Research Trends

Volume 1
Issue 34 *Topics in Medical and Health Research*

Article 7

9-1-2013

Trends in pediatrics: Overview of research trends from 2007-2011

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Elsevier

Section 6:
Research Trends

Trends in Pediatrics: overview of research trends from 2007-2011

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For this issue on trends in Medical research, we took a closer look at the field of Pediatrics. What are the recent 'hot' topics in Pediatric research? Or, more specifically, what topics have shown active growth in research output (published articles) over the past five years? To answer this question, we used a new visualization tool, developed in collaboration with the CWTS research group, specializing in bibliometrics at the University of Leiden. It enables us to explore the topics addressed in different journals and the citation impact of these topics. The tool can generate term maps based on all journals and conference proceedings indexed in Scopus. These term maps reveal the relationships between terms used in titles and abstracts of articles published in one or more selected journals and visualize these using VOSviewer software developed at CWTS for the visualization of journal impact maps (1).

Largest English language journals in Pediatrics

First, we used Scopus to delineate the Pediatrics field and determine the journals to be entered in the term mapping tool. An initial subject term search in Scopus revealed two relevant categories: Pediatrics, and Pediatrics, Perinatology & Child Health. A subsequent search for all output in those categories revealed that almost 39,000 articles were published in pediatrics in 2012. Based on this output, we determined the 10 largest English language journals, in terms of number of papers published, publishing in Pediatrics in the period 2007-11:

- Pediatrics
- Journal of Pediatric Surgery
- Archives of Disease in Childhood
- Journal of Pediatrics
- Acta Paediatrica, International Journal of Paediatrics
- Pediatric Infectious Disease Journal
- Pediatric Blood and Cancer
- Pediatric Radiology
- Journal of Child Neurology
- Journal of Pediatric Gastroenterology and Nutrition

Term mapping

Once this list of titles had been compiled, the term mapping tool was used to generate a term map, to determine relatively highly cited topics in the field. The term mapping tool performs an analysis of the keywords found in the titles and abstracts of articles in selected journals published over a specified period of time. In this case, the analysis was based on Scopus data (version June 2012), and included 14,878 articles published in the 10 largest English language pediatrics journals in 2007–2011, covering around 38% of the total output in the field. For the analysis a five year overlapping publication and citation window was used (2007–2011). Reviews and conference papers were excluded, as particularly reviews tend to refer to older content, rather than emerging topics. Publications without an abstract were also excluded.

Clusters of co-occurring terms

After the first version of the map was generated, it was checked for uninformative terms, such as publisher or society names, and generic terms such as literature, complication, parent, presentation, feature, etc. These were removed and the tool was rerun to generate a new version of the map. This version, shown in Figure 1, is a co-occurrence cluster map. Every term that occurs at least 5 times in the titles and abstracts of articles in the selected journals is represented by an individual node on the map. The size of the node indicates its frequency of occurrence: the larger the node, the more articles contain the term. The nodes are positioned in a 2D plot in which their relative positions are determined by their co-occurrence in titles and abstracts included in the analysis. The closer the terms, the more often they tend to co-occur. However, it is important to note that this is a 2D representation of a multi-dimensional network, so the proximity of terms is not perfect.

Finally, the terms are colored into clusters of terms that tend to co-occur. The map in Figure 1 clearly contains 6 main clusters of co-occurring terms. The blue cluster (middle and top left), for example, appears related to Vaccination, the red cluster (top right) to Surgery, and the green cluster (left) to Pediatric health and education. Field expertise can help check and appropriately name the clusters, as well as predict which clusters are likely to contain the most highly cited content, and why.

Highly cited terms

The next step in determining hot topics in the field is then to check which terms are relatively well cited in comparison to the rest of the content published in the journals. This can be done by changing the coloring in the cluster map to reflect the relative citation impact of each of the terms. This journal term co-occurrence citation impact map, shown in Figure 2, is colored as a heat map. The color of each item represents the average citation impact of the articles containing that term, relative to the average citation impact (1.00) of all articles included in the map. As older publications have had more time to be cited, the citations are normalized by year of publication to make a fair comparison possible. In the color scheme, terms with an above average citation impact are colored in red, terms with average citation impact are green and terms with below average citation impact are shown in blue.

