Science and Engineering Ethics (1998) ***4****, 135-140*

Comment

Redundant publication in biomedical sciences: Scientific misconduct or necessity?

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Keywords: peer review, duplicate publication, scientific misconduct, redundant publication

ABSTRACT: *Redundant publication in biomedical sciences is the presentation of the same information or data set more than once. Forms of redundant publication include "salami slicing", in which similar text accompanies data presented in disaggregated fashion in different publications and "duplicate or multiple publication" in which identical information is presented with a virtually identical text. Estimates of prevalence of the phenomenon put it at 10 to 25% of published literature. Redundant publication can be considered unethical, or fraudulent, when the author(s) attempt to conceal the existence of duplicate publication from editors and readers. Redundant publication in the area of clinical trials is potentially dangerous as it tends to overestimate the effects of interventions. The scientific community at large and governments should take urgent steps to safeguard the public from the possible effects of fraudulent multiple publications.*

INTRODUCTION

Earlier this year my colleagues and I embarked on a Cochrane review of the effects of Plasma Derived Vaccines (PDVs) against Hepatitis B (HB) in high-risk healthcare workers. The effects comprised efficacy and safety of PDVs.

Carrying out Cochrane reviews involves two phases. The first phase is the painstaking and systematic search, identification, retrieval and evaluation of studies, usually controlled clinical trials, following a set procedure which involves defined searches of electronic databases and hand (or "full text") searches of journals. The effort is aimed at identifying the maximum number of studies satisfying the entry criteria for possible inclusion in the review in order to minimise bias in the conclusions. Part of this process also entails seeking contact with authors, researchers

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active in the field and relevant industries in order to locate further studies, especially unpublished ones which could have been missed by the other search means.

The second phase consists of the summing up of the knowledge gleaned by the studies identified so far. This often leads to the pooling of data in a so-called meta-analysis. Meta-analyses are greatly in favour at the moment as, if properly conducted and reported, they provide powerful synthetic estimates of the effects of interventions. Pooled estimates of effect are considered far more powerful than the single studies included. In our case we found that PDVs are efficacious and safe vaccines in high-risk healthcare workers. We were able to reach this conclusion by pooling the results of four trials that had taken place in the early 1980s in renal dialysis and transplant units in the USA, France and Belgium. Each study report assessed the number of cases of HB and adverse effects in the vaccination and placebo arms of the trials.[1]

Our biggest surprise did not however come from the scientific results, important as they were. We found that of the 60 trials identified for possible inclusion in the first phase, 15 appeared to contain the same data relating to an identical set of comparisons carried out at similar times in similar settings. In other words one out of four study reports were duplicates. This finding did not come as a complete surprise to us as we had already heard of or read about the "duplicate publication issue". Our perplexity was reinforced by the finding that when we moved to the second phase of our Cochrane review three of the seven trials which we had identified as dealing with PDVs in high risk units appeared again as duplicates of each other. What were we to do? Two letters asking for clarification sent to the corresponding author of the duplicate trial got no answers and in the end we decided to exclude the three doubles from our review and to include only the study which appeared to contain the most exhaustive report of events.[2]

Our experiences and the time it took to compare studies and carefully check through their content led me to reflect on several aspects of the "duplicate publication issue". Firstly how can we define duplicate publication and how prevalent is it? Secondly, does the publication of the same scientific results in different sources represent scientific misconduct or simply a necessity of life, dictated by the desire to publicise one's work widely? Thirdly, does any of this matter from a scientific point of view? Finally, if duplicate publication is a problem, how can the international scientific community deal with it?

DEFINITIONS AND PREVALENCE

Huth[3] called multiple publications of the same study "salami science". Huston and Moher[4] used the term "redundancy" to describe multiple helpings of the same dish and "disaggregation" to describe the practice of publishing study results in installments, a practice which appears similar to Huth's "salami science". Waldron described duplicate publication as occurring "when the results of a single study appear in more than one journal". He went on to described two extremes of such a practice: one is the

already described practice of "salami slicing" or "meat extender publication"; the other extreme is the publication of identical papers.[5] This interesting and amusing collection of terms appears to include several different practices, with several duplicate and overlapping definitions.

To discuss the issue of duplicate publication further, at this point I should attempt to define a nomenclature to comprise the facets of the phenomenon so far discussed. As the common theme thus far seems that of presentation of the same information or the same data set more than once, I propose the generic term of "redundancy" for it and give the credit for this term to Huston and Moher.[4] Its various known forms are summarised in Table 1 below.

Content	**Duplicate publication**	**Salami Slicing**
Text	Identical or virtually identical	Similar
Data	Identical	Disaggregated

Table 1. Forms of redundant publication in biomedical sciences

"Disaggregated data" are those data which form part of the same set from the same study but are presented in discreet packages which may or may not overlap.

Thus I have so far tried to encompass possible forms of the practice rather than the reasons for it although these, which are discussed further on, have an important bearing on the practice and hence on our classification.

The size of the problem is a difficult issue. Some cases are well-publicised. An example is that of the Californian cardiological radiologist Robert Slutsky who between 1978 and 1985 authored 137 papers (at one point a rate of one paper every ten days), 60 of which were later classified as either complete fabrications or questionable.[6] In 1992, Waldron, then editor of the *British Journal of Industrial Medicine,* estimated the incidence of redundant papers published in his journal as between 6 and 12 percent and rising yearly.[5]

Tramèr and colleagues found that 17% of published full reports of randomised controlled trials investigating the effect of ondansetron (a 5-HT3 receptor antagonist compound) used to prevent and treat post-operative nausea and vomiting were redundant.[7] We found 25% redundancy in our small set of trials of HB vaccines.[1] As a complete survey of international scientific literature has, not surprisingly, never been carried out, we can perhaps conclude that available evidence points to a prevalence of between ten and twenty percent of published literature, a massive figure.

