Cancer research is evolving worldwide. However, publishing high-quality academic literature in oncology remains challenging for authors in the developing world. Young oncologists in low- and middle-income countries experience several barriers including lack of funding and research facilities, as well as inadequate training. Publication best practices, science integrity, and ethics are required to improve oncology research quality and therefore, improve patients’ care in these countries. To achieve this goal, we propose some basic principles and tools that may help young oncologists especially in developing countries overcome these issues and boost their academic careers.

INTRODUCTION

Research in oncology is a highly active field with more than 1 million papers published in the past 5 years alone, as clearly shown by the US National Library of Medicine Pubmed/Medline database.1 Notably, the largest part of this progress has been achieved in high-income countries. By 2030, it is expected that cancer will be the primary cause of death in low- and middle-income countries (LMICs).2 Promisingly, there is an enthusiastic movement among these developing countries to enhance scientific production in this field, but it is still facing big challenges, particularly regarding the shortage of the oncology workforce. Moreover, health researchers in these settings are markedly under-represented and there is a significant inequity regarding publications in leading medical journals compared with authors from high-income countries.3-5 Several well-documented factors have an influential impact on the poor production of oncology research papers in developing countries, including barriers to accessing oncology literature, inadequate training in research, lack of or poor mentorship, and rare international partnerships.5,6 Moreover, these authors are under-represented because of the competition of well-trained researchers from high-income countries and low financial support allowed for research in their affiliations. There is also a growing attitude among these authors to publish their cancer research with predatory publishers instead of reputed journals.7,8 Therefore, young oncologists in these countries should have access to optimal guidance as they might have a significant contribution to the global knowledge pool in oncology. Improving publication quality requires ethical standards and basic principles, as well as research integrity good practices. In this perspective, we discuss these critical emerging issues together and provide some practical principles that early-career cancer researchers from developing countries have to follow to improve the quality of their research. This is anticipated to potentially advance their academic expertise. We believe that this paper will provide useful guidance for curricular development in these settings with limited resources, and therefore, improve cancer control.

PRACTICAL TOOLS AND GUIDELINES

Always Get Approval From an Ethics Committee Before Conducting a Study Involving Human Participants

Lack of ethics committee approval is one of the main limitations for cancer research of authors in LMICs. Researchers should get prior approval for their studies to get more chances of acceptance in reputed oncology journals. Clinical and biomedical researches that include animal models and human participants require an earlier ethics committee approval before starting the study enrollment. According to the Declaration of Helsinki of the World Medical Association, research on human subjects should be clearly formulated in experimental protocols and these should be submitted to independent ethical review boards (ethics committees and institutional review boards) for approval before the study starts. Notably, every participant has to be clearly informed about the different
The tools and guidelines discussed in this paper will certainly help young cancer researchers developing skills for a better career in oncology.
In this perspective, authors should provide accurate and complete reporting of their rationale, methodology, results, their significance for practice, and limitations to maximize objectivity and extrapolation for daily management of patients with cancer. Several reporting guidelines have been developed according to the design of the studies to enhance the completeness and transparency as well as clarity of health research. Enhancing the QUAlity and Transparency Of health Research (EQUATOR) network is a valuable resource for researchers that was developed by several editorial working groups and provides a large and robust database of more than 400 reporting guidelines. This freely available and comprehensive searchable library provides explanations, online training, and guidance for use in several languages to help authors report their findings responsibly. Moreover, the database site contains toolkits for writing and peer-reviewing research for anyone involved in scholarly publishing. Recently, the EQUATOR has developed EQUATOR Oncology that aims to support cancer researchers for high-quality reporting of their research and is recommended for all young oncologists working in clinical investigation. An illustrative example of these guidelines is the Reporting Recommendations for Tumor Marker Prognostic Studies (REMARK) that was developed to address the common issues in studies reporting findings on cancer biomarkers for predicting prognosis. The REMARK checklist consists of 20 items that should be considered when designing, conducting, and writing manuscripts that describe tumor markers. However, despite the implementation of EQUATOR guidelines widely by cancer researchers and journals, they are frequently used inappropriately by authors. Therefore, young oncologists are invited to properly accomplish training on how to use them in their research on the basis of EQUATOR tools before writing their manuscripts for publication.

Table 2 provides a nonexhaustive list of reporting guidelines to be used when writing research.

