SCIENCE PHOTONS Publishers

Research Article

Innovative Insights in Digital Health

Trends in Artificial Intelligence-Based Publications in Radiology (2022-2026)

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Received Date: 21 Jan 2026;
Accepted Date: 08 Feb 2026;
Published Date: 11 Feb 2026.

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Citation: Som Biswas. Trends in Artificial Intelligence-Based Publications in Radiology (2022-2026). Innov Insights Digit Health. 2026; 2(1): 1-3.

ABSTRACT

***Objective:**. The purpose of this study is to evaluate the global trend in artificial intelligence (AI)-based research productivity involving radiology and its subspecialty disciplines.*

***Conclusion:** The United States is the global leader in AI radiology publication productivity, accounting for almost half of total radiology AI output. Other countries have increased their productivity. Notably, China has increased its productivity exponentially to close to 40% of all AI publications. The top three most productive radiology subspecialties were neuroradiology, body and chest, and nuclear medicine.*

***Keywords:** Artificial Intelligence, Radiology, Bibliometric Analysis, Global Research Trends, Machine Learning, Medical Imaging*

Introduction

In recent years, there has been an explosion in the growth of artificial intelligence (AI) research, particularly in the engineering, biotechnology, and medical industries [1]. In the field of medicine, radiology lends itself to AI research because of its large digital data sets [2]. In response, the radiology community has largely embraced AI research, as has been shown by the growing number of publications focusing on such research and the attention it has been given at large radiology society meetings [3]. Despite the burgeoning nature of the field, little is known about the global trend in radiology AI research. The purpose of this study was to perform a large database query to evaluate the global trend in AI research productivity involving the field of radiology and its subspecialties.

Materials and Methods

All publication searches were performed using a comprehensive central database (Web of Science Core Collection, Clarivate Analytics) that searches the world's leading scholarly journals and proceedings in the sciences and includes the MEDLINE and PubMed databases. From 2022 to 2026, all AI-related publications were selected using the following search terms: "artificial intelligence," "AI," "CNN," "CNNs," "ANN," "ANNs," "neural network," "neural networks," "machine learning," "deep learning," "computer learning," "support vector machine," "support vector machines," "Bayesian network," "Bayesian networks," "cluster analysis," "feature learning," "feature extraction," and "principal components analysis." Radiology-specific AI research was selected using the predefined database category "Radiology Nuclear Medicine Medical Imaging." The resulting publication database was then categorized by country of origin, funding agencies, organizations, publication type, and journal. Nine radiology subspecialty publications were evaluated using the following search terms. The chest and body terms were "chest," "body," "lungs," "lung," "kidney," "renal," "liver," "hepatic," "gallbladder," "biliary," "pancreas," "pancreatic," "peritoneum," "peritoneal," "gyn," "gynecologic," "uterus," "uterine," "ovary," "ovarian," "prostate," "prostatic," "splenic," "spleen," "intestine," "intestinal," "colon," "colonic," "appendix," "appendiceal," "stomach," "gastric," "testes," "testicular," "rectum," and "rectal." The musculoskeletal terms were "bone," "musculoskeletal," "osseous," "joint," "muscle," "skeletal," and "spine." The pediatrics terms were "pediatric," "child," and "children." The neuroradiology terms were

"brain," "neuro," and "CNS." The breast term was "breast." The nuclear medicine terms were "PET," "labeled," "FDG," "radionuclides," "radiopharmaceuticals," and "technetium." The cardiac terms were "cardiac" and "heart." The interventional terms were "intervention" and "interventional." The emergency terms were "emergency," "trauma," and "traumatic".

The global trend in the number of AI publications from 2022 to 2026, including contributing countries, was determined by linear and nonlinear regression analyses performed using a statistical software program; $p \leq 0.05$ was considered significant.

Results

Our bibliometric analysis yielded 23,800 radiology AI publications worldwide from 2022 to 2026. The global growth trend in AI research was exponential ($p < 0.0001$; Figure 1). The top 10 most productive countries were the United States, China, Germany, the United Kingdom, Canada, Japan, The Netherlands, France, India, and Australia. The United States had the highest AI publication output, accounting for approximately 35–50% of the total output. China was the second most productive country in the world, contributing 40% of the total output in 2025.