The map in Figure 2 clearly shows that the relatively highly cited terms tend to occur on the left side of the map. These are terms found in the blue, green and purple clusters shown in the cluster coloring version of the map in Figure 1, related to vaccines (blue cluster, top left), pediatric health & education (green cluster, left) and BMI & obesity (purple cluster, bottom left), as well as pediatric preclinical testing (yellow cluster, bottom right). Highly cited terms in these areas include:

- Rotavirus (rotavirus vaccine/vaccination, rotavirus gastroenteritis, rotavirus disease)
- Hydroxyvitamin D
- Nutrition examination survey
- National health
- Childhood obesity
- Food allergy
- Severe intraventricular hemorrhage
- Pneumococcal conjugate vaccine (pcv7, heptavalent pcv, invasive pneumococcal disease, valent pneumococcal conjugate vaccine)
- Vaccine serotype
- Vaccine effectiveness
- S. pneumoniae
- H1N1
- Late preterm

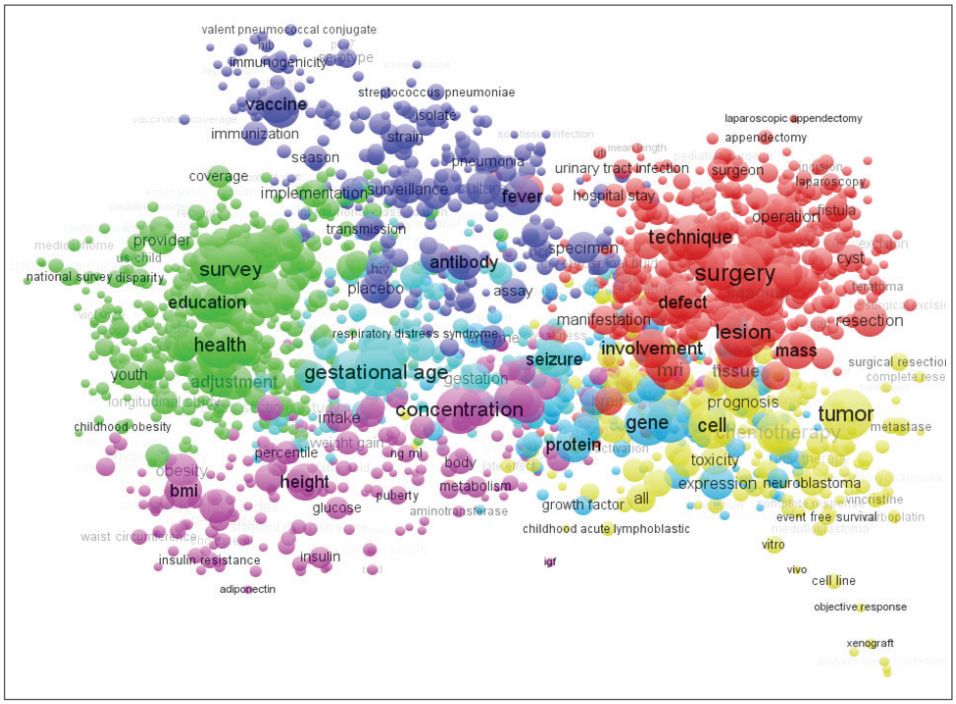


Figure 1: Journal term co-occurrence cluster similarity map for the 10 largest English Language Pediatrics journals (2007–2011)

