Trends in the scientific literature on atypical antipsychotic drugs in the United Kingdom: a bibliometric study

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Abstract

Objective: A bibliometric study was undertaken of peer-reviewed publications on atypical antipsychotic drugs (AADs) from the United Kingdom and the findings are presented herein.

Methods: We selected the documents from the Scopus database. We applied several production and dispersion bibliometric indicators, including Price's law on the growth of the scientific literature, and Bradford's law. We also calculated a so-called 'participation index' across different countries. The bibliometric data were thereafter correlated with social and health data from the UK, including total *per capita* expenditure on health and gross domestic expenditure.

Results: A total of 4156 original manuscripts were published within the timeframe 1967–2015. Our results are in accord with Price's law, with scientific output demonstrating exponential growth ($r = 0.9227$, as against an $r = 0.8766$ after adjustment). The drugs most widely evaluated were clozapine (465 documents), olanzapine (263) and risperidone (248). Stratification into Bradford zones produced a nucleus represented by the *Journal of Psychopharmacology* (168 articles) and *British Journal of Psychiatry* (159 articles). A total of 1250 different journals were evaluated.

Conclusions: Publications on AADs in the UK have shown exponential growth across the studied period, which is in line with the progressively burgeoning novel AAD releases. No evidence of a saturation point was observed.

Keywords: atypical antipsychotic drugs, bibliometrics, schizophrenia, United Kingdom

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Introduction

Schizophrenia is commonly a debilitating and enduring serious mental illness, with an aetiopathogenesis that remains incompletely understood. Epidemiological data vary, but typically show a population prevalence between 0.5% and 1%.[1,2] The World Health Organization (WHO) has shown it to be among the 10 leading high disability disorders in adults.[3]

The mainstay of treatment for schizophrenia during the last half century or so has been antipsychotic medication. A posited 'psychopharmacological revolution' began in the 1950s with the introduction of chlorpromazine[4,5] and, later, haloperidol.[6] These medications profoundly altered psychiatry and the provision of mental health care: they changed the clinical trajectory of psychosis, they helped herald a radical deinstitutionalization away from inpatient care, enormously reducing the number and duration of such admissions, towards community-based care, and drove a new understanding of pathological neurochemical changes.[7]

These initial medications, referred to as first-generation, classical or typical, were biochemically notably for blocking post-synaptic dopamine receptors, and demonstrated a considerable efficacy in

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reducing positive symptoms (hallucinations, delusions, etc.). Their main limitations were their side effects, notably particularly problematic extrapyramidal movement symptoms (EPS). However, after the reinstatement of clozapine in the United States, an antipsychotic first developed in the 1960s, later withdrawn owing its ability to induce life-threatening agranulocytosis,[8] expectations shifted radically. This agent, as well as producing very few EPS, demonstrated efficacy against both positive and negative symptoms, as well as improving outcomes in individuals refractory to alternative neuroleptic drugs.[9] Clozapine was, and remains, noteworthy for its characteristic and peculiar pharmacodynamic features, especially with regard to its relatively low affinity for dopaminergic D_2 receptors, and its binding to a wide range of others, especially serotonin receptors. Clozapine remains a landmark in the story of antipsychotic pharmacology and paved the way for the so-called 'atypical antipsychotics' (AADs),[10] starting with the production of risperidone in 1993.

The construct of the pharmacological 'atypicality' has been the subject of numerous debates;[11] initially based on pharmacodynamic descriptions of clozapine compared with earlier 'typical' medications, nowadays there is a range of criteria for atypicality that are commonly accepted. Among these nonclinical criteria, an antipsychotic drug is considered atypical when it shows effectiveness in experimental animal models without causing catalepsy, something that is readily determined in laboratory animals, and a proxy marker for extrapyramidal side-effects. Atypical compounds do not typically induce upregulation in dopaminergic D_2 receptor numbers or produce tolerance to the raised dopamine turnover during chronic treatment.[12] In recent times, biochemical criteria for atypicality have been proposed: these include more 5-HT_{2A} than D_2 receptor antagonism, preferential localization in extra-striatal dopamine receptors, fast dissociation of the D_2 post-synaptic receptor, partial agonist activity on D_2 receptors (and possibly 5-HT_{1A} partial agonism) and so forth. Conversely, clinical determination of atypicality includes an efficacy at least parallel to that of typical agents, altogether with a reduced propensity for extrapyramidal side-effects. The clinical conceptualization of atypicality includes having fewer extrapyramidal effects (tardive dyskinesia, akathisia, Parkinsonism, acute dystonia) and hyperprolactinemia.[12] Such agents are often perceived as having greater effectiveness in refractory patients and against primary negative symptomatology, though more recent data have tempered this somewhat; initial optimism was based, in part, on lessening the iatrogenic worsening of negative and cognitive symptoms sometimes seen on the older typical medications.[13]

