Trends in neonatology and pediatrics publications over the past 12 years

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Abstract
Objective: To test the hypothesis that the number of publications in Neonatology and Pediatrics increases over time, and to verify whether the categories of publications all follow the same pattern over time.

Design and setting: We evaluated all Medline articles during 1994–2005. Search was limited to humans, English and to ‘newborn’ or ‘all-child’. We used regression analysis to determine the effect of year-of-publication upon the number-of-publications of each type.

Results: Medline reported 36,141 publications in Neonatology and 169,823 in Pediatrics during the evaluation period. There was a significant linear increase in the number of publications in Neonatology and Pediatrics. There was a steady increase over time in Neonatology and in Pediatrics in meta-analyses, reviews, and editorials. There was a steady decrease over time in letters in Neonatology, but no significant change in letters in Pediatrics. While there was no significant change in clinical trials (CTs), randomized control trials (RCTs) in Neonatology, there was a significant increase in CTs and RCTs in Pediatrics.

Conclusions: The field of neonatology has not had a significant yearly increase of original studies, but has seen an increase in reviews, meta-analyses, and editorials. This contrasts with Pediatrics, which shows a similar increase in reviews, meta-analyses, and editorials, but also an increase in the number of CTs and RCTs and guidelines.

INTRODUCTION
The practicing physician faces the tremendous challenge of keeping abreast with the developments of his/her field of expertise, in view of the enormous amount of new medical information which is published in the literature (1,2). The number of journals that deal with a specific field of medicine increases over the years and Internet access makes them readily available. Several engines to effectively search for relevant medical literature have been developed. The National Library of Medicine offers the Medline as a free service that allows for convenient and fast searches. The Medline classifies publications as clinical trials (CTs), editorials, letters, meta-analyses, practice guidelines, randomized control trials (RCTs), or reviews.

The aim of this study is to test the hypothesis that the number of publications in Neonatology and Pediatrics increases over time in a linear fashion, and to verify whether the various categories of publications, as defined by the Medline, follow the same historical pattern over the last decade.

METHODS
We used the following Internet address: http://www.ncbi.nlm.nih.gov/entrez in order to evaluate all Medline articles registered from 1/1/1994 and until 12/31/2005. We focused upon our fields of expertise (i.e. Neonatology and Pediatrics). In order to do so, we limited the search, using Medline’s own limits engine to ‘newborn’ and humans only or to ‘all child (0–18 years) minus newborn’ (pediatric population only) and humans only. We limited the publications to only those written in English. We repeated the search by each time using one limit according to the type of publications, and recorded the total number per year of publication for the 12 years of the specified period. As mentioned in the Introduction section, we used Medline’s own classification of articles as CTs, editorials, letters, meta-analyses, practice guidelines, RCTs or reviews. In order to verify that the categorization and tagging offered automatically by PubMed was accurate, we used a random sample of 10 studies each year, and in 100% of the cases, PubMed’s categorization was found to be accurate.

Statistical analyses: the Minitab version 13.1 (State College, PA) was used for statistical analyses. We used regression analysis to determine the effect of advancing year of publication upon the number of publications of each type. A P-value of <0.05 was considered significant.

RESULTS
During the evaluation period, Medline reported 36,141 publications in Neonatology, and 169,823 publications in Pediatrics (Table 1 in Supplementary Material online). There was a significant linear increase in the number of publications over the study period both in Neonatology ($R^2 = 0.582, p < 0.004$) and in Pediatrics ($R^2 = 0.88, p < 0.001$) (Figs. 1 and 2). When we considered the various categories of publications,
there was a steady increase over time both in Neonatology and in Pediatrics, in meta-analyses ($R^2 = 0.79, p < 0.0001$ and $R^2 = 0.84, p < 0.0001$, respectively), reviews ($R^2 = 0.73, p < 0.0001$ and $R^2 = 0.92, p < 0.0001$, respectively) and editorials ($R^2 = 0.78, p < 0.0001$ and $R^2 = 0.86, p < 0.0001$, respectively). There was a steady decrease over time in letters in Neonatology, while there was no significant change in the number of letters in Pediatrics. There was no significant change in the number of guidelines both in Neonatology and Pediatrics. While there was no significant change in CTs, RCTs in Neonatology, there was a significant increase in CTs and RCTs in Pediatrics ($R^2 = 0.79, p < 0.0001$, $R^2 = 0.44, p = 0.02$, respectively).

