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# Intellectual production in collective health: epistemology and evidence from different traditions

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## ABSTRACT

**OBJECTIVE:** To evaluate the differences in the patterns of Brazilian scientific production, published in journals that concentrate the largest production from Brazilian postgraduate programs in the area of collective health.

**METHODS:** Based on the distinction between paradigmatic and non-paradigmatic science proposed by Kuhn, the publication of articles in the main collective health journals, related to the respective sub-areas and number of authors per article, was evaluated in the three-year period between 2004 and 2006. Data were collected from the LILACS database and independently categorized by authors into the traditional sub-areas of collective health.

**RESULTS:** Multiple-authored articles were much more frequent among those categorized into the sub-area of epidemiology, whereas single-authored articles were more frequent in the areas of social sciences and humanities in health. In addition, there was a difference in the frequency of publication of these types of articles in various journals, with the total number of articles on epidemiology being higher than the sum of all articles from the other two sub-areas.

**CONCLUSIONS:** The different patterns of authorship found have important implications for the processes that evaluate programs and researchers. This cannot be dismissed, otherwise the long-term sustainability of the multidisciplinary profile, which has characterized collective health in Brazil throughout three decades, will be threatened.

**DESCRIPTORS:** Public Health. Research. Research Personnel. Scientific Publication Indicators. Knowledge. Collective Health.

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## INTRODUCTION

Collective health became an independent area of study in Brazil from the 1970s on.<sup>10</sup> The fact that this discipline constituted its own field, distinct from traditional public health, is due to the incorporation of bodies of knowledge that had been left out of discussions on health, particularly those from social sciences and humanities.<sup>2,10</sup> This evades the usual division between human sciences and natural sciences, found in the scientific field in general, since they are brought together into a single area of study, with important repercussions for the proposals of evaluation of its production, increasingly dependent on quantitative indicators of publication, especially of articles.

Inner differences in the field of collective health can be better exemplified when considering two sub-areas with significant differences between them, epidemiology and social sciences/humanities in health. There are several possible references to reflect on the different sciences.

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According to Kuhn,<sup>6</sup> a key characteristic of the natural sciences is the fact that they operate within the context of a paradigm.<sup>6</sup> The definition of this concept is an object of great controversy, beginning with Kuhn himself, who would have used the word with at least 21 different meanings in “The Structure”.<sup>8</sup> However, the present study will use the most complete definition provided by the author himself in the postscript of the previously mentioned book, “the combination between the matrix of a discipline and the collection of shared examples”.<sup>6</sup> The existence of a paradigm implies the production of knowledge in the model Kuhn defined as normal science, where researchers seek to articulate the several facets of a paradigm as far as they are able to, solving intellectual problems (puzzles) created by this paradigm, according to theoretical-methodological instruments associated with it. This has immediate implications for text production; there is a great level of consensus on the epistemological-methodological foundations of the disciplines and these may be ignored during writing. In addition, the existence of relatively standardized forms of investigation facilitates the cooperative work performed in laboratories and subsequent publications.

However, social sciences and humanities are not characterized by the existence of a single, hegemonic paradigm (and probably never will). This also has implications for knowledge production. Authors in these areas have the need to explain their theoretical options in a more extensive way, frequently having to involve the discussion about classic texts (unlike natural sciences, “old” texts can be as relevant as or even more relevant than “new” ones – few, or probably no biologists would make the effort to mention Aristotle, although this may be essential for philosophers, for example). The inexistence of a normal science reduces the scope of previous tacit agreements and imposes an additional burden on the writing, which tends to make texts become longer and to cause problems of publication in the form of articles. This is recognized by authors of a reference book on social epidemiology, when dealing with the need for a more qualitative and historical approach to epidemiology, closer to that used by social sciences.<sup>11</sup>

Thus, there are structural reasons, intrinsic to the forms of production of several disciplines, for the sub-areas of collective health to have different publication standards. While epidemiology is clearly paradigmatic and, as a result, functioning according to the natural sciences, social sciences and humanities in health, as their own names indicate, are situated at the opposite pole. It could be supposed that these differences are also reflected in the number of authors per article; due to the previously mentioned reasons, production in Epidemiology would more easily serve more cooperative works, differently

from the remaining sub-areas. In this way, the number of authors per article would be an indicator capable of grasping, however imperfectly, the differences in the several traditions of scientific production.

The production of books is not dealt with in this study; the Ministry of Education’s *Coordenadoria de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES – Coordination for the Improvement of Higher Education Personnel) has adopted different logics and ways to assess books among areas. However, Luz<sup>7</sup> proposes a critical reflection on the relevance of book publishing for scientific production provides enough material for such a discussion.

