The Process of Researching Authorship Issues: A Case Study from the United Kingdom

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The high response rate in our study showed researchers' interest in authorship issues and that current authorship criteria lack widespread support. Our experience showed that teams researching scientific authorship should include members experienced in survey methods and that open- and closed-ended questions are recommended to elicit factual and attitudinal responses. Use of our questionnaire in future studies would facilitate comparison and possible pooling of data from various settings.

Background
Within the UK scientific community, as in the United States, publishing papers is of paramount importance for assessing research output and has financial consequences for both individuals and institutions. As outlined below, publication is also an integral part of the scientific process by which new knowledge is disseminated.

The virtues of the scientist are...the virtues of objectivity, critical thinking, honesty in recording and reporting data, freedom from bias, and the sharing of knowledge with the scientific community. (1)

The lifeblood of scientific journals is the publishing of high-quality, scientifically valid papers, reported honestly by researchers who accept full responsibility for the work. However, research suggests there is a mismatch between editors' definitions of authorship and the behavior of authors (2,3). Goodman's findings (3) suggest that some authors may not fulfill any criteria set down by editors. There is an inconsistency between an article that claims to reveal an honest, objective, and bias-free way some further understanding about the reality of the world we inhabit, and a list of those who purport to be authors but whose connection with the article may be tenuous and who are not in a position to explain and defend the work.

In the 1970s and 1980s a number of scandals were unearthed (4); heads of academic departments allowed their names to be added to papers of questionable scientific validity to which they had not contributed intellectually. As a result, the International Committee of Medical Journal Editors (ICMJE or the Vancouver Group) published criteria for authorship in 1985 (5) based on the principle that "Each author should have participated sufficiently in the work to take public responsibility for the content." The criteria for authorship are as follows:

Authorship credit should be based only on substantial contributions to

- a) conception and design, or analysis and interpretation of data;
- b) drafting the article or revising it critically for important intellectual content; and on
- c) final approval of version to be published.

Conditions a, b, and c must be met.

These criteria are subject to constant revision (6,7) and have been accepted by several hundred journals, both clinical and biomedical. While the ICMJE guidelines aim to reduce the number of authors who do not contribute to the research sufficiently to take public responsibility for it, there is growing evidence that they are frequently breached (3,4). These findings raise concerns about researchers' awareness of the ICMJE criteria and the appropriateness and acceptability of guidelines to researchers.

The ICMJE guidelines are not comprehensive and do not address other fundamental issues. For example, who should make the final decision in cases of disagreement among putative authors, or what should happen if a researcher who meets the criteria is omitted from the paper (4)? Unlike the American Psychological Association guidelines on authorship (8), the ICMJE guidelines do not explicitly address the issue of the ordering of authors (9). Finally, with the increase in collaborative, multidisciplinary research, it is questionable whether it is appropriate to expect every author to be able to defend all aspects of a paper written by contributors from various disciplines.

In an attempt to address such concerns about the ICMJE criteria and their limitations, and with the encouragement of Locknet (10), an international network of editors, researchers, and others interested in the process of publication, we undertook an empirical study of researchers' views on issues surrounding the authorship of academic papers. The preliminary findings from this study were presented at the Locknet international conference in June 1996 (11). Despite the intense debate on the subject over many years, much of which was echoed at the conference, there was no empirical evidence to show what researchers actually thought about authorship issues with the exception of the current study. The idea of authorship being replaced by listing contributions made to the research by each named researcher was the key new idea presented and discussed. The views of respondents in our study, as presented by our research team,
were judged to be consistent with this idea.

In this commentary, we describe a case study in which an intentionally selected social unit was used as the focus for an exploratory investigation (12). Further studies are necessary to assess the representativeness of such case studies. This paper is not designed to present the findings of our study but rather to outline the process by which our research was carried out. We hope this will enable other groups to undertake similar research to fill the evidence gap on this topical issue. To this end, the paper addresses a number of methodological issues to provide a framework against which others can base a study. The key points required to design an authorship study are summarized (Table); the substantive findings have been published elsewhere (13).

**The Research Team**

Having been approached by Locknet (10), the senior researcher (RSB) elicited support among members of the School of Health Sciences (which consists of the Departments of Epidemiology & Public Health and of Primary Health Care, and the Centre for Health Services Research). Research undertaken within this school is applied and includes work on attitudes and behavior.