DISCUSSION

There is an overwhelming amount of research data, information or evidence and the translation of these data into critical appraisal, synthesis, dissemination, and application is a daunting task (1). The immensity of the task has been emphasized recently by Sinclair (2), who pointed out that since the introduction of the term ‘evidence based medicine’ in Medline in 1992 (3), the use of this term has increased dramatically in the medical literature. Sinclair described that a search performed on March 12, 2004, retrieved over a 1000 reports for the 5-year period 1992–1997 and over 10,000 reports for the subsequent 5-year period (2).

Our review of the Medline confirmed our hypothesis that overall, in the past decade, the number of publications related to the field of Neonatology has steadily increased. This was also true for the field of Pediatrics as a whole. However, when analysed per type of publication, while the number of randomized clinical trials and CTs remained relatively stable in Neonatology, this number increased steadily in Pediatrics. A possible interpretation of this fact would be that there might be a relative stagnation in Neonatology research, as compared to a more dynamic research in general Pediatrics. Another potential explanation might be a selection bias, in that there might be some ‘space’ limitation for Neonatology publications that appear in ‘general’ Pediatric journals. Nevertheless, the number of reviews, meta-analyses and editorials increased significantly both in Neonatology and Pediatrics, while the number of letters to the Editor decreased in Neonatology, and remained the same in Pediatrics. These changes in the distribution of articles are interesting and deserve some discussion. It may appear as a paradox that the number of original studies in Neonatology (CTs and RCTs) appears to not change much, while ‘processed’ data (reviews, meta-analyses and editorials) increase over the years. Meta-analyses were hardly known in the 1990’s, while all other designs and types of publications have been around for ages. Thus it is not surprising that the number of meta-analyses increased significantly over time. Clearly, there is more room for meta-analyses when the number of CTs or RCTs accumulates (to the extreme there is no room for meta analysis when there is only one RCT on a specific topic). Conversely, meta-analyses appear to be more powerful (more likely to find significant differences) when the number of studies and the total sample size increases (4,5). Meta-analyses are considered currently as a powerful tool of research assessment (3,6). They cannot be compared in this regard with Reviews or Editorials: indeed, meta-analyses are research, while reviews and editorials are opinions and they are universally accepted as the lower level in the hierarchy of evidence, often not considered at all, since they have been repeatedly found to be non-reliable. However, there certainly is some justification for the latter type of publications. Indeed, in face of the increasing amount of data, there might be an increase need for reviews to be written that will process all available information and make it clearer to the reader. This is especially true when the review is written by one of the best experts of the topic, which supposedly is the case for a review. Similarly, editorials are justified when the results of a study are groundbreaking, or conflict with accepted concepts or with the results of a similar study published in the same issue of the journal. Thus, editorials bring to the readers the personal ideas and thoughts of an expert which may help clarify the whole topic. The reason why the number of letters decreased in Neonatology and remained unchanged in Pediatrics is unclear and we can only speculate about it. Firstly, letters do not usually bring much academic credit to whoever writes them. Secondly, with accumulating data to
read, readers may simply have less time to write letters and to read them as well. In addition, there might be a publication bias in that editors might not be willing to publish letters whose added value might not be substantial. Finally, many journals have adopted the concept of electronic letters that are available on the Internet but are not registered as a formal publication in the journal (for instance, Pediatrics uses a forum of letters (Post Publication Peer Review) in which the readers may chat and writers may respond but these letters are not recorded in the Medline) (7).

A limitation of our study is that the categorization and tagging that is offered automatically by PubMed might not be 100% accurate. This applies both to the age category (neonates, humans) and also to the type of study. Misclassification errors are possible. However, a random sample of the retrieved articles revealed an excellent degree of agreement with the PubMed categorization.

In conclusion, over the past decade the field of neonatology has not had a significant yearly increase of published original studies, but has seen a steady increase of reviews, meta-analyses and editorials. This contrasts with the field of Pediatrics which shows a similar increase in reviews, meta-analyses and editorials, but also a significant increase in the number of CTs and RCTs. We speculate that the Internet ‘revolution’ and the electronic resources available now to readers and authors may create additional striking changes in the trends that we currently report.

References


Supplementary Material
The following supplementary material is available for this article:

Table S1: Types of publications by year. Data are expressed as N (%) 

This material is available as part of the online article from: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1651-2227.2007.00337.x

(This link will take you to the article abstract).

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