### Learn the Basics of Evidence-Based Medicine and Biostatistics

The recent development seen in all areas of health care is associated with the rapidly growing field of medical publishing. Clinicians are therefore faced with a huge number of published articles in their field, which makes their use in health care decisions difficult. The so-called evidence-based medicine (EBM) was developed to systematically appraise and apply the current evidence in the context of patients’ condition. EBM is a cornerstone of our daily practice, and this area of clinical research methodology is highly active in oncology. The use of EBM principles in daily oncology care is expected to improve outcomes of patients with cancer. EBM is founded on the critical evaluation of the findings of randomized and controlled clinical trials, their meta-analyses, as well as other study types. Translating the findings of EBM in oncology into our real life is challenging. During residency in medical oncology and related specialties, courses on developing skills in EBM are rarely included in the regular training, particularly in the context of countries with limited resources. Thus,

### Table 1. Recommended Databases Registering Clinical Studies

| Databases             | Web Site                          | Aims                                      |
|-----------------------|-----------------------------------|-------------------------------------------|
| ClinicalTrials.gov*   | https://www.clinicaltrials.gov/   | Registration of interventional and observational studies |
| PACTR*               | https://pactr.samrc.ac.za/        | Registration of interventional and observational studies |
| PROSPERO*            | https://www.crd.york.ac.uk/prospero/ | Registration of protocols for systematic reviews and meta-analyses |
| The research Registry* | https://www.researchregistry.com/ | Registration of all types of research studies |
| ISRCTN*              | https://www.isrctn.com/page/why-register | Registration of clinical trials |
| AsPredicted platform | https://aspredicted.org/          | Preregistration of studies with various research designs |
| OSF initiative*      | https://osf.io/                   | Data repository and hosting of research projects |
| Trialtrove service*  | https://pharmaintelligence.informa.com/products-and-services/data-and-analysis/trialtrove | Registration and monitoring of clinical trials |
| EU Clinical Trials Register | https://www.clinicaltrialsregister.eu/ | Registration of interventional studies |
| INPLASY*             | https://inplasy.com               | Registration of protocols for systematic reviews and meta-analyses |

**Abbreviations:** EU, European Union; INPLASY, International Platform of Registered Systematic Review and Meta-Analysis Protocols; ISRCTN, International Standard Randomised Controlled Trial Number Register; OSF, Open Science Framework; PACTR, Pan African Clinical Trials Registry; PROSPERO, International Prospective Register of Systematic Reviews.

*Free.

*Requires a registration processing fee.
enhancing EBM skills in the training of young oncologists is highly recommended. Several strategies can be adopted, particularly, online-based courses and support. The use of the online COCHRANE training resources is highly recommended to master this area by young oncologists. COCHRANE offers various online courses, a rich documentation on EBM, as well as other tools that can be used for this purpose (see Appendix Table A1 and Table 3). Other essential guides such as the Journal Club of the European Society for Medical Oncology (ESMO) young oncologists’ corner and the ESMO Handbook of Interpreting Oncological Study Publications are good examples of successful tools for young oncologists that desire to be involved in evaluating evidence and learning the basics of evidence-based oncology. The ASCO training resources and its e-learning platform are also beneficial for developing capacities when doing EBM. In addition, the BMJ Best Practice tools and checklists can also be useful when reviewing the evidence on particular topics.

In several oncology publications, statistical reporting is incomplete and important interpretable and actionable data are not provided. Therefore, young researchers should support their manuscripts by a detailed description of statistical approaches used to test their hypotheses as recommended by international EQUATOR-related guidelines. The Statistical Analyses and Methods in the Published Literature guidelines were developed to help scientists report all the required statistical methods for publication in academic journals.

Young oncologists should also learn how to perform basic statistical testing such as associations, correlations, logistic regression, Kaplan-Meier estimation, and especially the Cox hazard proportional model, as this statistic is widely used in cancer research to study time to event data. This will allow them to perform good oncologic studies in their setting with a focus on survival analysis and its associated predictors. They are also encouraged to consult statisticians when writing the design of their studies and also before data collection. This is crucial for testing hypotheses as the expected findings are associated with the initial sample size considerations and the design used. Useful publications and guides on how to understand clinical biostatistics with a particular focus on oncology can be found in Table 4.