The research team was drawn from diverse backgrounds: 3 members of the group had trained in the life sciences before moving into public health, primary health care, and medical sociology. The others were a physician, an ethicist, a professor of epidemiology and public health, a social scientist, and 2 nurses. Several members of the team had training and experience in questionnaire design, interviewing, and the collection and interpretation of data in a social science context. Our research experience included both quantitative and qualitative methodologies: 5 of the team had extensive experience with interview surveys. We also had a range of prior experience of authorship in terms of numbers of papers published and of membership on varied research teams. The only criteria for joining the team were enthusiasm for the task and "a small amount of spare working time". A list of the following necessary tasks was drawn up and circulated to those who had expressed an interest: developing a sampling procedure, designing the questionnaire, identifying and implementing strategies for the analysis of qualitative data, conducting interviews, drafting or commenting on papers, and attending project meetings. We all agreed that if we completed our allocated tasks we would be eligible for authorship, as we would "have earned it", according to the ICMJE criteria.

At the 1st meeting of the group, the list was expanded to include additional tasks and shared among the members according to their skills and interests. Subsequent team meetings enabled discussion of our progress, for example, how many interviews had been conducted and issues at each stage of the research process (questionnaire design and wording, interpretation of data). The team discussions enabled those experienced in social science research and the interview process to highlight the key principles of this kind of research to other members of the group. When convening a research team to undertake similar research, if people with skills and experience in social science research do not volunteer, we would recommend they be actively sought.

**Sampling**

Because the target population for this study was authors likely to publish in medical and scientific journals, the sample was drawn from the academic and research staff within the Faculty of Medicine of 1 UK university. The departments within the Faculty include both clinical and biomedical specialties. Sampling was undertaken in accordance with the principles of social science research (12). As the study was exploratory and descriptive in nature, sample size was determined by pragmatic considerations rather than power calculations. Given the resources available, and the tight schedule with which we were working (the group was convened in late February 1996 and a report of the findings was required for the Locknet conference in early June 1996), we judged that we would be able to carry out a maximum of 70 interviews.

The staff list published in the University Handbook for the academic year 1995-1996 formed the sampling frame. We decided to interview all heads of departments since they are most likely to shape departmental policy on assigning authorship. To ensure adequate representation of both established staff, who had significant experience of research and publication, and more junior researchers, who are generally employed on short-term contracts, we stratified the sample by staff grade. We also sought a good spread across laboratory-based and nonlaboratory-based disciplines. A letter of invitation explaining the purposes of the study was sent to all choice subjects; to ensure that those invited to participate saw the study as being important, this letter was signed by the Dean of
Medicine and the senior member of the research team (RSB). Reserves were identified for each candidate. Excepting heads of departments, sampling of 1st-choice candidates and reserves was random but proportional to the size of the stratum.

Data Collection
Owing to the sensitive nature of issues surrounding authorship and the need to explore attitudes and beliefs in some depth, a semi-structured interview, including both closed- and open-ended questions, was deemed the most appropriate method of data collection. Because nonresponse and acquiescence biases (14) are related to mismatches between the characteristics of interviewer and respondent, interviewees were allocated to interviewees of similar status. Interviews, scheduled to take 30 to 40 minutes, were carried out in a setting chosen by the interviewee to ensure a comfortable, nonthreatening environment. In practice, the interview took on average an hour to complete, as respondents were very open about their personal experiences of authorship and seemed to welcome the opportunity to voice their opinions. There were no refusals to participate. However, 5 1st-choice candidates were unavailable for interview in the allocated time period; the appropriate reserves were therefore approached and consented to participate. In a further 4 cases, protracted difficulties in making contact to arrange interviews left no time to approach the reserve candidates. The final response rate was therefore 94% (66 of 70), a highly satisfactory response for a lengthy interview survey.

Types of Questions
The question content drew on several main sources. First, we incorporated issues highlighted by the literature, for example, the concepts of gift authorship (15), ideas about the ordering of authors and in particular 1st authorship (2), and strategies for assigning credit when publishing (16). In addition, we drew on N Goodman’s questionnaire on criteria for authorship (personal correspondence). The questions were refined by drawing on our own experiences with authorship issues. A concise version of the questionnaire is shown in the Appendix.

The 1st section of the questionnaire explored people’s awareness of existing criteria for authorship, which criteria they currently used, if any, and their attitudes toward having criteria for authorship. The 3 key components of the ICMJE conditions for authorship were explored in greater depth. Respondents were asked to indicate whether they agreed with these criteria and why, and to explain their perceptions of why the criteria were breached. Some of the commonly suggested alternative methods for assigning authorship were examined. A list of activities involved in producing a research paper was presented, and respondents were asked which of these should, of themselves, confer the right to authorship.

In the 2nd section, themes around gift authorship were developed; in particular, questions explored ideas about what was meant by the term “gift authorship”, subsequently defined by the interviewee as “occasions when those who have not contributed significantly to the research are included as coauthors”. Respondents were asked if they perceived this to be a problem, and their views on reasons why it might occur were elicited. Ideas for reducing gift authorship were explored, drawing upon the respondents’ own views and on suggestions proposed in the literature (15).

