



A Bibliometric Analysis of the 100 Most Influential Papers in Radiation Oncology: Mapping A Decade of Scientific Progress

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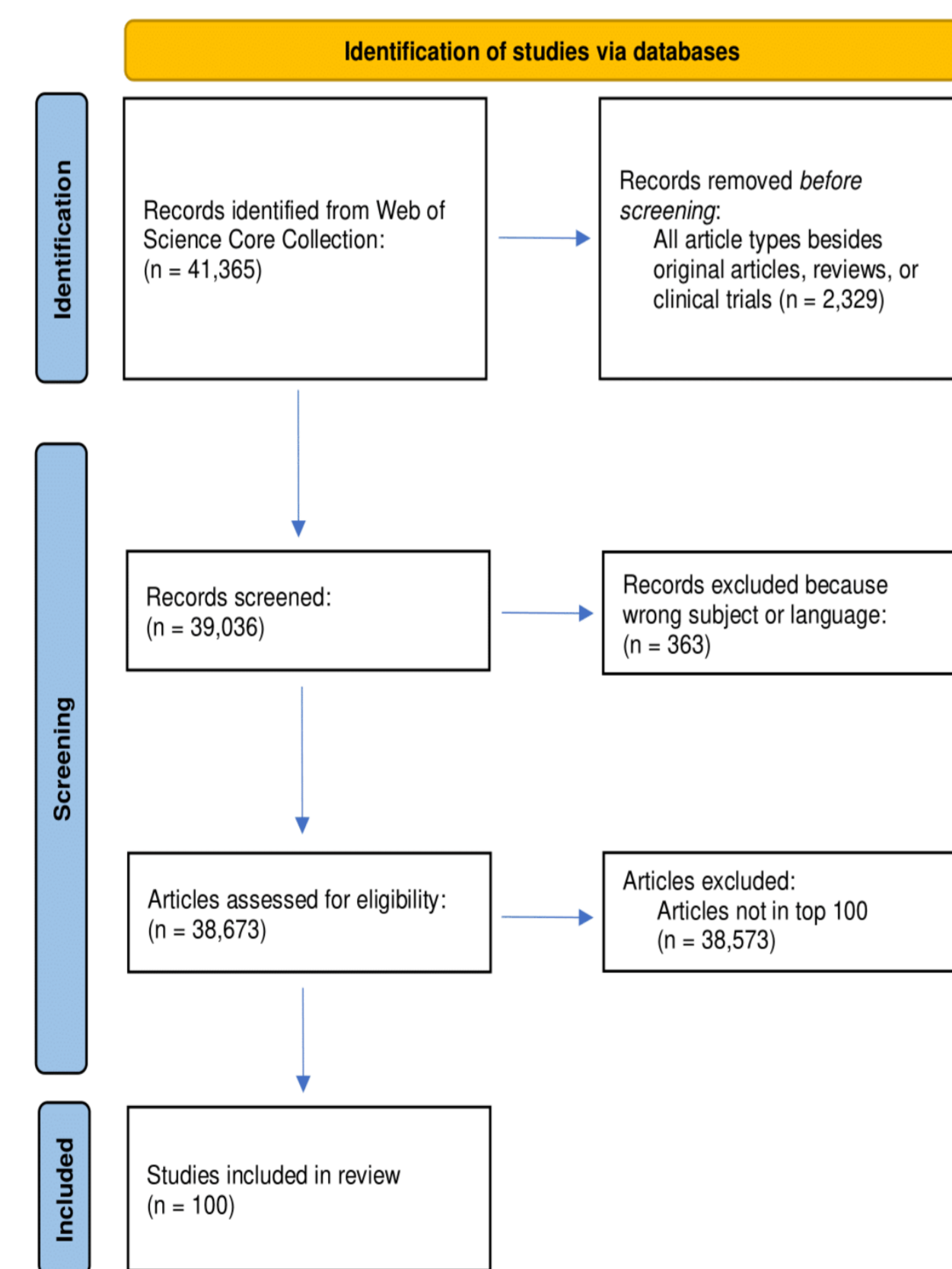
REDISCOVERING RADIATION MEDICINE AND EXPLORING NEW INDICATIONS