Do Not Publish in Predatory Journals
An impressive number of open-access predatory journals and publishers are launched every year as money-collecting machines. They are now well known by their features such as the absence of peer-review, plagiarism tolerance, misleading US-based addresses, confusing indexing and fake high-impact factors, spam invitations, the nearly 100% acceptability rates, fake and unqualified editors, and so on. They basically accept everything without any verification of the contents of the submissions. With their typical e-mails, predatory journals and fake conferences will invite authors to submit their research. In addition, they use attractive names for their fake journals including the terms Canadian, British, American, European, International, etc. to attract the attention of potential authors. These authors, particularly from developing countries with limited training in publishing ethics and
under pressure to publish faster, submit their findings intentionally or unintentionally to predatory journals to boost academic promotion, grant applications, and jobs. This issue has become a bullying crisis that threatens the scientific integrity of research findings. This causes severe damages for young authors in these settings as these for-profit journals publish without proper peer review and therefore their articles are questionable, not credible, and have little scientific impact.35 It is mandatory that oncologists avoid these predatory journals and not accept to be part of their editorial boards. Unfortunately, it has been recently noticed that predatory journals can infiltrate respectable indexing/abstracting databases.8 Therefore, authors should be vigilant when selecting journals for publication. They must always take the needed time to verify the quality of academic journals before submitting

### TABLE 3. Freely Available Sources on EBM Tools

| Tools                        | Web Site Links                                                                 |
|------------------------------|--------------------------------------------------------------------------------|
| COCHRANE Training            | https://training.cochrane.org/handbooks; https://training.cochrane.org/handbook/current |
| ASCO Learning Tool           | https://elearning.asco.org/homepage                                             |
| ASCO Education Portal        | https://www.asco.org/training-education/education-career-resources             |
| ASCO Professional Development Portal | https://www.asco.org/training-education/professional-development             |
| BMJ Best Practice/EBM Tools  | https://bestpractice.bmj.com/info/toolkit/ebm-toolbox                         |
| BMJ Toolkit of Appraisal Checklists | https://bestpractice.bmj.com/info/toolkit/ebm-toolbox/critical-appraisal-checklists |
| CASP Checklists              | https://casp-uk.net/casp-tools-checklists                                       |
| Illinois EBM Library        | https://guides.library.illinois.edu/ebml/appraise                              |
| EBM Toolbox                  | https://ebm-tools.knowledgetranslation.net/self-evaluation                    |

Abbreviations: CASP, Critical Appraisal Skills Programme; EBM, evidence-based medicine.