Developments in the pharmacology of antipsychotic drugs over the past quarter century have been impressive, with the introduction of various AADs (risperidone, olanzapine, quetiapine, ziprasidone, aripiprazole, etc.) (see Supplementary Table 1). These have been argued to have enhanced the quality of life (QoL) of individuals with schizophrenia and have helped weaken the stigma surrounding psychiatric pharmacotherapy.[12] However, it has also been argued that longer-term 'real-world' socio-occupational outcomes have not matched initial expectation, primarily due to inadequate impact on negative and cognitive symptoms.[14] In this context, since 1993, with the growth of the new antipsychotics and, later on, with their authorization in many jurisdictions for the management of bipolar disorder, research into these compounds has increased significantly, and this has resulted in a notable growth in the scientific literature on these drugs, as has been reported in the particular case of the United Kingdom (UK) in this work.

The most recent prevalence survey in England found that less than one in a hundred adults (0.7% in 2014 and 0.4% in 2007) in the past year experienced a psychotic disorder.[15] Given the sample excludes inpatient populations, this is likely an underestimate of actual rates. Ethnicity and socioeconomic group are positively related to prevalence rates in psychotic disorder. For example, rates of psychosis were shown to be greater in black men (3.2%) and amongst individuals who receive employment and support allowance (13.4%).[15]

The UK has 14.63 psychiatrists per 100,000 population.[16] The majority of people with a psychotic disorder receive some form of treatment (82.4%), which is mostly some form of psychotropic medication. Of those receiving treatment, 45.7% receive antipsychotics.[15] Treatment in the community is most common. Out of the 2,637,916 individuals reported as being in contact with secondary mental health services during 2016 and 2017, only a small proportion (3.9%) was admitted to hospital as part of their contact with secondary mental health services.[17]

Bibliometric indicators are a proxy marker for activity in a field of research.[18] They can be useful tools for assaying the scientific, and indeed social,

relevance of a given discipline or area.[19] Our group has evaluated changes in the scientific literature in different psychiatric conditions and specific therapeutic aspects within the area of psychopharmacology utilizing bibliometric tools.[20–24] In recent years, we have also reported on the changes in scientific output on AADs across different countries in Asia,[25,26] Spain[27] and Italy.[28] Herein, we focused this bibliometric approach on AADs publications sourced in the UK.

Methods

Data collection

Scopus was used for this bibliometric study as it is the largest abstract and citation database of the peer-reviewed scientific literature. It ranges over almost 22,000 journal titles from more than 5000 publishers; of these approximately 20,000 are specifically scientific, technical, medical, and social science publications. Scopus is particularly suited to the biomedical field, being more comprehensive and easier to use compared to any competitor, and it is widely regarded as the world's biggest database for abstract and citation information,[29,30] and it is regularly used in various bibliometric studies.

Remote downloading methods were applied to select manuscripts that had, in the author address (AD) field, the descriptor *United Kingdom*, and in the title (T1) field, one or more of the following descriptors *atypic* antipsychotic*, zotepine, risperidone, olanzapine, second-generation antipsychotic*, clozapine, blonanserin, sertindole, quetiapine, asenapine, perospirone, ziprasidone, amisulpride, aripiprazole, paliperidone, iloperidone, lurasidone*, within the publication timeframe of 1967–2015. Further descriptor fields related to psychopharmacological issues were not restricted in any database field. For this study, we included all original articles, short reports, reviews, editorials, letters to the editor and so forth; any duplicated material was eliminated.

Bibliometric indicators

The methodology utilized in this work was similar to our previous bibliometric studies.[31,32] This included *Price's law*,[33] which is undoubtedly the most widely used bibliometric indicator of productivity within a given discipline or country, reflecting a fundamental aspect of scientific production, which is its exponential growth. In order to ascertain whether or not the increase in scientific output on AADs follows Price's law, we completed an exponential adjustment of the data, utilising the equation $y = 3E– 93e^{0.1088x}$, and an additional adjustment to an exponential curve, using the equation $y = 5.6514x – 11167$.