In view of the need for reflection on certain basic assumptions to evaluate research and postgraduate studies in Brazil, the objective of the present study was to assess the differences in patterns of Brazilian scientific production, published in journals that concentrate the largest production of postgraduate programs in the area of collective health in this country.

## METHODS

The journals selected were identified from the analyses performed by the CAPES evaluation management team, which calculated a set of indicators for all journals that had published articles by authors involved with Brazilian postgraduate programs during the 2004-2006 three-year period, based on data collected from program reports. These analyses were widely spread by CAPES itself through email discussion lists of program coordinators, among other things. This governmental agency categorizes scientific periodicals in a ranking with several levels. In the period studied, this classification separated periodicals according to their circulation (international, national or local), dividing each of the three levels into three sub-levels (A, B or C), with a total of nine classifications possible, varying from International A (the best one) to Local C (the worst one). Such classification was based on a set of rules, which included index databases and bibliometric indicators.<sup>a</sup>

Journals with publications in the area of collective health that belonged to Pareto’s first stratum (P1, concentrating the highest proportion of articles from a certain area), had this area as the source area (i.e. with the highest concentration of publications coming from the same area), were considered as International C or higher in the period, and had a minimum number of published articles (30) were selected for the present study. The following were the journals selected according to these criteria: *Cadernos de Saúde Pública* – *FIOCRUZ* (International A), *Ciência & Saúde*

<sup>a</sup> Associação Brasileira de Pós-Graduação em Saúde Coletiva. Critérios para Classificação de Produção Bibliográfica Acadêmica. Qualis/Capes (triênio 2004-2006). Área de Saúde Coletiva [internet] [cited 2010 Apr 05] Available from: [http://www.abrasco.org.br/UserFiles/File/FCPSC/Avaliacao\\_2007-Qualis\\_Saude\\_Coletiva\\_2004-2006.pdf](http://www.abrasco.org.br/UserFiles/File/FCPSC/Avaliacao_2007-Qualis_Saude_Coletiva_2004-2006.pdf)

*Coletiva* (International C), *Revista de Saúde Pública* (International A), *Revista Panamericana de Salud Pública* (International A), *Interface - Comunicação, Saúde e Educação* (International C), *Saúde e Sociedade* (International C), *Physis - Revista de Saúde Coletiva* (International C).

As all these journals are indexed in the LILACS database, we used this database to search for all the articles published by Brazilian authors between 2004 and 2006 (to be maintained in the same period when indicators were calculated), downloading all bibliographic information, including abstracts and keywords. The keywords searched were as follows: “pan am. j. public health” or “physis (rio j.)” or “cad. saude publica” or “cienc. saude coletiva” or “interface comun. saude educ” or “rev. saude publica” or “saude soc” [Journal] and “2004” or “2005” or “2006” [country, year of publication] and “BRASIL” [affiliation]. Search was performed on May 25<sup>th</sup>, 2008.

A total of 1,790 article references, of which 1,568 included an abstract, were obtained. The latter were used by this study to gather as much information as possible about bibliographic data to categorize articles. References were distributed to classify sub-areas among researchers, without information about authors or title of journal, although with the title of article, abstract and keywords (the latter, when available). Thus, the classification key adopted was the following: social sciences and humanities in health, epidemiology and planning. Researchers also included a category named “others” to analyze the production that was not considered in the classification used (for example, health, environment and work, and education and health). Each reference was independently assessed by two evaluators, who agreed in 1,190 of the cases (75.9%). The 378 cases that showed no agreement included a third evaluator, who performed the classification, also in an independent way. The final classification proposed by two of the three evaluators from the same sub-area was adopted. There was no majority classification in 46 references; these were analyzed by two authors, who attributed the final classification by consensus.

The distribution of articles was analyzed according to sub-area and the median was calculated (interquartile interval – IQ), with the difference among sub-areas being assessed by the Kruskal-Wallis test. In addition, the proportional distribution of the number of authors per article was assessed, according to its area.

## RESULTS

Epidemiology included almost half (49.6%) of the articles produced in this area, in the period studied, followed by Planning (23%), Social Sciences and Humanities in Health (21%) and Other areas (6.4%).

The median of authors for the set of articles was 3, being significantly higher for those classified in the sub-area of epidemiology ( $p < 0.001$ ) (Table). When considering the different sub-areas in terms of percentage of production, it was observed that 75.3% of the epidemiology articles had three or more authors (50.3%, four or more). Meanwhile, in the areas of planning and social sciences and humanities in health, these proportions were 42.9% (26.61%) and 29.8% (13.1%), respectively.