### TABLE 4. Recommended Reading on Biostatistics Methods in Oncology

| References                                                                 | DOI                                      |
|---------------------------------------------------------------------------|------------------------------------------|
| Barraclough, et al: Biostatistics primer: What a clinician ought to know: hazard ratios. J Thorac Oncol 6:978-982, 2011 | 10.1097/JTO.0b013e31821b10ab              |
| Simms, et al: Biostatistics primer: what a clinician ought to know—Prognostic and predictive factors. J Thorac Oncol 8:808-813, 2013 | 10.1097/JTO.0b013e318292bdcdf             |
| Barraclough and Govindan: Biostatistics primer: What a clinician ought to know: subgroup analyses. J Thorac Oncol 5:741-746, 2010 | 10.1097/JTO.0b013e3181d9009e              |
| Dudley, et al: An introduction to survival statistics: Kaplan-Meier analysis. J Adv Pract Oncol 7:91-100, 2016 | 10.6004/jadpro.2016.7.1.8                |
| Emmerson and Brown: Understanding survival analysis in clinical trials. Clin Oncol (R Coll Radiol) 33:12-14, 2021 | 10.1016/j.clon.2020.07.014               |
| Abd ElHafeez, et al: An overview on standard statistical methods for assessing exposure-outcome link in survival analysis (Part II): The Kaplan-Meier analysis and the Cox regression method. Aging Clin Exp Res 24:203-206, 2012 | 10.1007/BF03325249                        |
| Tripepi, et al: An overview of standard statistical methods for assessing exposure-outcome link in survival analysis (Part I): Basic concepts. Aging Clin Exp Res 24:109-112, 2012 | 10.1007/BF03325157                        |
| Veen, et al: A clinician’s guide for developing a prediction model: A case study using real-world data of patients with castration-resistant prostate cancer. J Cancer Res Clin Oncol 146:2067-2075, 2020 | 10.1007/s00432-020-03286-8               |
| Dey, et al: Practical overview and reporting strategies for statistical analysis of survival studies. Chest 158:S39-S48, 2020 (suppl 1) | 10.1016/j.chest.2020.03.015              |
| Rich, et al: A practical guide to understanding Kaplan-Meier curves. Otolaryngol Head Neck Surg 143:331-336, 2010 | 10.1016/j.otohns.2010.05.007             |
| Wang and Ji: Sample size estimation in clinical research: From randomized controlled trials to observational studies. Chest 158:S12-S20, 2020 (suppl 1) | 10.1016/j.chest.2020.03.010              |
| Dey, et al: A practical overview of case-control studies in clinical practice. Chest 158:S57-S64, 2020 (suppl 1) | 10.1016/j.chest.2020.03.009              |
| Bullen: Studies of medical tests: Design and analytical considerations. Chest 158:S103-S112, 2020 (suppl 1) | 10.1016/j.chest.2020.03.006              |
| Wang and Kattan: Cohort studies: Design, analysis, and reporting. Chest 158:S72-S78, 2020 (suppl 1) | 10.1016/j.chest.2020.03.014              |
| Wang and Cheng: Cross-sectional studies: Strengths, weaknesses, and recommendations. Chest 158:S65-S71, 2020 (suppl 1) | 10.1016/j.chest.2020.03.012              |
| Zabor, et al: Randomized controlled trials. Chest 158:S79-S87, 2020 (suppl 1) | 10.1016/j.chest.2020.03.013              |
| Hernandez, et al: Meta-analysis. Chest 158:S97-S102, 2020 (suppl 1) | 10.1016/j.chest.2020.03.003              |
their research. Several criteria can be used to find the most suitable journal for a manuscript. This includes multiple indexing on the three recognized databases—Medline, Scopus, and Web of Science—as this may limit the presence of infiltrating predatory journals. The use of the Beall’s list can also be useful, but it is not regularly updated as dozens of new predatory journals are launched every month. The prestige and the experience of trusted publishers should also be considered as it is rare to have a predatory journal published by a standard academic publisher. Appendix Table A2 shows trusted publishers that place nonfraudulent information regarding indexing/abstracting, impact factor and other metrics, and data on their official web site.

Some measures can be considered by authors to better repair this emerging issue. When their research findings are published accidentally in a predatory journal, they should deposit their article for evaluation by PubMed Central. This database has an initiative to index articles after an internal peer review and therefore, this is highly recommended. For more transparency and credibility, articles published in predatory journals can be deposited into social networks such as ResearchGate to enhance postpublication open peer review with the scientific community. At an individual level, authors are compassionately invited to explain why they published their research in predatory journals in their curriculum vitae to enhance the reliability of their academic achievements. Their research institutions should also publicly discuss this matter to prevent any other predatory publications in the future (for recommended reading on this topic, refer Appendix Table A3).

Participate in the Open Science Movement

Open access refers to making publication contents freely and openly accessible for readers and authors for reuse under the CC BY 4.0 license. The broader term open science is used for a more general movement to disseminate knowledge and improve collaboration between researchers and the public. This framework has been developed worldwide by funders, policymakers, and research institutions to enhance access to research findings. From this perspective, cancer researchers with limited resources may benefit from the Research4Life partnership initiative that enables access to peer-reviewed content via a unique public-private partnership between United Nations Agencies, Yale and Cornell Universities, and academic publishers. Participating journals may provide partial or full waivers of article-processing charges according to the World Bank classification. Thus, authors should check the web sites of open-access journals when desiring to publish this way. However, the classification criteria to benefit from this advantage may be deceptive in some cases. As Moroccan young cancer scientists, we can benefit from a 50% waiver but we cannot afford it. Open science has a financial toxicity for oncologists from developing countries as their publications are rarely funded. Therefore, green open access should be supported and offered to these authors. Some other national projects such as the publication subsidy (Programme de Subvention des Publications) by the Institut de Recherche sur le Cancer in Morocco that supports its research associates to pay the charges of open access is a good program that should be developed to progress open science in similar settings. When choosing a subscription-based journal, submitting the draft to preprint servers such as Research Square and medRxiv is recommended for data sharing widely to enhance prepublication and postpublication peer review as well as the open science initiative. However, authors must check the policy of target journals for submission as some of them do not accept such deposition in preprint servers. Recommended preprint servers to be used to enhance transparency and publishing ethics can be found in Table 5. Importantly, there is a disparity related to the access to medical literature between LMICs and developed countries. In keeping with this, several initiatives were developed to provide access to hidden content behind paywalls, including the questionable Sci-Hub project. This service offers free access to a great pirated proportion of articles. At the same time, licensed and authorized services also exist and can be used by authors from LMICs and those with limited resources to sustainably access research publications. For instance, EndNote Click (formerly Kopernio) is an online tool that can be used by researchers worldwide to search for free articles–related portable document format. This full-text finder service can be integrated into web browsers to identify freely available article text. Other new tools such as Open Access Button and Unpaywall with their advantages and disadvantages were nicely discussed elsewhere.

