesis of data from diverse studies. Some methods have become an integral part of systematic reviews and meta-analyses, with reviewers, editors, instructional handbooks, and guidelines encouraging their routine inclusion. However, the evidence for using these methods is sometimes lacking, as the reliance on funnel plots shows.

What is a funnel plot?

The funnel plot is a scatter plot of the component studies in a meta-analysis, with the treatment effect on the horizontal axis and some measure of weight, such as the inverse variance, the standard error, or the sample size, on the vertical axis. Light and Pillemer proposed in 1984: "If all studies come from a single underlying population, this graph should look like a funnel, with the effect sizes homing in on the true

underlying value as n increases. [If there is publication bias] there should be a bite out of the funnel."¹ Many meta-analyses show funnel plots or perform various tests that examine whether there is asymmetry in the funnel plot and directly interpret the results as showing evidence for or against the presence of publication bias.

The plot's wide popularity followed an article published in the *BMJ* in 1997.² That pivotal article has already received over 800 citations (as of December 2005) in the Web of Science. With two exceptions, this is more citations than for any other paper published by the *BMJ* in the past decade. The authors were careful to state many reasons why funnel plot asymmetry may not necessarily reflect publication bias. However, apparently many readers did not go beyond the title of "Bias in meta-analysis detected by a simple, graphical test."

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Details of *BMJ* systematic reviews mentioning funnel plots are on bmj.com

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