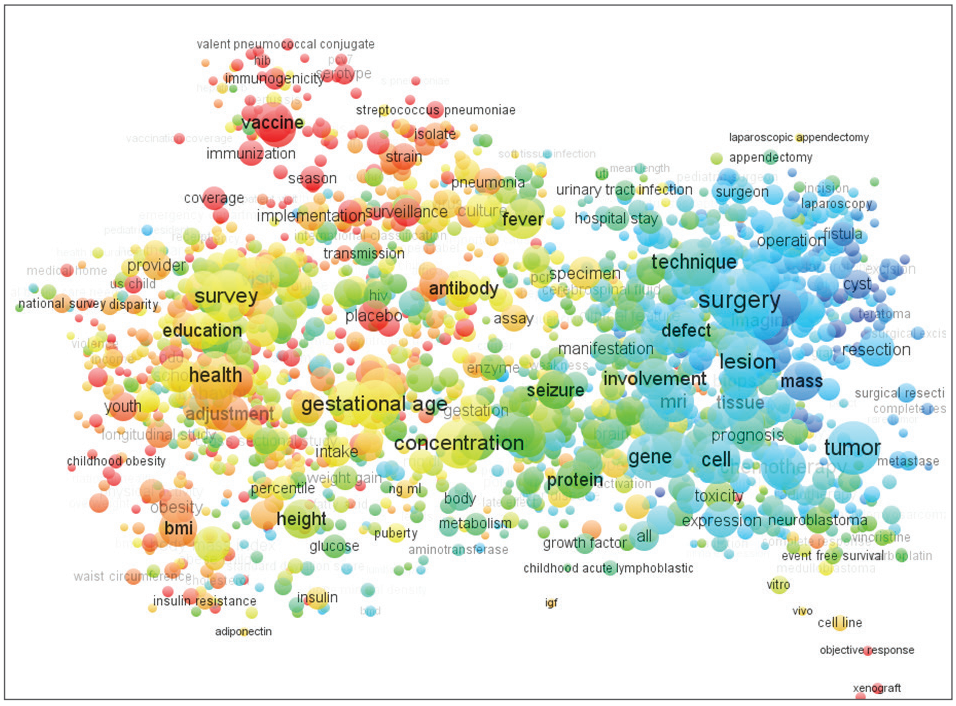
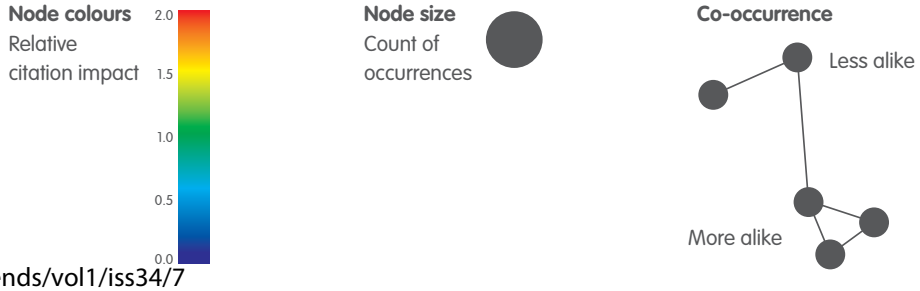


Figure 2: Journal term co-occurrence citation impact map for the 10 largest English Pediatrics journals (2007–2011)



Hot topics?

As a final step to determine what topics have shown active growth in research output (published articles) over the past five years, a Scopus keyword search was performed for a few of the terms in the map with the highest relative citation impact, to determine if these were isolated occurrences or part of growing areas of research focus within Pediatrics. The outcome of this keyword search confirmed that there were at least 5 areas in Pediatrics which had a Compound Annual Growth Rate (CAGR) of more than 5%, which indicates that there was an above average increase of number of papers published in these areas over the past five years, as the average CAGR is 3-5% (see Table 1).

In conclusion, the main topics in Pediatrics that generated most interest in the past five years were related to research on Influenza, Vitamin D and Childhood Obesity. This is not surprising, given the increased real-world interest in avian flu (H1N1) and vaccinations against this since the pandemic in 2009, and the global rise in childhood obesity, especially in developed countries (2). The Scopus keyword search confirmed that the topics suggested by the map were indeed topics that have been attracting attention in the field. Although this specific map at field level is somewhat generic, it does provide a general idea of where to look for hot topics in more detail. Therefore, generating term maps based on Scopus data is clearly a useful way to determine areas of growth in specific fields of scientific research.

Relatively highly cited terms	Relatively highly cited terms that co-occur with the main term:	No. of papers published ('07 – '11):	CAGR* ('07 – '11):
Influenza	H1N1, influenza infection, influenza virus, haemophilus influenzae/type B/hib, streptococcus pneumoniae, pandemic influenza, influenza vaccination/vaccine	852	22.7%
Vitamin D	Hydroxyvitamin D, vitamin D deficiency	645	20.1%
Obesity	Childhood obesity, obese, overweight, bmi, body mass index	4619	15.9%
Late preterm	Infant death, neonatal mortality/death, neonatal intensive care, neonatal outcome, healthy neonate	168	6.3%
Vaccine	Immunization, vaccination, vaccine, serotype	2638	5.3%

Table 1: Overview of number of papers containing relatively highly cited terms from the term map and their compound annual growth rates. Source: Scopus

References:

1. Van Eck, N.J., & Waltman, L. (2010) "Software survey: VOSviewer, a computer program for bibliometric mapping", Scientometrics, Vol 84, No. 2, pp. 523–538.

2. Ogden, C.L., Carroll, M.D., Kit, B.K., Flegal, K.M. (2012) "Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010", Journal of the American Medical Association, Vol. 307, No. 5, pp. 483-490. http://jama.jamanetwork.com/article.aspx?articleid=1104932