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# International comparative performance of mental health research, 1980–2011

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## Abstract

Scientific understanding of mental illness, mental health and their neurobiological and psychosocial underpinnings has greatly increased in the last three decades. Yet, little is known about the landscape of this knowledge and how and where it is evolving. This paper provides a bibliometric assessment of mental health research (MHR) outputs from 1980 to 2011. MHR papers were retrieved using three strategies: from key mental health journals; using US National Library of Medicine Medical Subject Heading (MeSH) keywords; and from additional journals in which mental health topics accounted for over 75% of papers. The number of papers per year increased over time in absolute terms and as a proportion of total medical output. The US's proportion of world publication output dropped from 60% in 1980 to 42% in 2011, while the EU increased its share from 27% to 40%. Countries with greater research intensity in mental health generally had higher citation impact, such as the US, UK, Canada and the Netherlands. MHR also became more collaborative: 3% of all MHR papers published in 1980 were the result of international collaboration compared to 22% in 2011. We conclude by noting that the rise in MHR appears to be due to funding and that bibliometrics can help highlight the potential drivers of variation in performance of MHR systems. The paper provides an analytical basis for benchmarking MHR trends in the future.

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## 1. Introduction

The scientific understanding of mental illness, of mental health and of their underlying neurobiological and psychosocial bases

has greatly increased in the last three decades. Yet, little is known about the landscape of this knowledge and how and where it is evolving. The objective of this paper is to provide a bibliometric assessment of mental health research (MHR) outputs from 1980 to 2011 across the most productive and emerging countries. Bibliometrics is the quantitative analysis of scientific publications and their citations, typically focusing on journal papers in the peer reviewed literature (De Bellis,

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2009). It is one of a set of evaluation methods that may be used to help assess research (Ismail et al., 2009), and has been used in comparative analysis of other fields of medical science (Lewison et al., 2001; Patel and Sumathipala, 2006).

To our knowledge, no studies have attempted to provide a comprehensive bibliometric assessment of MHR. There have been analyses focused on specific disorders, including schizophrenia (Morlino et al., 1997; Theander and Wetterberg, 2009), bipolar disorder (Clement et al., 2003, López-Muñoz et al., 2006), ADHD (López-Muñoz et al., 2008a), post-traumatic stress disorder (Figueria et al., 2007), eating disorders (Theander, 2002, 2004), treatment for depression (López-Muñoz et al., 2003), forms of treatment (García-García et al., 2008), use of diagnostics (López-Muñoz et al., 2008b), locations or countries (Affi, 2005; Archambault et al., 2004), or on specific journals (Pincus et al., 1993). However, no study has identified trends in all MHR publications across the major and emerging producers of this literature with a scope that covers the last three decades.

Such knowledge is critical for two reasons. First, the field of MHR itself needs to know where its major producers are and how their roles have evolved overtime. Second, research funders require an evidence base to make informed decisions on operations, policy and strategy (Grant and Wooding, 2010). Bibliometrics contributes to that evidence base by providing those responsible for research management with data capturing trends in research activity and impact, by institute, country, field, etc (Pincus et al., 1993).

In this paper we focus on trends in research outputs over time and by country, the intensity of MHR in comparison to all medical research activity, the impact of the research outputs as measured by citations, and patterns of collaboration. We also specifically compare trends in research outputs in the US and EU-27, as well as Brazil, Russia, India, and China (the BRIC countries), given their position as emerging powers. We begin by explaining how we defined and identified MHR papers. In the discussion we highlight the limitations of the analysis and draw out policy observations.