Other indicators related to growth of scientific literature are so-called '*doubling time*' and *annual growth rate*. The former is the time necessary for a given subject matter to double its output; and the latter conveys how it has grown over the preceding year, which is denoted as a percentage. The doubling time (D) is calculated as follows:

$$D = \frac{Ln2}{b}$$

Herein, b represents the constant that relates the rate of growth relative to the size of the output already attained. The annual growth rate is calculated as follows:

$$R = 100\left(e^{b} - 1\right)$$

The 'inverse square law of scientific production' expresses the frequency distribution of scientific productivity by the number of published articles.[34] This construct, first conveyed by Lotka (and also known as *Lotka's law*), found that the number of authors who publish fewer papers is greater than those who publish many.[35] Mathematically, this is expressed by the formula:

$$A(n) = \frac{A(1)}{n^2}$$

Utilizing this index, authors are categorized into one of three levels of productivity: 'small producers' (publishing a single article), 'medium-sized producers' (producing 2–9 articles) and 'large-scale producers' (publishing 10 or more). The 'productivity index'(PI) or '*productivity distribution*' corresponds to the logarithm of the number of author publications, and is a key bibliometric indicator.

It is further informative to ascertain and understand the number of authors with only a single publication: the *transience index* (TI). This can be calculated as the percentage of authors with a single publication against the total number of publications:

$$TI = \frac{Authors\ with\ only\ one\ publication}{Total\ number\ of\ authors} * 100$$

Bradford's law was utilized as a bibliometric indicator of the dispersion of scientific information.

This creates a model of concentric zones of productivity (also known as Bradford zones) with decreasing information density.[36] That is to say that every zone contains a similar number of documents, but the number of *journals* in which they are published increases as one moves from one zone to the next. This allows identification of the most widely used and highest impact journals in a given area of evaluation.

Impact factor (IF) was the key measure of a journal's influence; first developed by the Institute for Scientific Information (Philadelphia, PA, USA), it is updated every year in the *Journal Citation Reports* (JCR) section of the *Science Citation Index* (SCI). IF is calculated by the number of times a given journal is cited by SCI journals across the two previous years, and the total number of published articles by that journal in this time frame. The JCR allocates each their IF, ranking journals by subject areas, a marker of scientific 'prestige'.[37] In this paper we utilized the 2015 IF data.

The national *participation index* (PaI) for overall scientific production was also utilized; this is the ratio of the number of documents generated by a given country, in this instance the UK, compared with the total number of manuscripts on the topic in question (here AADs), as well as with the global participation index in biomedical and health sciences more widely and the subareas of psychiatry and mental health more specifically. Further, the participation index can be correlated with health data, such as *per capita* expenditure on health and a country's gross domestic expenditure. The participation index for the UK has herein been correlated with the corresponding participation indices of the world's 11 most scientifically productive countries from 1996 to 2015, with data obtained from The World Bank[38] and World Health Organization Department of Health Statistics and Informatics.[39]

Results

A total of 4156 unique documents (original articles, reviews, editorials, letters to the editor) related to AADs in the UK were obtained covering the period 1967–2015. Of these, 465 correspond to clozapine, 263 to olanzapine, 248 to risperidone, 121 to quetiapine, 98 to aripiprazole, 43 to amisulpride, 37 to ziprasidone, 27 to sertindole, 24 to asenapine, 16 to zotepine, 2 to iloperidone, 1 to lurasidone and blonanserin. No documents were related to perospirone.

As outlined in Figure 1, over the past 49 years there has been a sharp rise in the number of manuscripts published on AADs in the UK, in line with worldwide trends. The mathematical adjustment to the exponential curve, demonstrated in Figure 1, creates a correlation coefficient $r = 0.9227$, demonstrating 7.73% variance unexplained by the model fitting. Conversely, a linear adjustment of the values creates an $r = 0.8766$, and therein 12.34% unexplained variance. These data thus better align with an exponential fit rather than a linear one, and therefore with the postulates of Price's law.

The scatter plot shown in Supplementary Figure 1 demonstrates the temporal production of manuscripts along a trend line, which was fitted to the equation $y = 10.324e^{0.1338x}$, with a correlation coefficient of 0.9753; over the 49 year timeframe, this had a doubling time of 5.15 years.

The introduction of the newer atypical AADs across different countries, as well as their approval for use in the treatment of bipolar disorder, appears to have contributed significantly to the increase in scientific production, as is shown in Figure 2. From 2008 onwards, this growth was primarily due to publications on two drugs in particular: aripiprazole and olanzapine.

It can be observed that cumulative growth in total UK scientific output on AADs in each 5-year period shows a gradual increase over the previous ones (Figure 3). The distribution in 5-year periods shows that the timeframe 2011–2015 is the one that contains most documents, with 27.82% of the total. Supplementary Figure 2 shows the growth, for periods of 5 years, of psychiatry and mental health *versus* AADs.

Bradford's model was applied to evaluate the journals that these papers were published in. The mean number of articles per Bradford zone is 1039, though if the final zone is discarded, as its accuracy is inevitably lower, the mean would be 1007 (Table 1). A total of 1250 different journals published the analysed material, though just over 6% of them were responsible for more than 50% of manuscripts. The core, those that contain the largest number of articles, consisted of 16 journals; notably the *Journal of Psychopharmacology* and *British Journal of Psychiatry*, with a 4.04 and 3.83 of IP, and IF of 3.898 and 7.991, respectively.