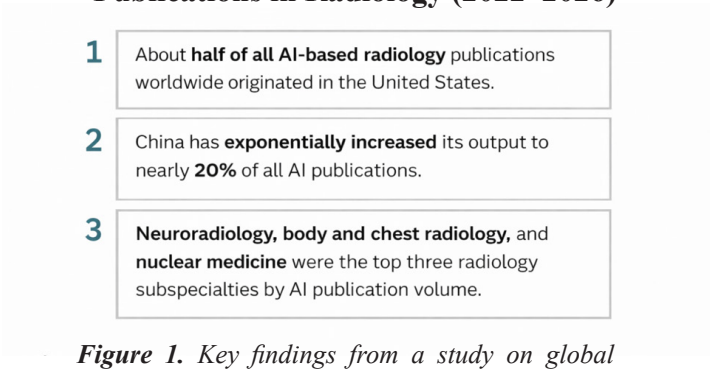

Figure 1. *Key findings from a study on global trends in artificial intelligence-based radiology publications from 2022 to 2026.*

The four countries that served as the top funding sources for radiology AI publications from 2022 to 2026 were the United States (50%), China (40%), the United Kingdom (4 %), and Canada (2%). The top funding sources in the United States included the National Institutes of Health (NIH; public source), the National Cancer Institute, and the National Science Foundation (public source). In China, the top funding sources included the National Natural Science Foundation of China (public source) and the National Science Foundation of China (public source). In the United Kingdom, the top funding sources included the Medical Research Council (public source) and the Wellcome Trust (private nonprofit source). In Canada, the top funding sources included the Canadian Institute of Health Research (public source). The top three organizations in research productivity were were from the United States (the University of California system, the NIH, and Harvard University). Other top organizations from other countries included the University of London (United Kingdom), Institut National de la Santé et de la Recherche Médicale (France), the Chinese Academy of Science (China), the Helmholtz Association (Germany), Radboud University Nijmegen (The Netherlands), the University of Toronto (Canada), and Seoul National University (South Korea).

The types of publications identified most often were articles (65%), proceedings papers (20%), and meeting abstracts (15%). The journals in which these were published most frequently were NeuroImage (16.1%), IEEE Transactions on Medical Imaging (6.9%), and Medical Physics (6.9%). The subspecialties with the most AI-relat ed publications were neuroradiology (24.4%), chest and body (20.7%), nuclear medicine (13.0%), and breast imaging (12.0%).

Discussion

There has been an exponential growth worldwide in AI radiology research, led by the United States, which produces almost half of global AI research. This is not surprising given that the United States also has the most funding sources for AI research. Most U.S. funding has come from large government funding agencies, including the institutes and centers at the NIH; however, the United States has a diverse portfolio of funding that includes both governmental and nongovernmental agencies. With such strong support for AI radiology research, the United States is home to the three institutions of highest publication productivity. Although the United States has been the global leader, several other countries have become increasingly significant contributors to AI radiology research. Of note, China has increased its productivity exponentially, from less than 5% to close to 40% of all AI publications. China's ability to exponentially increase productivity is likely due to the country's unique research infrastructure. The availability of large centralized data and rapid implementation across commercial industries have already helped the nation become very productive in AI research in a short period [4]. In addition, Chinese government directives and funding for the advancement of AI have generated an incredible mobilization in research and development among Chinese researchers [4]. The neuroradiology subspecialty produced the most AI publications in this study. This is not surprising, given that neuroradiology is a unique subspecialty of acuity, where "time is brain" for stroke evaluation demands fast and accurate diagnoses suitable for AI applications. In addition to tumor assessment, a common AI application shared with other subspecialties, other neurologic disease processes, including psychiatric disorders, traumatic brain injury, demyelinating diseases (multiple sclerosis), and dementia (Alzheimer disease), are well matched for AI applications [5]. Further investigation is needed to better understand the nuances of AI radiology research within neuroradiology and other radiology subspecialties. A major limitation of this study is likely underestimation of total AI research productivity using a single search engine, even though it includes well-established databases such as PubMed and MEDLINE. In addition, the proprietary "Radiology Nuclear Medicine Medical Imaging" category likely would have excluded relevant studies that were presented at non–radiology-specific meetings and published in non–radiology-specific journals that did meet the preset criteria. Two oth-

er factors added to the underestimation of the total AI research productivity: Studies from the arXiv.org web-site (an important source of AI research) were not part of the search query, and private for-profit entities that sponsor medical AI research (including medical imaging research) tend not to publish their findings. Despite these areas contributing to underestimation of the absolute number, we believe our bibliometric analysis still provides valuable insight into the global trend of AI radiology research. Other limitations include the fact that our analysis does not account for quality of publications and the fact that metrics such as impact factor were not considered. In addition, funding sources were evaluated by the number of publications produced rather than by the monetary amount given. Although productivity can be used as a marker for funding, it does not truly reflect the amount of money allocated toward research. Exponential growth in AI radiology research has occurred worldwide, with the United States leading overall AI research productivity. China has made the second biggest contribution, largely driven by unique research infrastructure ideal for AI research and significant government funding support. The future success of the United States will depend on continued government funding and prioritization of AI radiology research within the research community.

Conflicts of Interest

The authors declare no conflict of interest and received no specific funding for this work.

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