



ORIGINAL ARTICLE / *Professional information*

## Academic productivity of French radiology residents: Where do we stand?



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### KEYWORDS

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### Abstract

**Rationale and objectives:** Although medical research by French radiology residents is encouraged, their publication productivity remains unknown. Thus, we aimed to assess and analyze the publication rate of medical theses and the overall academic productivity of radiology residents who graduated in 2009 and 2010.

**Materials and methods:** The list of radiology residents and imaging theses were obtained from the French internet database of university theses. The main characteristics of the theses were recorded and correlated with associated publications identified by scanning the PubMed database. All other publications by French radiology residents not related to the theses were also obtained, described and compared to published theses.

**Results:** Seventy-nine out of 224 (35.3%) medical theses written by French radiology residents in 2009 and 2010 were transformed into articles published in Medline-indexed journals. Residents were first authors in 69% (60/87) of these articles. The factors associated with publication of the thesis were a prospective design ( $P=0.01$ ) and the publication as a first author of an original study not related to the thesis ( $P=0.01$ ). Seventy-one percent of the residents had published at least one other article, including 36.6% as first authors.

**Conclusion:** Academic productivity of French radiology residents is high thanks to published theses and other articles.

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In France, residents must defend a medical thesis at the end of their residency to obtain the title of medical doctor. Residents with a medical specialty must also defend a report in their academic specialization to become a specialist. Thus, each French radiology resident must conduct at least two academic studies during their 5 year-residency to graduate. These studies, whose goal is to introduce residents to clinical or experimental research, are very different from daily clinical practice. It is interesting to note that, research methodology is currently only taught in a single training session during the residency, and historically the academic medical authorities did not request publication.

Recently, the French Academic College of Radiology (collège des enseignants de radiologie de France [CERF]) has addressed this issue and decided that submission to a peer-review journal should be mandatory before defense of the medical specialization report. Although the total number of new residents who have begun a radiology residency program has rapidly increased from 166 in 2010 to 240 in 2014, the number of academic radiologists has remained stable. Thus, supervising the studies by all these additional residents will be challenge, especially if publication and not only submission of these studies, becomes mandatory by the CERF in the near future.

Nevertheless, this submission process is still not mandatory for the medical thesis. Thus if students produce their thesis for purely administrative reasons, it is difficult to evaluate the individual academic benefit of this experience. Besides being an indicator of the scientific quality of the study, and/or the dynamism of the team they are working with, publication of the medical thesis in indexed peer-review journals can also be a sign of the resident's interest in the academic field.

There are no existing studies to date on the publication rate of theses or the overall publication productivity of French radiology residents. Previous studies have reported that the publication rate of medical theses for all French residents was below 20% [1,2]. Thus we felt that it was important to have an overview of the research productivity of French radiology residents.

The aim of this study was to assess and analyze the publication rate of medical theses and the overall publication productivity of radiology residents who graduated in 2009 and 2010.

## Materials and methods

### Identification of residents and theses

The list of all radiology residents who had defended their medical thesis in 2009 and 2010, and if available the title of their medical thesis, was obtained from the CERF. To complete this list, we performed a cross-check on the national internet database of university theses ([www.sudoc.abes.fr](http://www.sudoc.abes.fr)), and searched for all medical theses on imaging during the same period. The title and abstract of the medical theses were available on the website. To make sure that all the theses on imaging were published by radiology residents, we checked their medical specialty at the French National Medical Council (Conseil national de l'ordre des

médecins [CNOM], <http://www.conseil-national.medecin.fr/annuaire>). All theses defended by non-radiologists residents were excluded. The year the thesis was defended (2009 or 2010) was also recorded.

### Identification of residents' publications

Publication in Medline-indexed journals was identified by scanning the PubMed database (<http://www.ncbi.nlm.nih.gov/pubmed/>) using the last name and the initial letter of the first name of the resident. For women, the married name was also used when known.

First, we checked if the medical theses were published in Medline-indexed journals, comparing the titles and the abstracts of the articles with the theses. We then recorded all other articles published by each resident over a period ranging from 5 years before the defense of the medical thesis to 3 years after the defense of the thesis (from January 2004 to December 2012 for medical theses defended in 2009, and from January 2005 to December 2013 for medical theses defended in 2010). To avoid mistakes from homonyms, we checked the affiliation (France or city), and the topic of the publication (imaging or not).

### Theses and publications characteristics

All identified medical theses and publications were analyzed by two radiology residents (GC and VDR). For each individual medical thesis or publication, the following items were recorded: a radiological subspecialty (e.g. neuroradiology, abdominal and digestive imaging... as defined by the French Society of Radiology), diagnostic or interventional radiology, the main modality of imaging (i.e. plain radiography, ultrasound (US), computed tomography (CT), magnetic resonance imaging (MRI), nuclear medicine, and multimodal imaging when different imaging techniques were used), human, technical or animal study, retrospective or prospective design, the type of report (i.e. case report, case series, review, original article, or letter).

The following items were also recorded for each publication: the ranking of the resident among the authors and the total number of authors, the name of the journal, the language of the journal, the year of publication, and the impact factor of the journal according to the Thompson Reuters Journal Citation Report® on the date of publication. For articles published in 2013 and 2014, the 2012 impact factor was considered and if a journal had no associated impact factor, it was assigned a value of zero.

For journal ranking, we used SIGAPS software which is a bibliometric system developed in France to analyze Medline-indexed publications [3,4]. This tool is used for bibliometric activity-based funding of French hospitals. Journals are ranked on a six level quality scale (A, B, C, D, E and not ranked) derived from the impact factors of the journal compared to others in the same medical or scientific specialty.

### Statistical analyses

Values are expressed as means and standard deviations, or medians and interquartile ranges, and percentages, as appropriate. The Chi<sup>2</sup> or Fisher exact test was used for the comparison of categorical variables. The Mann–Whitney

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