Table 2 provides the authors' distribution according to Lotka's law. As can be observed, this

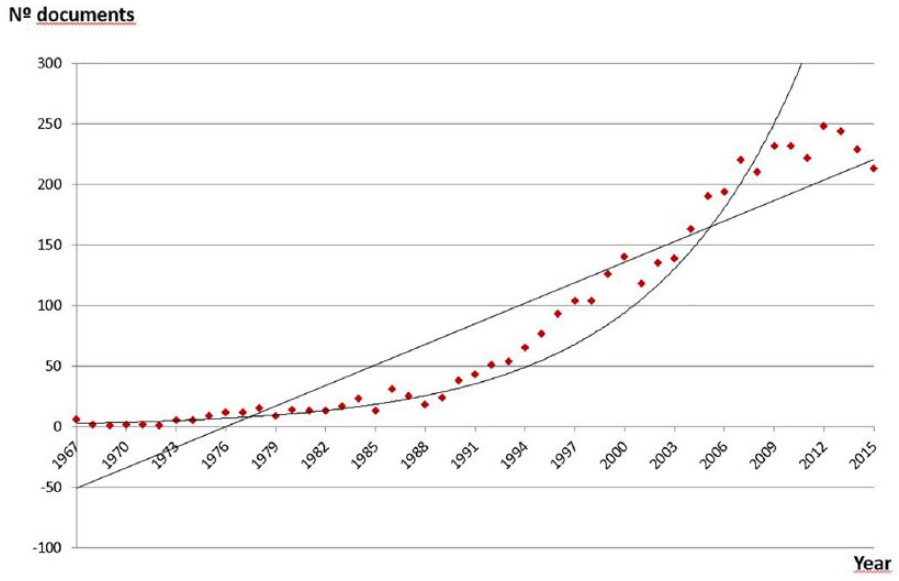

Figure 1. Growth of scientific production on AADs in UK. A linear adjustment of the data was carried out, and a fitting to an exponential curve, in order to check whether production follows Price's Law of exponential growth.
Linear adjustment: $y = 5.6514x - 11167$ ($r^2 = 0.8766$).
Exponential adjustment: $y = 3E - 93e^{0.1088x}$ ($r^2 = 0.9227$).

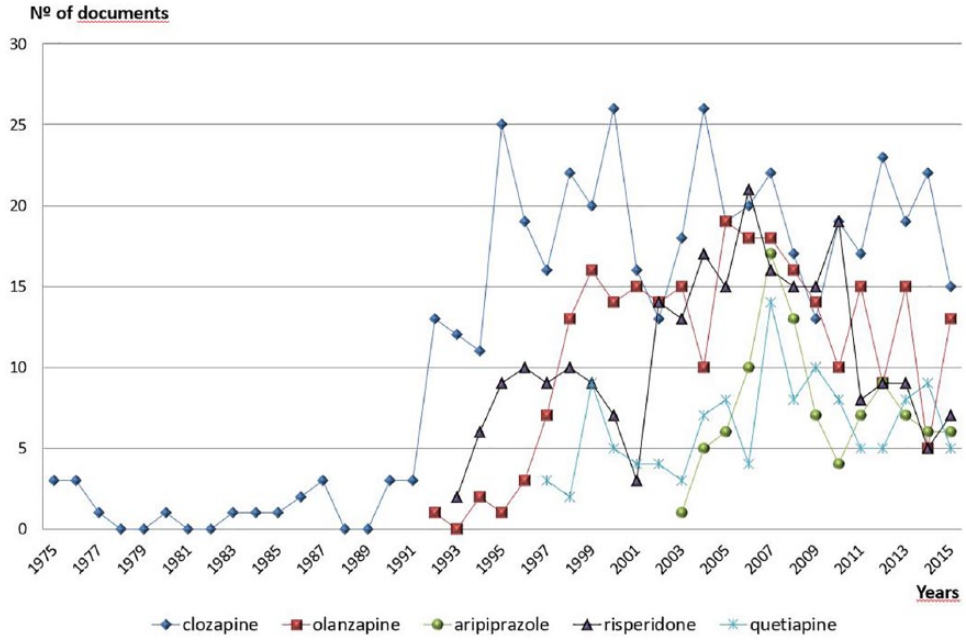

Figure 2. Number of documents on AADs (1975–2015).

distribution is strongly centred around 'small producers', with a transience index (occasional authors) above 80%, and only .77% of the authors represent large producers (an author with 10 or more items). The total number of authors is 12,998, which represents a co-authorship index of 3.13 for the 4156 retrieved articles.