## DISCUSSION

In the present analysis, there were important differences in the production of postgraduate program articles in collective health in the 2004-2006 three-year period, when the same was classified according to sub-area. It should be emphasized that the types of articles do not refer to the area of study of their authors, since they were not identified in the moment of classification, but rather through the information provided by titles, abstracts and keywords. Epidemiology included almost half of the articles produced by the area, in the period studied, a number higher than the sum of those from social sciences and humanities in health and planning. In addition, the median of the number of authors from the sub-area of epidemiology was two times that of these two sub-areas.

The differences observed in patterns of authorship are probably due to inner characteristics of different traditions of research and organization of respective groups, as observed by other authors in various contexts.<sup>9</sup> There is no value judgment when this fact is shown; i.e. it is not possible to say whether one form is “better” or “worse” than another. Nevertheless, one should acknowledge that this difference in co-authorship has important repercussions in the evaluation processes that are currently adopted by several agencies that fund postgraduate studies and research (CAPES – Coordination for the Improvement of Higher Education Personnel, CNPq - National Council for Technological and Scientific Development, and state FAPs – Research Support Foundations), which increasingly value the total number of articles published. As an example, four researchers acting individually can produce the exact same number of papers as four other researchers publishing together; however, due to the way assessments are made, the production of the latter will be four times higher in their respective resúmes. This question gains relevance when considering, for example, the finding by Barata & Goldbaum<sup>1</sup> that, in 2002, about 70% of individuals who had been granted a scholarship by CNPq in research productivity were in the area of epidemiology.

The highest proportion of articles published and classified in the sub-area of epidemiology is also in agreement with the differences in academic production, since empirical studies predominate in this sub-area,

**Table.** Median and interquartile intervals (IQ) and distribution of the number of authors per article, according to the sub-area of Collective Health. Brazil, 2004-2006.

Area	Median (IQ)	Number of authors per article (%)				Total number of articles (%)
		4 or +	3	2	1	
All	3 (2-4)	570 (36.4)	326 (20.8)	452 (28.9)	220 (14.0)	1,568 (100.0)
Epidemiology	4 (3-5)	391 (50.3)	194 (25.0)	163 (21.0)	30 (3.9)	778 (49.6)
Planning	2 (2-4)	96 (26,6)	59 (16,3)	138 (38,2)	68 (18,9)	361 (23,0)
Social Sciences and Humanities in Health	2 (1-3)	43 (13.1)	55 (16.7)	129 (39.2)	102 (30.0)	329 (21.0)
Others	3 (2-4)	40 (40.0)	18 (18.0)	22 (22.0)	20 (20.0)	100 (6.4)

whereas the reflective character of production and the dialogue with different theoretical traditions are essential, resulting in timings of production which are distinct from one another. To require researchers from the sub-area of social sciences and humanities in health to submit to norms compatible with other sub-areas of collective health, by simply asking why they do not write more articles, is thus a grave mistake. It is important to consider that, although it is not possible to conclusively state this based on the data used, the predominance of a certain type of article in the “market” of articles may be creating barriers to the access to other sub-areas, due to a crowding-out effect.

Some limitations to this study should be mentioned. As all taxonomies, the classification adopted in the present study is somewhat arbitrary and subject to criticism; fitting articles into one of the three sub-areas was difficult when these dealt with health service assessment, for example, which easily included theoretical and methodological aspects, or when there were themes such as worker’s health or the environment, which used methodological resources from the three sub-areas. In several cases, the “Others” category was adopted. Moreover, as an example, it is possible that a significant part of the production classified as social sciences and humanities in health comes from researchers of the sub-area of planning, due to the theme or approach revealed by the titles of articles. Nevertheless, we believe that the methodological procedures adopted greatly reduced possible classification bias. In addition,

it should be noted that this classification was entirely made without information about the number of authors. In terms of the categories adopted, they are widely accepted as fundamental sub-areas of collective health. Thus, the actual value of the findings from this study seems reasonable.

In conclusion, the differences observed in the present study suggest, according to the epistemological reflection shown, that there are important structural, unavoidable differences in the form of intellectual production of different sub-areas of collective health.

We consider that this situation poses the challenge of effectively discussing the meaning of evaluation criteria and their impact on the same area, as observed by Kerr-Pontes et al.<sup>5</sup> According to Caponi & Rebelo,<sup>3</sup> an important component of this discussion is the recognition of epistemological and academic power aspects, in addition to economic determinants (systematic reduction in funding for Science & Technology with intensification of competitive mechanisms), described by Meis et al<sup>4</sup> and underlying any proposal of evaluation of such type, rather than the systematic reification of current criteria. Two clear alternatives can be outlined at this moment: to keep on pursuing the same course of action, or to attempt to produce forms of evaluation that actually respect the plurality of collective health. The first alternative, which we consider unacceptable, puts the integrity and historical continuity of this scientific field at risk.

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The authors declare that there are no conflicts of interest.