PURPOSE / OBJECTIVES

- Over the past decade, radiation oncology has evolved significantly through technological innovations, improved understanding of radiobiology, and integration with novel therapeutic approaches.
- Paradigm shifts have occurred with adoption of Intensity Modulated Radiation Therapy (IMRT), Stereotactic Body Radiotherapy (SBRT), and particle beam therapy such as proton beam therapy (PBT)
- Other advances including the emergence of immunotherapy and its synergistic potential with radiation have opened new therapeutic frontiers
- Bibliometric analysis serves as a tool for understanding the evolution and impact of scientific research
- This study analyzes the 100 most-cited radiation oncology papers from the past ten years to identify influential research patterns and guide future directions.

MATERIAL & METHODS

- The Web of Science Core Collection (WoSCC) database was selected as the primary data source for this comprehensive bibliometric analysis
- The search was conducted on October 15, 2024, covering publications from January 1, 2014, to January 15, 2024.
- The main search string was as follows: (TI = (radiotherapy OR radiation oncology OR radiation treatment OR radiation therapy OR radiation OR chemoradiation OR chemoradiotherapy OR radiotherapeutic OR radiosurgery OR proton therapy OR particle therapy OR photon therapy OR sort OR stereotactic OR idei OR igtb OR vast OR brachytherapy OR radiotherapy techniques OR dosimetric analysis OR radiation dosimetry OR radiation therapy outcomes OR radiotherapy complications)) AND (TI = (cancer OR carcinoma OR neoplasm OR malignancy OR tumor OR oncology)).
- To ensure comprehensive capture of relevant literature while maintaining specificity, additional filters were applied: Language restriction to English publications; Document types limited to original research articles, reviews, and clinical trials, excluding letters, editorials, and conference proceedings to focus on substantial research; Restriction to peer-reviewed journals indexed in WoSCC, ensuring quality control.



RESULTS

- A total of 100 papers met the inclusion criteria for this bibliometric analysis, representing the most highly cited publications in radiation oncology from 2014 to 2024. Collectively, the papers accumulated 70,986 citations, with the highest-cited paper receiving 3,256 citations and the least-cited among them still achieving a substantial 389 citations. The median citation count stood at 556, reflecting the overall high impact of these publications within the field.

The highest impact radiation oncology manuscripts of 2014-2024 were in the themes of immunotherapy, cancer biology, clinical trials, and hypofractionation