UK science had a global PaI of 7.03 with respect to world production in the period and thematic area analysed. Amongst the major AAD research-generating countries, the most substantial is the United States, with a PI of 27.37, followed by the UK (PaI = 7.03), Germany (PaI = 5.43), Japan (PaI = 5.18), Canada (PaI = 4.17) and France

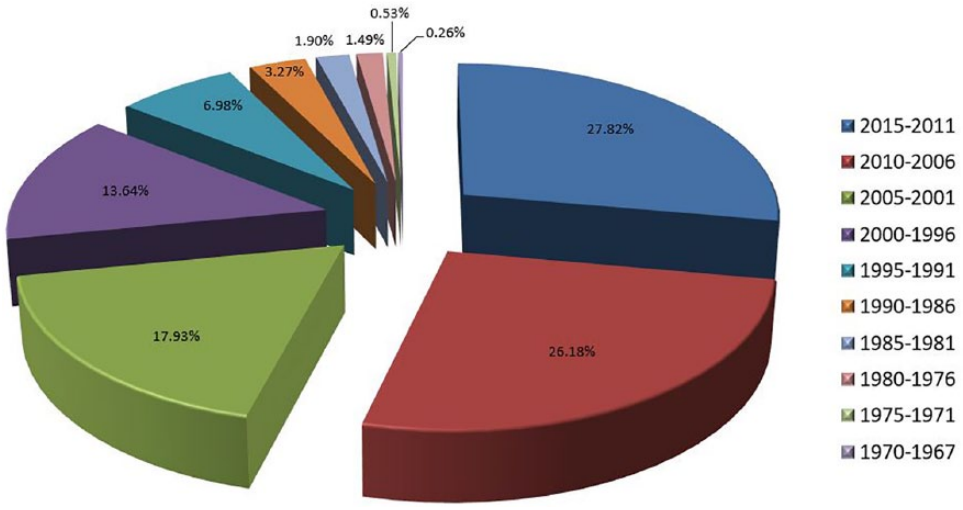

Figure 3. Evolution of the number of documents every 5-year periods.

Table 1. Distribution of the journals in Bradford's zones.

	No. of journals	% of journals	No. of articles	% of articles	Bradford multiplier
Core	16	1.28	1039	25.00	
Zone 1	67	5.36	1056	25.41	4.18
Zone 2	214	17.12	928	22.33	3.19
Zone 3	953	76.24	1133	27.26	4.45
TOTAL	1250	100.00	4156	100.00	3.94

Total number of journals = 1250.
Average number of articles = 1039.
Average number of articles, excluding the last Bradford zone = 1007.

(PaI = 4.16) (Table 3). However, subanalysing their productivity solely within the fields of psychiatry and neurology, only Spain, of the 11 largest producers in the period 1996–2015, devoted a greater amount of research focus on the study of AADs (Figure 4). Analysing the correlation between PaI and national *per capita* health expenditure, the distribution obtained in the studied nations was relatively similar (Figure 5).

Figure 6 shows the most productive UK institutions. King's College London accounted for a remarkable 15% of UK output; it is one of the oldest universities in the UK and, crucially, contains the Institute of Psychiatry, Psychology and Neuroscience, one of the world's pre-eminent mental health research schools; it was followed by University College London, which accounted for 4.28% of the publications. However, it must be noted that the corresponding institution was defined entirely based on the information given in the Scopus AD field.

Discussion

Bibliometric studies are useful for determining the importance of a given discipline or area of study through its relative size, distribution and growth, and any change over a period of time. The construct of 'bibliometrics' was first noted by Alan Pritchard in 1969 as a means to study the application of statistical and mathematical models and methods to the dissemination of scientific work.[40] It also affords a view on the (relative) scientific production of an institution, country, author or research group.[41]

There are inevitably limitations to any form of analysis, and several specific ones have previously been shown in the sociometric approach of

Table 2. Classification of authors based on productivity.

	PI ⩾ 1 (10 or more articles)	0 < PI < 1 (2–9 articles)	PI = 0 (1 article)	Total
Number of authors	100	2331	10,567	12,998
% authors	0.77	17.93	81.30	100.00

PI, productivity index.
The PI led to the establishment of three accepted levels of productivity: PI = 0 (transience index; fortuitous authors); 0 < PI < 1 (authors of intermediate productivity); PI ⩾ 1 (large producers).

Table 3. Distribution of documents on atypical antipsychotics, psychiatry and neurology in the world's 11 most productive for the period 1996–2015.