Get Involved in Working Groups and Scientific Social Networking

The use of scientific social networking has recently emerged as a potential approach for professional development and collaboration. Integrating social media in modern oncology practice and research is a recent trend that enabled the expansion of working groups to improve patients’ care and foster research between oncologists from low-income countries and others from prestigious institutions from the developed world. This opportunity provides an extremely promising frontier for cancer research without physical barriers. Moreover, this allows easy interaction and communication between oncologists worldwide to enhance second opinions on difficult patients’ cases. In this perspective, The ONCOLLEGE working group is a good example of ideas sharing and collective contribution of young oncologists to improve cancer patients’ care via the use of social media to discuss cases that need second opinions. This initiative developed by youth working in different fields of oncology has also facilitated the development of several research projects that resulted in publications gathering.
TABLE 5. Recommended Preprint Servers and Repositories

| Repositories       | Website Links                                                                 |
|--------------------|-------------------------------------------------------------------------------|
| Research Square    | https://www.researchsquare.com                                                |
| medRxiv            | https://www.medrxiv.org                                                        |
| bioRxiv            | https://www.biorxiv.org                                                        |
| Authorea           | https://www.authorea.com/browse-open-science-articles                         |
| Engage             | https://www.cambridge.org/engage/coe/submission-information                   |
| OpenDOAR           | https://v2.sherpa.ac.uk/opendoar                                               |
| SSRN               | https://www.ssrn.com/index.cfm/en                                              |
| OSF Preprints       | https://osf.io/preprints                                                       |
| AfricArXiv         | https://info.africanxiv.org/fr                                                 |
| AMRC Open Research | https://amrcopenresearch.org                                                   |
| Sage Advance       | https://advance.sagepub.com                                                    |
| SciELO Preprints    | https://preprints.scielo.org/index.php/scielo                                 |
| HRB Open Research  | https://hrbopenresearch.org                                                    |

Abbreviations: AMRC, Association of Medical Research Charities; HRB, Health Research Board; OSF, Open Science Framework; SSRN, Social Science Research Network.

Apply for Funding Opportunities, Fellowships, and Grants

Cancer research in countries with a high income is predominantly sponsored by the pharmaceutical industry that addresses financial interests. Moreover, funding agencies play an important role in the performance of research institutes in these settings. The development of these human and funding capacities in high-income countries has generated outstanding improved outcomes that we have seen in the past few years. In LMICs, as mentioned above, lack of skilled researchers and motivation to conduct research as well awareness of the impact of the real-world studies are the significant factors affecting cancer research.6,5 Financial barriers for conducting clinical trials and other types of oncology research are additional factors that are negatively associated with the poor productivity of scientific publications that affect patients’ outcomes in under-resourced settings.5,6 Promisingly, various initiatives are available to authors in LMICs to fund their research and boost their career. This encompasses fellowships, grants, and other funding opportunities from international organizations and scientific oncology societies. A good and illustrative example is the Conquer Cancer, an ASCO foundation, which offers several funding opportunities and awards to cancer researchers that cover various cancer settings for oncologists from all over the world. To benefit from these funding projects, oncologists from LMICs should apply for memberships as this is a requirement for submitting their proposals. A useful list of web site links to these opportunities can be found in Table 6. Importantly, most of these funding agencies require a prior writing of grant research proposals. Therefore, young oncologists should have the skills and guidance for successful research grant and fellowship applications. In this regard, various papers addressing recommendations for grant and research proposal writing were published to guide these scientists.69-77 Notably, this also usually needs English language skills when writing proposals. English has long been the dominant language in scientific writing and publishing. Nearly all oncology journals publish in English, and those with other languages such as French are currently switching to it. Learning English and scientific writing earlier in the career of oncologists is anticipated to create the environment for fostering international collaboration and publishing excellence. Native languages should be reserved for the popularization of science and are needed for communication with the public as well as patients with cancer. Useful links for developing scientific writing skills can be found in the Equator Network initiative.78

