**Administrative Information**

**Title:**

Medical Oncology Education for Medical Students – Where do we stand? A scoping review protocol for updating a literature review

**Registration:**

Our protocol was drafted using the Preferred Reporting Items or Systematic Reviews and Meta-analyses Protocol (PRISMA-P).1 All authors reviewed the protocol prior to completion. The protocol will be registered to Northwestern University’s DigitalHub.

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**Author Contributions:**

JT, JWF, and JRF are the leads for protocol development, literature review, and manuscript writing with mentorship and assistance from a faculty member who will later be determined. DN is the research librarian assisting with search strategy formulation and literature search conduction with JT, JWF, and JRF. All listed contributors will contribute to interpretation of data, manuscript writing, and approval of the final manuscript.

**Amendments:**

All relevant amendments to the protocol will be documented with date, description of amendment, and rationale for change as needed during the study period.

**Support:**

This scoping review will not require a formal funding source.

**Introduction**

**Rationale:**

Cancer is a top cause of death in multiple countries and some estimates predict that cancer will become the number one cause of premature death in most countries, surpassing cardiovascular disease in the coming century.2 Oncology diagnosis and treatment is a rapidly evolving field, which requires parallel innovation in medical student education and training in oncology. Oncology may be relatively lacking in medical school curricula and requires a patient centered, longitudinal learning approach throughout stages of training.3

The most extensive previous literature review was completed by Gaffan et al4 and covered literature from 1993-2004. An updated literature review by Ha et al5 highlighted key takeaways from the entire body of oncology education literature. While this study has advanced our understanding of current and novel topics in medical oncology education, this work included radiation oncology specific literature and did not include an extensive reporting of key recent articles as completed by Gaffan et al.

Understanding the current state of medical oncology education is critical to evaluating curricula worldwide and creating evidence-based teaching methods for future generation of physicians. A comprehensive, up to date review of the medical oncology literature over the last 18 years of literature specific to medical oncology would contribute substantially contribute to current curriculum evaluation at medical schools worldwide.

**Objectives:**

The objective of our article is to systematically review the last 18 years (Aug. 1, 2004 – present) of medical oncology education literature for undergraduate medical students regarding teaching interventions in a variety of key skills including cancer pathophysiology, physical exam, diagnostic testing, treatment, communication skills, and screening and prevention. Our goal is to provide succinct, accessible, and current information on medical oncology education that will inform design of curricula and inspire future teaching innovation and study.

**Methods**

The PRISMA-ScR checklist will be used to ensure a rigorous review6. Independent reviewers will perform eligibility decisions using an online digital review program, Rayyan, for assistance.7 Data extraction will be performed by the research team. Data from selected studies will be extracted and qualitatively summarized.

**Eligibility Criteria:**

* Inclusion:
  + Population: Undergraduate medical student education - preclinical and clinical
  + Intervention/outcomes: Oncology education teaching interventions and student performance/knowledge before and after intervention (e.g. detection of breast masses, knowledge assessments [test scores] after a teaching course) regarding topics including oncology courses (e.g. pathophysiology), physical exam/detection, treatment, communication skills, screening and prevention, extracurricular groups
  + Type of studies: Descriptive studies with before and after intervention data, cohort studies, intervention/control or randomized controlled trials, qualitative and narrative studies
  + Peer-reviewed literature
  + Location: Any country of origin if translated to English and meets other criteria
  + Dates: August 2004 – Present
* Exclusion:
  + Any medical training where the undergraduate medical students are not the object of the training - resident, fellow, etc training (residents and fellows teaching medical students are included)
  + Gray literature
  + Topic of article: radiation oncology, palliative care not related to oncology
  + No evaluation of data or intervention

**Information Sources:**

We will search the following databases:

* Medline ( Ovid)
* EMBASE
* Cochrane Library
* Education Resources Information Center (ERIC)
* Scopus
* MedEd Portal

**Search Strategy:**

Search terms and strategies will be developed closely with an experienced librarian. The search strategy will combine keywords and controlled vocabulary terms for undergraduate medical education, curriculum, and medical oncology. We will develop the search in Medline (OVID) and adapt it to the pre-specified databases. We will search each database from the year 2004 to the present. We will review the reference list of included studies for relevant citations. A draft of our search strategy created in Medline (OVID) is provided below:

|  |  |  |
| --- | --- | --- |
| Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions <1946 to October 25, 2022> | | |
|  |  |  |
| 1 | exp Education, Medical/ | 181678 |
| 2 | \*Education, Medical, Undergraduate/ | 21074 |
| 3 | (medical adj3 education).ti,ab. | 53566 |
| 4 | 1 or 2 or 3 | 202564 |
| 5 | \*Clinical Clerkship/ | 4366 |
| 6 | (Clinical and (clerkship or teach\* or rotation\* or education)).ti,ab. | 158287 |
| 7 | 5 or 6 | 160660 |
| 8 | exp Students, Medical/ | 41703 |
| 9 | \*"Internship and Residency"/ | 43011 |
| 10 | (medical adj3 (Intern\* or residen\* or student)).ti,ab. | 27185 |
| 11 | 8 or 9 or 10 | 98935 |
| 12 | \*Hospitals, Teaching/ | 7671 |
| 13 | (teaching and (hospital\* or round\*)).ti,ab. | 65296 |
| 14 | 12 or 13 | 68933 |
| 15 | 4 or 7 or 11 or 14 | 406463 |
| 16 | exp Curriculum/ | 95955 |
| 17 | exp Education, Distance/ | 6224 |
| 18 | (Curriculum or education or pedagogy or "competency based education" or "high fidelity simulation training" or "electronic learning" or "distance education" or "problem based learning" or "simulation training" or "patient simulation").ti,ab. | 567269 |
| 19 | 16 or 17 or 18 | 610416 |
| 20 | exp Medical Oncology/ | 28658 |
| 21 | (oncology and (clinical or medical or psych\* or surgical or gyne\* or geriatric or hematolog\* or neuro\* or thoracic or urolog\* or pediatric)).ti,ab. | 79444 |
| 22 | 20 or 21 | 97180 |
| 23 | exp Neoplasms/ | 3752501 |
| 24 | (Tumor\* or Neoplasm\* or Neoplasia\* or Cancer\* or "malignant Neoplasm" or Malignancy).ti,ab. | 3226803 |
| 25 | 23 or 24 | 4710421 |
| 26 | 22 and 25 | 81237 |
| 27 | 15 and 19 and 22 | 3225 |
| 28 | 15 and 19 and 26 | 2249 |
| 29 | 27 or 28 | 3225 |
| 30 | limit 29 to yr="2004 -Current" | 2509 |

**Study Records:**

* **Data Management:** Study citations discovered will be managed with EndNote and made accessible to the reviewers. Rayyan will be used for assistance with results as well as title, abstract and full text review management.7 This will also be used to aid in creation of the PRISMA flow diagram.8
* **Selection Process:** Reviewers will independently screen titles and abstracts against the inclusion and exclusion criteria. Reviewers will then have full texts made accessible for more detailed evaluation. Each reviewer will review all papers and any disagreements among reviewers will be discussed to ensure consensus. JRF will serve as tie breaker where consensus is not reached. Reviewers will record reasons for exclusion of each paper.
* **Data Collection Process:** Reviewers will independently record data from each selected publication using standardized forms and/or tables. Key data abstracted from each study will include study type, topic, number of participants, intervention, outcome measure, and outcome. To ensure consistency across reviewers and decrease extraction error rates, a pilot of data collection forms will be conducted. Disagreements in data recorded will be resolved by discussion.

**Data items:**

We plan to extract the study type (cohort, randomized controlled trial, etc), topic (oncology courses, screening and prevention, diagnostic testing, examination skills, communication skills), participant number, intervention, outcome measure, and outcome from each of the publications that meet inclusion criteria and are not excluded.

**Data synthesis:**

Data will be summarized in table format of the above data items and summarized qualitatively.

**References**

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2. Bray F, Laversanne M, Weiderpass E, Soerjomataram I. The ever-increasing importance of cancer as a leading cause of premature death worldwide. *Cancer*. Aug 15 2021;127(16):3029-3030. doi:10.1002/cncr.33587

3. McRae RJ. Oncology Education in Medical Schools: Towards an Approach that Reflects Australia's Health Care Needs. *J Cancer Educ*. Dec 2016;31(4):621-625. doi:10.1007/s13187-016-1088-0

4. Gaffan J, Dacre J, Jones A. Educating undergraduate medical students about oncology: a literature review. *J Clin Oncol*. Apr 20 2006;24(12):1932-9. doi:10.1200/jco.2005.02.6617

5. Ha FJ, Parakh S. Novel Approaches To Undergraduate Oncology Education. *J Cancer Educ*. Jun 2018;33(3):500-504. doi:10.1007/s13187-016-1109-z

6. Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med*. Oct 2 2018;169(7):467-473. doi:10.7326/m18-0850

7. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan-a web and mobile app for systematic reviews. *Syst Rev*. Dec 5 2016;5(1):210. doi:10.1186/s13643-016-0384-4

8. PRISMA. PRISMA transparent reporting of systematic reviews and meta-analyses. Accessed September 1, 2022. [www.prisma-statement.org](file:///C:\Users\dan5319\Downloads\www.prisma-statement.org)