Country*	Psychiatry and mental health	Neurology	AADs	AADs/Psychiatry–neurology
United States	34.26	27.33	27.37	0.92
United Kingdom	10.78	7.01	7.03	0.84
Germany	7.16	8.34	5.43	0.69
Canada	4.85	4.34	4.17	0.92
Australia	4.26	2.56	2.22	0.70
France	3.95	4.32	4.16	0.99
Italy	3.59	5.53	4.75	0.98
Netherlands	3.15	2.70	2.04	0.71
Spain	2.32	2.80	3.32	1.26
Japan	2.07	7.06	5.18	0.98
China	1.17	3.21	2.12	0.85

AADs, atypical antipsychotic drugs.
*The world's 11 most productive countries in psychiatry (and mental health) and neurology for the period 1996–2015.
Total documents 1996–2015 in psychiatry and mental health: 544,264 (Scimago Journal & Country Rank).
Total documents in Neurology 1999–2015: 968,287 (Scimago Journal & Country Rank).

bibliometric studies,[42] not least, for example, as it is obvious that scientific production in any given area exceeds the database(s) chosen, and for various reasons typographical or other indexing errors or lack of standardisation can hinder accurate data collection.[43] Nevertheless, we believe that the present study covered a very significant part of the extant literature on the topic, and that our coverage constitutes a very representative sample of the literature on this topic.

With such limitations in mind, the analysis presented in this current work allows us to make a reasonable overarching assessment of the growth in AAD publications in the UK, and their relationship to other areas of study and other nations' output. Figure 1 is noteworthy in this regard as the exponential growth seen over the past half-century shows no current evidence of yet reaching the saturation point postulated by Price's model of expansion of the scientific literature.[33] This is consistent with other work by our group looking at parallel data from countries of European Union, such as Spain[27] and Italy.[28] The 'time of duplication' for AADs was only 5.15 years, which demonstrates great dynamism in this field of scientific activity within the UK.

Prescription rates for antipsychotics have increased in the UK (during this period of increased scientific activity). Between 1998 and 2010 prescriptions for antipsychotics increased

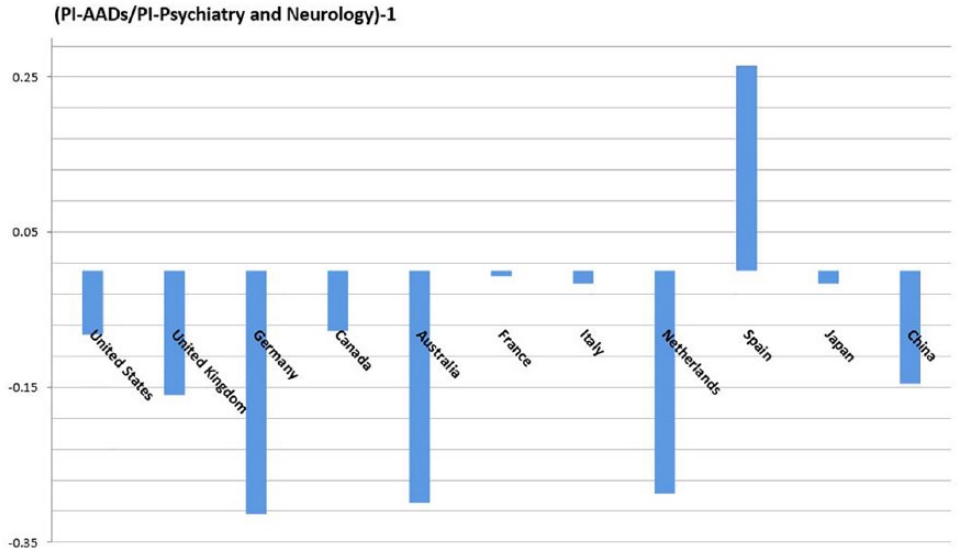

Figure 4. Relationship between production of scientific literature on AADs and total production in the field of psychiatry and neurology in the world's 11 most productive countries.
AAD, atypical antipsychotic drug; PaI, participation index.