RESULTS

Table 1: Top 25 Cited Studies in Radiation Oncology 2014-2024

Rank	Title	Citations	Year	First Author	Journal	DOI
1	Durvalumab after Chemoradiotherapy in Stage III Non-Small-Cell Lung Cancer	3256	2017	SJ Antonia	New England Journal of Medicine	10.1056/NEJMoa1709937
2	10-Year Outcomes after Monitoring, Surgery, or Radiotherapy for Localized Prostate Cancer	2035	2016	FC Hamdy	New England Journal of Medicine	10.1056/NEJMoa1606220
3	Radiation and dual checkpoint blockade activate non-redundant immune mechanisms in cancer	1969	2015	C Twyman-Saint Victor	Nature	10.1038/nature14292
4	Neoadjuvant chemoradiotherapy plus surgery versus surgery alone for oesophageal or junctional cancer (CROSS): long-term results of a randomised controlled trial	1903	2015	J Shapiro	The Lancet Oncology	10.1016/S1470-2045(15)00406-6
5	Effect of radiotherapy after mastectomy and axillary surgery on 10-year recurrence and 20-year breast cancer mortality: meta-analysis of individual patient data for 8135 women in 22 randomised trials	1692	2014	P McGale	The Lancet	10.1016/S0140-6736(14)60488-8
6	STING-Dependent Cytosolic DNA Sensing Promotes Radiation-Induced Type I Interferon-Dependent Antitumor Immunity in Immunogenic Tumors	1616	2014	L Deng	Immunity	10.1016/j.immuni.2014.10.019
7	Standard-dose versus high-dose conformal radiotherapy with concurrent and consolidation carboplatin plus paclitaxel with or without cetuximab for patients with stage IIIA or IIIB non-small-cell lung cancer (RTOG 0617): a randomised, two-by-two factorial phase 3 study	1597	2015	JD Bradley	The Lancet Oncology	10.1016/S1470-2045(14)71207-0
8	The tumour microenvironment after radiotherapy: mechanisms of resistance and recurrence	1585	2015	HE Barker	Nature Reviews Cancer	10.1038/nrc3958
9	Stereotactic ablative radiotherapy versus standard of care palliative treatment in patients with oligometastatic cancers (SABR-COMET): a randomised, phase 2, open-label trial	1337	2019	DA Palma	The Lancet	10.1016/S0140-6736(18)32487-5
10	Radiation therapy or surgery of the axilla after a positive sentinel node in breast cancer (EORTC 10981-22023 AMAROS): a randomised, multicentre, open-label, phase 3 non-inferiority trial	1337	2014	M Donker	The Lancet Oncology	10.1016/S1470-2045(14)70460-7
11	DNA exonuclease Trex1 regulates radiotherapy-induced tumour immunogenicity	1301	2017	C Vangouille-Box	Nature Communications	10.1038/ncomms15618
12	Ipilimumab versus placebo after radiotherapy in patients with metastatic castration-resistant prostate cancer that had progressed after docetaxel chemotherapy (CA184-043): a multicentre, randomised, double-blind, phase 3 trial	1284	2014	ED Kwon	The Lancet Oncology	10.1016/S1470-2045(14)70189-5
13	Stereotactic ablative radiotherapy versus lobectomy for operable stage I non-small-cell lung cancer: a pooled analysis of two randomised trials	1196	2015	JY Chang	The Lancet Oncology	10.1016/S1470-2045(14)70168-3
14	Prostate-specific membrane antigen PET-CT in patients with high-risk prostate cancer before curative-intent surgery or radiotherapy (proPSMA): a prospective, randomised, multicentre study	1193	2020	MS Hofman	The Lancet	10.1016/S0140-6736(20)30314-7
15	Patient-Reported Outcomes after Monitoring, Surgery, or Radiotherapy for Prostate Cancer	959	2016	JL Donovan	New England Journal of Medicine	10.1056/NEJMoa1606221
16	Conventional versus hypofractionated high-dose intensity-modulated radiotherapy for prostate cancer: 5-year outcomes of the randomised, non-inferiority, phase 3 CHHIP trial	938	2016	D Deamaley	The Lancet Oncology	10.1016/S1470-2045(16)30102-4
17	Radiotherapy to the primary tumour for newly diagnosed, metastatic prostate cancer (STAMPEDE): a randomised controlled phase 3 trial	886	2018	CC Parker	The Lancet	10.1016/S0140-6736(18)32486-3
18	Short-course radiotherapy followed by chemotherapy before total mesorectal excision (TME) versus preoperative chemoradiotherapy, TME, and optional adjuvant chemotherapy in locally advanced rectal cancer (RAPIDO): a randomised, open-label, phase 3 trial	884	2021	RR Bahadoer	The Lancet Oncology	10.1016/S1470-2045(20)30555-6
19	Radiotherapy plus cetuximab or cisplatin in human papillomavirus-positive oropharyngeal cancer (NRG Oncology RTOG 1016): a randomised, multicentre, non-inferiority trial	884	2019	ML Gillson	The Lancet	10.1016/S0140-6736(18)32779-X
20	Previous radiotherapy and the clinical activity and toxicity of pembrolizumab in the treatment of non-small-cell lung cancer: a secondary analysis of the KEYNOTE-019 phase 1 trial	866	2017	N Shaverdian	The Lancet Oncology	10.1016/S1470-2045(17)30380-7
21	The role of ferroptosis in ionizing radiation-induced cell death and tumor suppression	784	2020	G Lei	Cell Research	10.1038/s41422-019-0263-3
22	Effect of Chemoradiotherapy vs Chemotherapy on Survival in Patients With Locally Advanced Pancreatic Cancer Controlled After 4 Months of Gemcitabine With or Without Erlotinib The LAP07 Randomized Clinical Trial	775	2016	P Hammel	JAMA	10.1001/jama.2016.4324
23	Open versus laparoscopic surgery for mid-rectal or low-rectal cancer after neoadjuvant chemoradiotherapy (COREAN trial): survival outcomes of an open-label, non-inferiority, randomised controlled trial	762	2014	SY Jeong	The Lancet Oncology	10.1016/S1470-2045(14)70205-0
24	Induction chemotherapy plus concurrent chemoradiotherapy versus concurrent chemoradiotherapy alone in locoregionally advanced nasopharyngeal carcinoma: a phase 3, multicentre, randomised controlled trial	729	2016	Y Sun	The Lancet Oncology	10.1016/S1470-2045(16)30410-7
25	Outcomes of Observation vs Stereotactic Ablative Radiation for Oligometastatic Prostate Cancer: The ORIOLE Phase 2 Randomized Clinical Trial	726	2020	R Phillips	JAMA Oncology	10.1001/jamaoncol.2020.0147

