

# Enhancing open access in the biomedical field

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## ABSTRACT

This study was designed to document the state of open access (OA) in the biomedical field in 2009. PubMed was used to collect bibliographic data on target articles published in 2009. Google and PubMed were then used to establish the availability of free full-text online versions for these articles. Articles were analyzed according to the type of OA to provide insight into the characteristics of OA. The main finding was that almost half of the articles were accessible as OA articles, indicating that OA has progressed rapidly since our previous surveys reported for 2005 and 2007. More than half of the OA articles in the biomedical field are provided by Open Access Journals, the so-called 'Gold Road'. PubMed Central is used for journal publishers to archive their contents freely. The percentage of OA articles accessible via institutional repositories (IR) and authors' websites, or the 'Green Road', has consistently remained low.

## Keywords

open access, public access policy, scholarly communication, 'Gold Road', 'Green Road'

## INTRODUCTION

The percentages of open access (OA) in the fields of Science, Technology and Medicine (STM) were recently reported (Björk, B-C et al, 2010). According to their survey, about 20.4% of all articles published in the STM fields in 2008 are OA.

We previously investigated the percentage of OA articles published in the biomedical field in 2005 (Matsubayashi et al., 2009) and 2007 (Kurata et al., 2008). The purpose of the present study was to investigate the percentage of OA articles published in the biomedical field in 2009 and to compare this percentage with those reported for 2005 and 2007.

## METHOD

A target sample was taken in December 2009, consisting of all the articles in PubMed with publication dates from January to September 2009 and with page numbers of 11 - 19 in the "Pagination" tag.

We obtained a final sample of 1,955 articles after narrowing down the sample through several steps (for further details, see Figure 1).

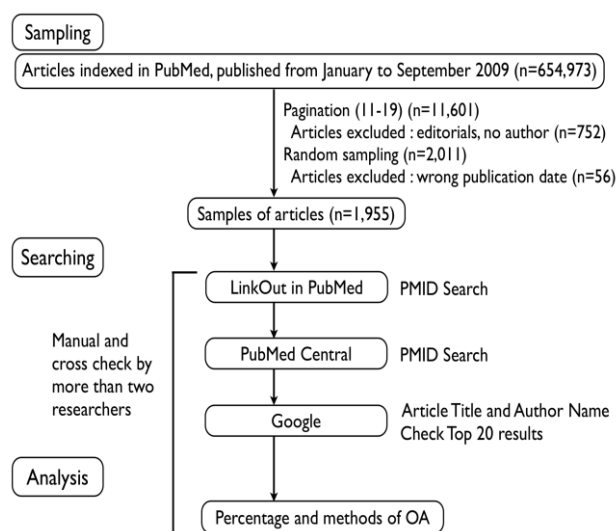


Figure 1. Steps of method

It took one month (March, 2010) to search PubMed, PubMed Central and Google to locate the full-text (FT) articles in this sample. If multiple versions of the FT existed, we recorded all versions. If the FT was found in any of these searches, the URL was recorded using a code corresponding to one of three categories, as follows: 1=OA; 2=restricted OA (e.g., user must register to gain access; Medscape.com); 3=electronic subscription journal (non-OA). Articles for which no FT could be found were assigned to a fourth category, "not available online".

## RESULTS

### Overall Trends

Almost half of the articles (50.4%) in this sample were available as unrestricted OA and 0.6% were available as "restricted OA". In contrast, the FT of 44.0% of the articles was only available in electronic subscription journals. Only five percent of the articles did not have an online FT (Table 1).

<b>OA</b>	50.4%
<b>Restricted OA</b>	0.6%
<b>Electronic subscription journal</b>	44.0%
<b>Not available online</b>	5.0%

Table 1. FT availability of sample articles (n=1,955)

Thus, the percentage of OA has increased notably, compared with the percentages reported for 2005 and 2007 (Figure 2, 'OA' including OA and restricted OA).

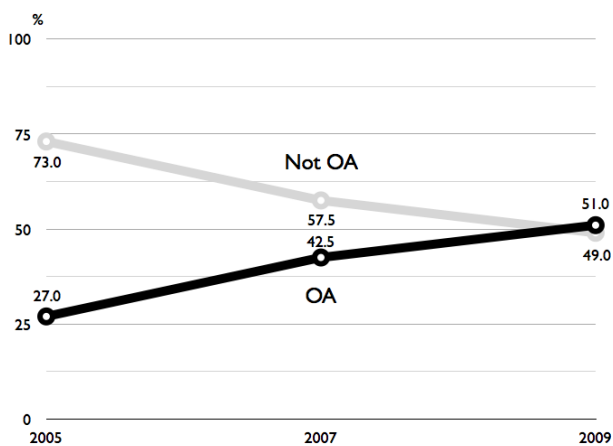


Figure 2. Change in the percentage of OA (2005-2009)

### Methods of providing OA

We classified the OA articles (n=986) into seven categories, as follows: 1) PubMed Central (PMC), 2) open access journals (OAJ), 3) toll journals (embargo, sample, 'Open choice' etc.), 4) institutional repositories (IR) and author websites, 5) free article database, such as 'findarticles' which provides free articles in several hundreds of journals, magazines and newspapers, 6) websites of organizations, such as American Nurses Associations, which provides free journal articles as part of various information resources (job information, news etc.), and 7) others (see Figure 3).

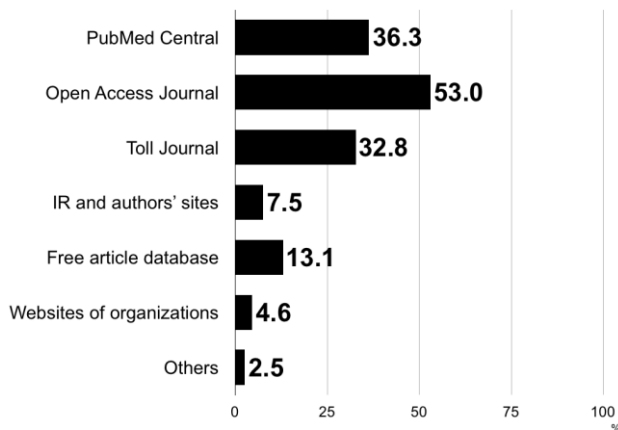


Figure 3. Method of Providing OA (n=986, multiple count)

The majority of the OA articles were available from OAJ (53.0%), the so-called 'Gold Road'. In second position, 36.3% of the OA articles were available from PMC. However, only a few articles were available as "author manuscript" (4.0%). PMC enables journal publishers to archive their contents freely. The percentage of OA articles available via PMC has also increased in comparison with the percentages reported for 2005 and 2007

(26.0% and 28.0%, respectively). This suggests different interpretations as to how the Public Access Policy by the NIH is advancing the status of OA.

A few articles were available in self-archives such as IR or authors' websites (7.5%), the so-called 'Green Road'. The percentage of OA articles available via IR and authors' websites has remained consistently low since 2005.

### DISCUSSION/CONCLUSION

The status of OA has progressed rapidly from 2005 to 2009 (from 27.0% to 51.0%, including restricted OA). Although the number of OA articles via PMC is increasing, the present OA status is mainly supported by OAJ.

### ACKNOWLEDGEMENT

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