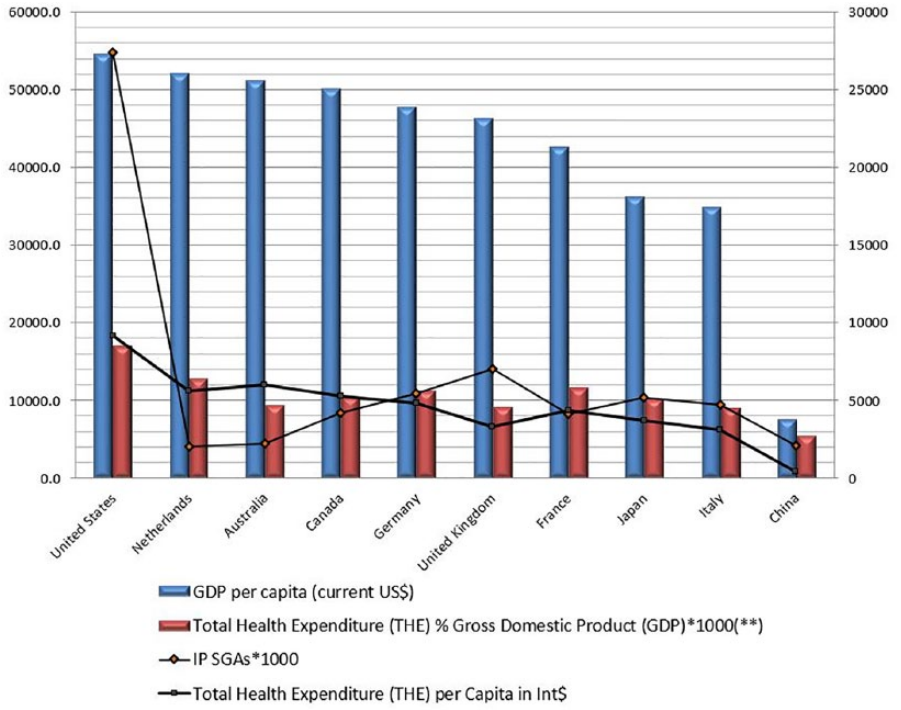

Figure 5. Gross domestic product (GDP) *per capita* and relationship between production of scientific literature on AADs and the total expenditure on health on GDP and *per capita* in Int$, in the world's 10 most productive countries in psychiatry and neurology.
AAD, atypical antipsychotic drug; PaI, participation index.
*World Bank data.[38]
**World Health Organization data.[39]

by 5.1% [95% confidence interval (CI) 4.3–5.9]. Interestingly, cost for antipsychotics also increased by 22% each year (95% CI 17–27%)[44] during this period. Furthermore, antipsychotics were prescribed for other mental health conditions including anxiety and depression.[44,45]

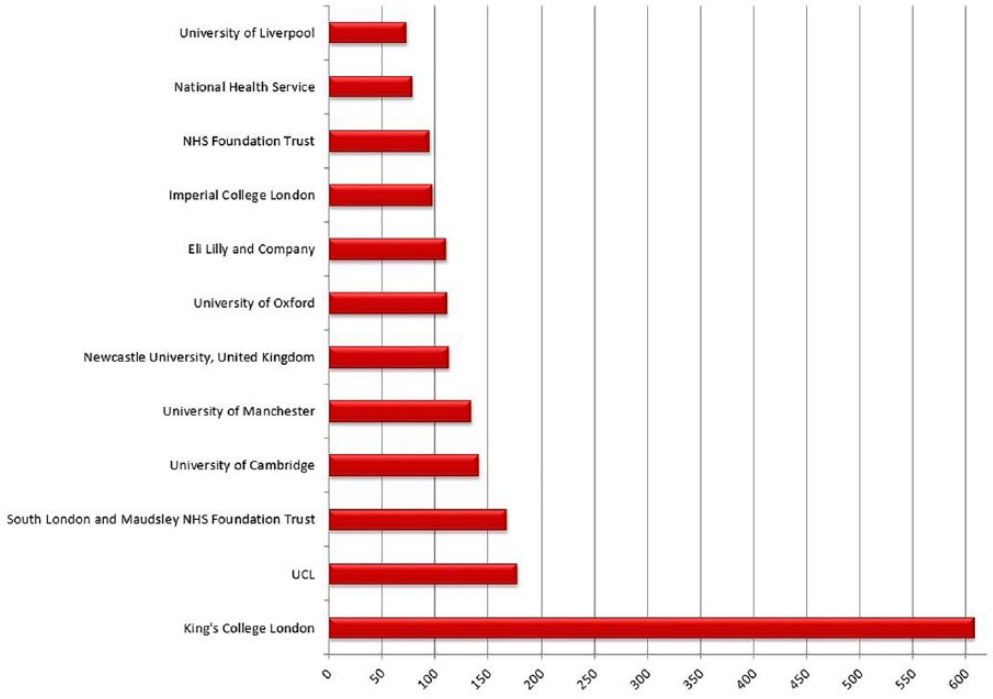

Figure 6. Contribution of different UK institutions.