In the final section of the questionnaire, respondents were asked to think about their own experiences with authorship issues and to give the approximate number of papers they had published, the number they had coauthored, and the number on which they had been the 1st author. Respondents were asked to share any difficulties in relation to authorship and strategies used to resolve these, if they were resolved. Respondents were asked whether they were involved in any group with an explicit approach to authorship and if they had ever been in a position where they had assigned or had been assigned inappropriate authorship. Each respondent was asked to consider his or her most recent coauthored paper and discuss the process by which authorship decisions were made. Finally, respondents were asked for any further comments on the whole issue of authorship. At the end of the interview, the offer of a copy of the substantive findings of the research was made as a mark of gratitude for their participation.

Open-ended questions provided a means of examining authorship issues in detail. We recommend that respondents’ answers be recorded verbatim to guard against incomplete or selective recording.

Analysis
The richness of the data collected enabled both quantitative and qualitative analysis. Frequency of each response to the closed-ended questions was analyzed, for both the sample as a whole and broken down by seniority (defined in terms of staff grade at the time of interview). Analysis by laboratory-based versus nonlaboratory-based disciplines, however, proved more difficult. Reflecting the multidisciplinary nature of modern medical research, we found that there were nonlaboratory-based staff working in primarily biomedically oriented departments and laboratory scientists in clinical departments.

Qualitative analysis was thematic (14). Two members of the team coded the free-text comments for each question by using a grounded-theory approach (17). A 3rd member triangulated the coding process by checking the categorization. These data formed the quantified listings of key findings (13). In addition, 4 members of the team analyzed the qualitative data by reading through each interview in its entirety, by respondent rather than by question. This enabled broader themes to be identified, as indicated in the summary of the findings.

Summary of Findings
Detailed findings are presented elsewhere (13). We found a general lack of awareness of the ICMJE criteria for authorship, suggesting that dissemination and implementation strategies are not working. Our sample
supported the concept of criteria for authorship, but did not believe that they were adhered to, partly because they did not accord with researchers' values, experiences, and the current research climate. The development of new criteria that give weight to practical, as well as intellectual, contributions was seen to be necessary. The respondents believed future criteria should be agreed upon by both researchers and editors, rather than the latter only.

In addition, some illuminating insights were gained from the responses to the open-ended questions. A paper on these findings is in preparation. The emerging themes included the different meanings of the word "author", the concept of authorship both as academic currency and as a personal reward mechanism, the use of prestigious names to enhance publication potential, and ethical issues to do with "policing" the publication system.

**Authorship Order**

We developed a pragmatic approach to the ordering of authors on the papers arising from this study (18). The ordering of authors for each of our papers was agreed upon by the group, and results from the judgments made by each member about the contributions of other team members, omitting his or her own contribution. The order of authorship for this paper resulted from the application of this process.

**Discussion**

As has been noted in previous research (3), the ICMJE criteria for authorship are not adhered to. Despite the criteria being widely accepted by editors, some of our respondents saw any criteria as guidelines rather than rules and wanted to retain the power to interpret them.

There does not appear to be a common currency by which to compare work on a project with work on a paper, nor indeed inspiration with perspiration. An explicit description of each author's contribution would reduce misunderstanding in the short term and might influence any shared definition that emerges in the future.

In our survey, we were able to canvass a wide variety of views in a very short space of time with no additional resources. However, the time required, particularly for discussion of successive drafts of the resulting papers, exceeded initial expectations. Our results represent the views of researchers in 1 academic center, but are in accordance with concerns about authorship raised by other research (2,3,19).

The choice of method, which used semi-structured interviews with a mix of open- and closed-ended questions, enabled the collection of both factual data and opinion. We were able to explore attitudes and opinions on authorship issues in depth. The high response rate, the time respondents were prepared to devote to the interview, and the detailed comments we obtained demonstrated the willingness of researchers to engage in debate on authorship issues. Our methods could be easily replicated both in other UK settings and in other countries, where the organization of research differs. Further research could provide a body of evidence capable of influencing the policies of researchers and journal editors and lead to the production of guidelines that are universally known and are widely accepted by researchers. We invite other centers to participate in such research.

**References**

2. Shapiro DW, Wenger WS, Shapiro MF. The contributions of authors to multiauthored biomedical research papers. JAMA 1994;271:438-42.
Appendix: Newcastle Authorship Questionnaire

For the purpose of reproducing this survey, the spacing and response numbering have been omitted; the actual format of the questionnaire included spaces for responses to the open-ended questions.

MM Tacker

Earning Authorship: Views from a UK Medical School

The purpose of this interview is to gather the views of researchers on issues surrounding the allocation of authorship.

Section 1
First of all, some questions on criteria for authorship:

1. Are you aware of any criteria which have been set to help you assign authorship on papers submitted for publication? (If yes) Which criteria are you aware of?