## 2. Experimental procedures

Bibliometric data are drawn from a database built by the *Observatoire des Sciences et des Technologies* (OST) based on the Thomson Reuters' Web of Science (WoS) (<http://www.ost.uqam.ca/>). The WoS includes three databases - the Science Citation Index Expanded<sup>TM</sup>, Social Science Citation Index<sup>TM</sup>, and Arts & Humanities Citation Index<sup>TM</sup> - covering, as of 2011, ca. 12,000 journals in all disciplines. These databases do not include all papers since some are disseminated through scientific media not indexed by the WoS (e.g. highly specialised journals, national journals, etc). However these databases do cover the predominant share of researchers' scientific output that is most visible to worldwide scientific communities and therefore is most likely to be cited. Although the WoS database includes several types of documents, only articles, research notes and review papers are used since these are generally accepted as the main instruments for communicating original research (Carpenter and Narin, 1980; Moed, 1996).

### 2.1. Retrieval of papers

A key challenge in any bibliometric analysis is defining and identifying the field for investigation (Moed, 2005) - in this case,

MHR. Given the broad nature of MHR - stretching from molecular biology through to the effectiveness of social interventions such as supported employment - we combined three strategies for identifying publications:

- **Key journals:** OST's bibliometric version of the WoS database uses two disciplinary classifications. The first is the journal subject categories developed by Thomson Reuters and used in the WoS (<http://apps.isiknowledge.com>). The second is the field and subfields classification developed by the Patent Board (formerly CHI Research) (Hamilton, 2003) and used by the US National Science Foundation (NSF) (<http://www.nsf.gov/statistics/seind06/>). We selected all papers published in the 105 journals to which either Patent Board or Thomson Reuters assigned the 'Psychiatry' classification. This includes both journals covering a wide range of topics, such as the *American Journal of Psychiatry* or the *Journal of Nervous and Mental Disease*, and more specific titles, such as *Schizophrenia Research* or *Psychopharmacology Bulletin*. Using journal classifications has been the standard practice in bibliometric analyses for decades (see Moed, 2005).
- **MeSH headings:** The US National Library of Medicine Medical Subject Headings (MeSH) uses a controlled vocabulary to assign a medical domain to each paper indexed in the PubMed database (<http://www.ncbi.nlm.nih.gov/pubmed>), and has been used extensively in bibliometric analyses because of its precision (Lundberg et al., 2006; Clarke et al., 2007). Three MeSH headings best describing MHR were chosen: Mental Disorders (excluding Substance-related Disorders), Mental Health Services and Mental Health. It should be noted that the structure of MeSH headings is hierarchical, meaning that, for example, specific diagnoses are picked up as subcategories under the term 'Mental Disorders'. By using MeSH headings we identify papers published in multidisciplinary journals including, for example, *European Neuropsychopharmacology*. These three MeSH headings retrieved in PubMed, as of March 2012, 513,440 papers published between 1980 and 2011 (572 of these papers were from *European Neuropsychopharmacology*, accounting for 41% of its output of articles, notes and reviews since the first paper was indexed on the WoS in 1992). Of these papers, 395,916 were recalled in the WoS using their author name(s), volume number, issue number and pages. Unmatched papers were published in journals that are not indexed by Thomson Reuters and were excluded from our analysis.
- **Additional journals:** Given that the match between the WoS papers and PubMed papers was not perfect, and MHR papers may not always have a proper MeSH heading attributed, it was decided to complement papers to which MeSH headings were assigned with papers published in additional journals that were not assigned the 'psychiatry' classification by the Patent Board or Thomson Reuters but where 75% of papers had a mental health MeSH term. This resulted in an additional 18 journals. Many of these journals were in the fields of developmental or neurodegenerative disorders, including the *Journal of Autism and Developmental Disorders* and the *Journal of Alzheimer's Disease*.

In total, 453,048 MHR papers were retrieved between 1980 and 2011, of which 380,345 were retrieved using MeSH headings and 199,581 using the lists of journals. The overlap between the two methods contained 126,878 papers, which means that 56% of papers were MeSH-retrieved papers published outside core psychiatry journals. Similarly, 36% of papers published in additional journals did not have any of the three MeSH headings assigned. This shows the importance of using both additional journals and MeSH headings to retrieve papers in the area.

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