Learn Peer Review

The peer-review system plays a central role in maintaining the high standards of scientific research and academic publishing. This process evaluates research and literature-based findings for originality, significance, quality, and impact on clinical practice.79,80 The duration of peer review varies significantly between publishers and academic international authors together.56-60 Notably, The International Immuno-Oncology Biomarker Working Group on Breast Cancer played a pivotal role in bringing clinicians and scientists to work together and improve cancer care through cooperation.69 This working group has published several impactful papers on the implementation of tumor-infiltrating lymphocytes in settings with limited resources as a surrogate for programmed death-ligand 1 testing in breast cancer.63-66 Other similar works and initiatives were also successful in providing practice changes through networking.67 These conceptual models are valuable for integrated care delivery and interorganizational collaboration.68 Despite these ideas being in early proof-of-concept stages, young oncologists are encouraged to enthusiastically participate in this movement to boost their career. Oncology is an active and rapidly evolving field that requires collaboration and taking an active role in shaping its future. Moreover, peer networking and regional collaboration between oncologists in LMICs should also be considered to develop research affecting outcomes as they share similar issues related to cancer control. This will certainly help establishing durable long-term research initiatives.

Memberships in international oncologic societies such as ESMO and ASCO is highly recommended as they offer various travel grants, training programs, and support for oncologists to better manage patients with cancer and advance research on cancer. Interested oncologists can benefit from free or low fees of membership and enjoy various benefits to make their career in oncology better. A recommended list of working groups, international and recognized cancer organizations, and societies can be found in Appendix Table A4. They can be consulted regularly to explore education and training opportunities for young oncologists.
| Opportunities | Website Links |
|---------------|--------------|
| ASCO Conquer Cancer Foundation and Career Development | [https://www.ascocareerdevelopment.org/grants-awards/funding-opportunities](https://www.ascocareerdevelopment.org/grants-awards/funding-opportunities) |
| | [https://www.ascocareerdevelopment.org/grants-awards](https://www.ascocareerdevelopment.org/grants-awards) |
| | [https://careercenter.asco.org/](https://careercenter.asco.org/) |
| Funding opportunities from the AACR | [https://www.aacr.org/professionals/research-funding/current-funding-opportunities/](https://www.aacr.org/professionals/research-funding/current-funding-opportunities/) |
| ESMO training and funding opportunities | [https://www.esmo.org/research/research-funding-opportunities](https://www.esmo.org/research/research-funding-opportunities) |
| | [https://www.esmo.org/career-development](https://www.esmo.org/career-development) |
| UICC fellowships and grants | [https://www.uicc.org/what-we-do/capacity-building/fellowships](https://www.uicc.org/what-we-do/capacity-building/fellowships) |
| | [https://www.uicc.org/news/apply-research-grant](https://www.uicc.org/news/apply-research-grant) |
| Grants of the ACS | [https://www.cancer.org/research/apply-research-grant.html](https://www.cancer.org/research/apply-research-grant.html) |
| AORTIC training opportunities | [https://aortic-africa.org/education-training-committee/](https://aortic-africa.org/education-training-committee/) |
| NCI fellowships and grants | [https://cancercontrol.cancer.gov/about-dccps/fellowship-opportunities](https://cancercontrol.cancer.gov/about-dccps/fellowship-opportunities) |
| | [https://www.cancer.gov/grants-training/training/at-nci](https://www.cancer.gov/grants-training/training/at-nci) |
| | [https://ccr.cancer.gov/training/trainee-resources/funding-opps](https://ccr.cancer.gov/training/trainee-resources/funding-opps) |
| Fellowships and training programs at Dana-Farber Cancer Institute | [https://www.dana-farber.org/for-physicians/education-and-training/fellowships-and-training-programs/](https://www.dana-farber.org/for-physicians/education-and-training/fellowships-and-training-programs/) |
| EACR fellowships | [https://www.eacrlrc.org/hcp-education-training/fellowships/search](https://www.eacrlrc.org/hcp-education-training/fellowships/search) |
| Memorial Sloan Kettering Cancer Center | [https://www.mskcc.org/hcp-education-training/fellowships/search](https://www.mskcc.org/hcp-education-training/fellowships/search) |
| Other opportunities | [https://europe.ac/research-funding.html](https://europe.ac/research-funding.html) |
| | [https://findaphd.com/](https://findaphd.com/) |
| | [https://findapostdoc.com/](https://findapostdoc.com/) |
| | [https://ecancerpatient.com/](https://ecancerpatient.com/) |

Abbreviations: AACR, American Association for Cancer Research; ACS, American Cancer Society; AORTIC, African Organisation for Research and Training in Cancer; EACR, European Association for Cancer Research; ESMO, European Society for Medical Oncology; NCI, National Cancer Institute; UICC, International Union Against Cancer.