Figure 1 Research Theme and Citation Density Analysis

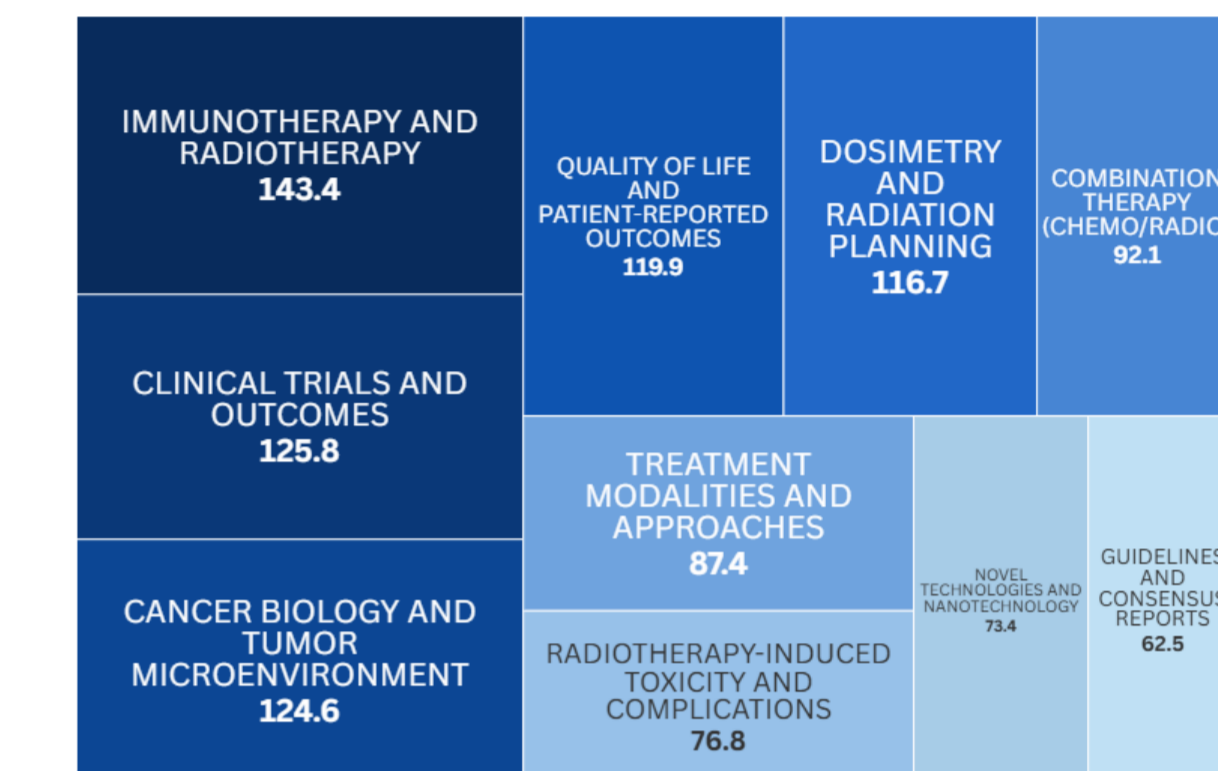


Figure 2: Geographic distribution of radiation oncology research output

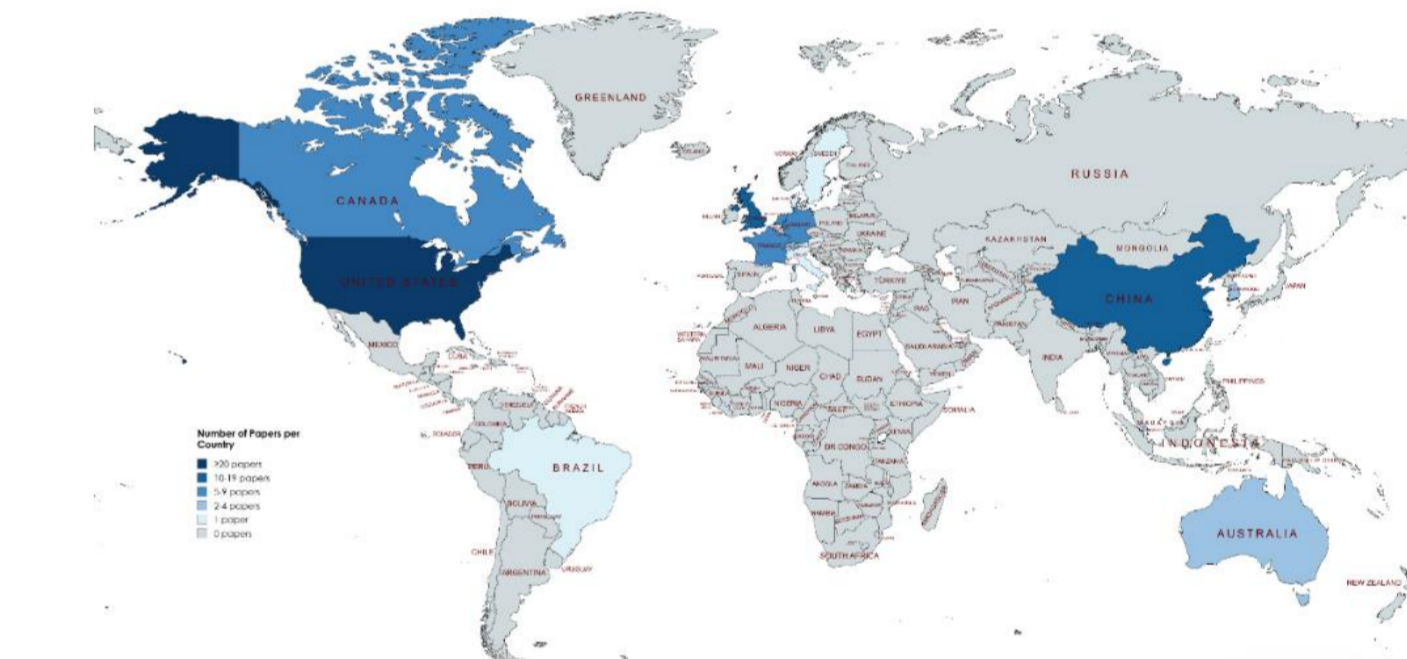
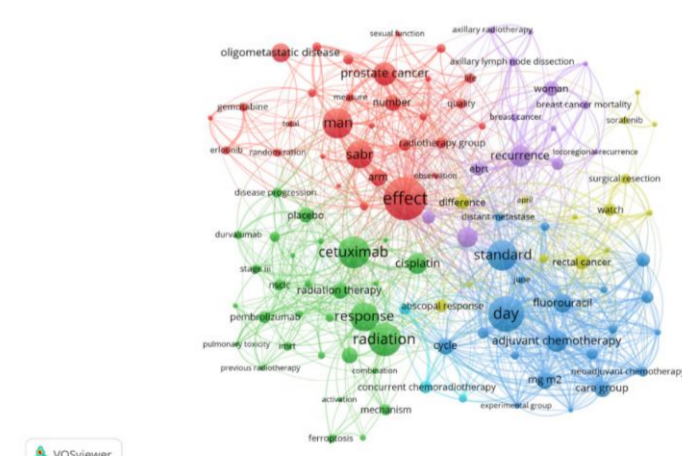


Figure 3: Keyword Co-Occurrence Network in Radiation Oncology Research



SUMMARY / CONCLUSION

- The 100 most-cited radiation oncology papers coalesced around biologic integration and precision delivery
- Influence was clinical trials-driven and concentrated in immunotherapy-radiotherapy combinations
- Highest visibility were in general medical journals