IS REDUNDANT PUBLICATION ETHICAL?

The next issue, that of the positioning of publication redundancy on the moral spectrum, appears relatively straightforward. Researchers publishing redundant material with the intention of misleading the public, editors and readers, in order to make them believe the study is different from the original are in breach of current ethical tenets. Pointers to such behaviour are the lack of cross-referencing the other redundant publication(s) and other attempts at "covert" publication, such as changing the names of the authors or their order, translation in different languages or minor cosmetic efforts to alter text and data presentation. There are however several legitimate types of redundant publication such as publication or presentation of abstracts or preliminary results at scientific meetings or congresses, publication of data from large multicentre trials, publication of updates of work in progress and, lately, publication on paper and electronic means. All of these should however bear cross-referencing to the "parent" publication, as covertness is to me an indication of intention to deceive. Explicitness or lack of it appears the strongest factor to distinguish an honest scientific endeavour from a dishonest one. The definitions in Table 1 can thus be further subdivided into fraudulent and non-fraudulent by the simple expedient of asking the question: "Was this done with an intention to deceive?" (See Table 2 below).

Was the redundant study published with the intention to deceive?	**Yes**	**No**
	Fraudulent duplicate publication	Duplicate publication
	Fraudulent salami slicing	Salami slicing

Table 2. Ethical status of forms of redundant publication in biomedical sciences

Such a neat solution is unlikely to receive a straight "yes" or "no" answer, as at times intentions in a proportion of cases are difficult to fathom. This is especially true if the study report is badly written and lacks explicitness and the authors eschew correspondence or other forms of contact with reviewers, equally common findings in my experience.

DOES REDUNDANT PUBLICATION MATTER?

Next on our agenda is the question of whether redundancy does matter or whether it is just a natural outcome of scientific endeavour. As we are in the field of biomedical science the question is perhaps better phrased thus: "is redundant publication likely to affect people's lives?" The superficial answer to this question may be "no" as it seems unlikely that study results published several times in different journals would be noted, read or even quoted by other researchers or members of the public. Against this

simplistic view of biomedical research stands the current trend towards globalisation of information and electronic databasing often carried out with the intent of attempting to pool evidence from different studies. The Cochrane Controlled Trials Register (CCTR) is a good example. The third issue of the 1997 CCTR contained more than 131,000 reports of clinical trials, assembled with the intent of aiding the execution of systematic reviews.

Although the effects of redundancy have been little studied, Tramèr and colleagues have provided us with strong evidence that *bona fide* inclusion of redundant data in their meta-analysis of studies of the effects of Ondansetron led to a 23% overestimation of its efficacy. Perhaps even more worrying was the finding that trials reporting a greater treatment effect were more likely to be duplicated,[6] strongly pointing to the likely main reason for redundant publication: the pursuit of a strong publication record in furtherance of the researcher's career. Even without such cogent and worrying proof of the effects of and possible motives behind covert redundant publication, common sense tells us that if we read the same study more than once without realising its redundant nature we are more likely to remember the findings and perhaps alter our behaviour appropriately.

HOW CAN THE INTERNATIONAL SCIENTIFIC COMMUNITY TACKLE THE ISSUE OF REDUNDANT PUBLICATION?

So if redundant publication is a prevalent problem, its covert forms are unethical and can have an impact on clinical behaviour, how can we tackle it?

Theoretically, the simplest way could be to remove the reasons for such behaviour. Although this approach assumes complete knowledge of people's motives, appointment boards of some academic institutions in the USA consider only the five most significant or recent publications and not the whole list, thus in theory removing some of the rationale for redundancy. Another possible way to tackle the issue would be greater vigilance from journal editors. The Uniform Requirements of the International Committee of Journal Editors emphasises the need for disclosure and documentation of possible redundant publication by authors when submitting studies for publication.[8] Editors are however very loath to take on a "scientific police role" not least because of a potential tension between a policing role and that of searching for better and more interesting manuscripts.[9] One proposed solution is centred on the setting up of national committees for surveillance of medical research in each member state within the European Union, with an EU-wide equivalent to consider cases of European relevance.[10] National committees would be modelled on the Danish Medical Research Council Committee on Scientific Dishonesty and Good Scientific Practice. This committee which was set up in 1992 has a mandate for the whole country and has an inquiry and investigative role and regularly discloses cases of all types of scientific fraud (not just redundant publication). The Committee does not however punish researchers but leaves the application of sanctions to the relevant institution.[11]

Such a proposal appears a good way forward but *per se* probably not sufficient to both detect and tackle fraudulent redundant publication and other types of fraud. Practices to enhance prevention and detection are likely to include education of researchers at all levels, and the use of systematic reviewing. Reviews are most useful in such a role as they place the study or studies under review in the context of their "peer" studies and make detection of redundancy quicker. In the absence however of a clearly defined chain for reporting detected or possible redundant publications, the phenomenon is likely to stay with us.

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Corrigenda: In: Jefferson, T. (1998) Redundant publication in biomedical sciences: Scientific conduct or necessity?, *Science and Engineering Ethics* **4**(2): 135-140.
The term "redundant publication" should be attributed to Marcia Angell and Arnold S. Relman (see Angell, M. & Relman, A,S. (1989) Redundant publication [editorial]. *New England Journal of Medicine* **320**(18):1212-4). In the above paper (p. 137), this term was attributed to Huston and Moher (Huston, P. & Moher, D. (1996) Redundancy, disaggregation and the integrity of medical research, *Lancet* **347**:1024-26).