The UK appears to be performing equally well in other areas of biomedical research, although bibliometric studies comparing the UK to global comparators are scarce. A bibliometric analysis on regenerative medicine found that the UK increased the number of publications in line with global trends.[46] Furthermore, average publication impact was found to be high compared with other regions in the world.[46] Notable positive trends have been reported for the UK's contribution to selective serotonin reuptake inhibitor (SSRI) research between 1980 and 2000[20] and antimalarial drug resistance research between 2006 and 2015.[47]

The growth of the AAD scientific literature coincides with a widening of its approval for the treatment bipolar disorder and refractory depression in multiple jurisdictions. Olanzapine, risperidone, quetiapine, ziprasidone, aripiprazole and asenapine all have such licenses, though the precise indications and restrictions vary between countries. AADs are also increasingly prescribed (and researched) in various off-label states, including personality disorder, agitation, tics, substance use disorders and so forth.[48,49] This maps onto the upsurge in the specific 5-year period 2002–2006, that coincided with the official approval for new clinical indications for AADs. In the analysis of the individual new AADs, risperidone emerges as the most widely studied compound.

As a proxy measurement of the quality of publications, we utilized the markers of impact and excellence of the journals housing these works. Prestigious high impact journals including the *Journal of Psychopharmacology* (IF = 3.898), *the British Journal of Psychiatry* (IF = 7.991) and *The Lancet* (IF = 44.002) published articles on AADs from UK, demonstrating clinical and social relevance for the topic. Among the 10 most widely used journals in the UK for work on AADs, six rank amongst the most relevant in the field of psychiatry (IF > 3) (Scimago Journal & Country Rank 2015).

During the two last decades, there has been a marked rise in scientific output in the wider area of psychiatry and neurology in UK (Supplementary Figure 2), with this growth higher again for AADs (Supplementary Table 2). As we have demonstrated in other work,[24–27] research on AADs is one of the fastest growing psychopharmacological fields in psychiatry; analogously, other bibliometric work has demonstrated schizophrenia research to be growing at a relatively greater rate than other clinical fields in mental health.[50] Putatively, this may be due to the relatively greater seriousness of

the illness, and the personal, clinical and societal impact of the condition. Theander and Wetterberg[51] have noted how the number of references to schizophrenia in MEDLINE has tracked the wider increase of medical publications, accounting for 0.42% of the total medical literature in the time-frame evaluated.

The two major Anglophone countries, the United States and the UK, lead the table of AAD research, accounting between them for over a third of total output in this domain (34.39%). Noteworthy, they are home to many of the pharmaceutical companies responsible for the development of AADs (olanzapine, Eli Lilly, USA; risperidone and paliperidone, Janssen Pharmaceutica, USA; quetiapine, AstraZeneca, UK; ziprasidone, Pfizer, USA; and aripiprazole, Bristol-Myers Squibb/Otsuka Pharmaceutical Co., USA/Japan) may help to explain this high PaI, though of course this association could be bidirectional, with pharmaceutical companies attracted to countries with perceived high-quality scientific output.

Table 3 shows the 11 most productive nations in the discipline of psychiatry and mental health and neurology, and compares them with their specific productivity in the subdomain of AADs. It is interesting to note that Germany, Canada and Italy sit near the top of the ranking for AAD journal output (Table 3), seeming to demonstrate a relatively greater academic interest in AADs in these nations. The United States and the UK rates of productivity in AADs research are more in proportion with their wider global index for psychiatry and neurology. Finally, we must highlight countries, such as Spain, where the ratio of research on AADs is relatively higher than its more general scientific output (Figure 4), as we have shown in a recent publication.[27]

An alternative perspective is to consider the relationship between AAD scientific output and the national *per capita* health expenditure, shown in Figure 5; in general, the greater the health spend, the higher the research output. A country's scientific output is the end-point of a much earlier investment in research and development, and is not the reflection of particular economic circumstances in the evaluated time-frame.[21,22] The correlation analysis between AAD scientific output and the gross domestic in heath expenditure placed the Netherlands, Australia and Canada in the lowest three positions of the evaluated nations. In this regard, mental health expenditure in the UK is 10.82% of the total health budget, which high when compared with the world median (m = 2.82%) or European median (m = 5%).[52] Mental health receives less than 6% of the overall health research spend in the UK.[53]

Despite bibliometric studies' inherent limitations, we believe that this work offers a representative picture of the change in AAD research in the UK in relation to that undertaken internationally. Research in this area will most probably continue to grow in the coming years, bearing in mind that the 'ideal' antipsychotic drug has not yet been found[12] and that the aetiopathology of schizophrenia is still incompletely understood. AADs have, and will continue to have, an ever-expanding range of clinical indications.

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Conflict of interest statement

Dr. Tracy is a senior lecturer in the Department of Psychosis Studies, at the Institute of Psychiatry, Psychology and Neuroscience, King's College London (KCL), and a visiting senior lecturer at University College London (UCL): he is also on the editorial board of the *British Journal of Psychiatry* (the *BJPsych*): KCL, UCL and the *BJPsych* were favourably noted in this current manuscript's analysis.

Supplemental material

Supplemental material for this article is available online.

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