2. Have you used any of them? (If yes) Can you briefly specify what criteria you used?

3. Do you think there should be any criteria for being included as an author? An International Committee of Medical Journal Editors (also referred to as the Vancouver Group) has developed conditions which have to be satisfied for being an author of a medical scientific paper.

4. Have you heard of the group? (If yes) Do you know what the conditions are? (If yes) Please specify the conditions.

5. The ICMJE conditions for authorship are substantial contributions to:
   a. conception and design or analysis and interpretation of data
   b. drafting the article or revising it critically for important intellectual content
   c. final approval of the version to be published.
   Conditions a, b, and c must be met.

For each of the three conditions, can you tell me whether you agree/disagree with it and why?

First, conception and design or analysis and interpretation of data. Second, drafting the article or revising it critically for important intellectual content. Third, final approval of the version to be published. Fourth, the fact that all three criteria must be met.

In general, what do you think of the ICMJE conditions for authorship?

6. Have you ever used the ICMJE criteria for making decisions about coauthorship? (If yes) Please explain in what way the criteria were helpful or unhelpful.

7. Do you use any other criteria for authorship? What are they?

8. Do you think the ICMJE guidelines are usually adhered to in scientific writing? There is in fact a widespread view that the ICMJE guidelines are frequently breached. What do you think about this? Can you explain why they might be breached?

9. I am going to read out some criteria which could be used to assign authorship. Can you say whether you think each contribution should, of itself, confer authorship?
   a. Being head of department
   b. Being head of a research group
   c. Obtaining the research grant
   d. Bringing in any additional money
   e. Conceiving the research idea
   f. Designing the study
   g. Conducting a literature review used in a scientific paper
   h. Collecting data (for example taking blood, examining patients, interviewing)
   i. Providing access to research subjects
   j. Providing access to specialist equipment
   k. Providing statistical advice
   a) on an ad hoc basis
   b) on an ongoing basis as part of a project

10. How do you think credit should be assigned to colleagues who have contributed to a research study but who do not meet the ICMJE criteria for authorship?

Section 2
Moving on to another aspect,

1. What do you understand by the term “gift authorship”?
   “Gift authorship” has been defined as occasions when those who have not contributed significantly to the research are included as coauthors.

2. Do you think “gift authorship” is a problem?

3. How common do you think “gift authorship” is?
   Rare/Infrequent/Fairly common/Very common/Don’t know
   There is an emerging view that “gift authorship” is common.

4. Why do you think “gift authorship” occurs?

5. Do you think “gift authorship” should be prohibited? (If yes) Why? (If no) Why not?

6. Do you have any ideas on how to reduce “gift authorship”?

7. Here are some suggestions from others on ways of reducing “gift authorship”.
   For each suggestion, can you tell me how practical you think it is and why?
   a. Authors signing a statement giving their justification for being an author.
   b. Limiting the number of publications
to be listed in a c.v. for job applications and grants.
c. Develop a system of fixed credit per publication which is to be shared out amongst coauthors.
d. A statement in the publication stating the actual contribution of each author.
e. Do you have any other suggestions? Please specify.

8. Which of these suggestions do you think would be the most effective and why?

Section 3
Finally, a few questions about yourself in relation to authorship issues.

1. What age are you? ______________

2. Can I just check, you are in the ______________ School and that you are a ______________ (job title).

3. Have you been an author on a co-authored paper? ______________

4. How many papers in peer-review journals do you have? ______________

5. On how many of these have you been first author? ______________

6. Have you ever had any difficulties with regard to authorship, for example,
   a) not knowing that you were a co-author of a paper submitted for publication?
   b) not being included when you deserved to be?
   c) being included unnecessarily when your contribution did not merit it?
   d) or the perception that you were placed wrongly in the authorship order?
   e) any other issue? (please specify)
   (If yes to any of the above) How were the difficulties resolved?
   (If no) To what do you attribute your success in avoiding authorship problems?

7a. Do you, or any of the research groups to which you belong, have an explicit approach for assigning authorship?

7b. What is your or your research group's approach?

8. Have you ever been involved in assigning authorship?

9. Have you ever assigned coauthorship which was in your view inappropriate?
   (If yes) Why did you?

10. In accepting coauthorship, what criteria do you apply to yourself?

11. Have you ever been assigned coauthorship when, in your view, it was inappropriate?
   (If yes) Why did you feel it was inappropriate?

11b. What did you do?

Now finally looking at the most recent coauthorship research paper you have published . . .

12a. What criteria did you use for assigning authorship?

12b. What criteria did you use for deciding on the ordering of authors?

13. Do you have any other comments on the issue of authorship in research?

Thank you for giving up your time for this interview. This survey will be submitted for publication. Would you like me to send the results and/or a copy of the paper to you?