Do Not Be the Last to Know About the Latest News in Cancer Research

Oncolgy research is evidently a greatly active field with remarkable interventional and observational clinical trials that release on-fire findings every week. This outstanding cancer research has a powerful and direct impact on patients’ survival and outcomes. Summary and expert discussion on practice-changing clinical research is provided by various trusted educational platforms and companion web sites of international societies and organizations that were created to deliver the latest news in oncology. A number of these services can be found in Appendix Table A6. Educational portals for oncologists, such as The ASCO Post, the ESMO News/OncologyPRO, the ecancer, and also the ASCO Communications, which provide oncology news allow readers to be up to date with the latest developments that influence daily practice by newsletters and interacts with their authors. An illustrative example of these good free online initiatives is ecancer. This resource presents updated and free-of-charge knowledge on all areas of cancer research to meet global oncology needs. Ecancer publishes open research and research news, shares video resources and insights from covered conferences, provides continuing medical education–accredited e-learning in multiple languages, and provides free or low-cost in-person educational training across the globe. This initiative also offers education for patients with cancer through its program ecancerpatient.org intended to simplify oncology news and information in a friendly format.
Be Involved in Blogging, Volunteering, and Simplifying the Oncologic Sciences for the Public and Undergraduate Students

Blogging in oncology is a relatively recent extracurricular activity. It permitted to several oncologists and patients' advocates individual sharing of authors’ perspectives and opinions on emerging concerns in oncology such as access to treatments, financial toxicities of novel drugs, governmental policies, supportive care, and issues in clinical trials that are not covered by traditional peer-reviewed academic journals. Blogging has a potent impact on improving patients’ care by attracting a general audience that may increase awareness of current issues in oncology globally. Various platforms for blogging are available for all oncologists worldwide to share their ideas and interact with the oncology community. The ASCO Connection is a good example of a free successful blogging platform that can be used by early-career oncologists to issue their thoughts.83 Volunteering in offering care, patients’ education, preventive consultations, and popularization of cancer sciences provide an opportunity for young oncologists to build leadership and soft skills. Therefore, these future leaders will expectedly be competent at accurately speaking to the public and attracting decision makers and policymakers to respond to the needs of their oncology settings. Importantly, a shortage of cancer specialists is an emerging issue that needs to be addressed in developing countries. Involving undergraduate medical students in cancer research projects earlier during their career is a good initiative to attract them to this stunning specialty. Furthermore, attracting more students to oncologic sciences to prepare the future workforce can be achieved by early exposure to these specialties during their graduate training.84 Notably, organizing courses on the basics of oncology for medical students to enhance the scientific interaction with senior oncologists seems to be promising.85 Oncology is a rapidly evolving field in which they can practice EBM and research compared with other medical specialties. Also, national societies should engage these students in internships and courses to make a career in oncology to boost the number of oncologists and respond to the increasing need for skilled care physicians.

CONCLUSION

Authors in countries with limited resources doing research on this pivotal medical field still need training and support to advance cancer research in their settings. To date, little is known about the capacity of cancer researchers, including oncologists in conducting accurate research to meet the needs for appropriate studies and actionable data for cancer burden control. Further bibliometric investigations on research outputs of oncologists from LMICs are required and awaited. This will hopefully bridge the gap of clinical research that affects patients’ outcomes in these settings. Moreover, this will address the current challenges that health care professionals face in these countries by implementing better evidence-based programs and recommendations for best practices. We hope that this paper will provide useful information and guidance for cancer researchers from developing countries to boost their career.

AFFILIATIONS
1Department of Medical Oncology, Mohammed VI University Hospital, Oujda, Morocco
2Faculty of Medicine and Pharmacy, Mohammed 1st University, Oujda, Morocco

CORRESPONDING AUTHOR
Khalid El Bairi, MD, Department of Medical Oncology, Mohammed VI University Hospital, BP 4806 Oujda Universite 60049, Oujda, Morocco; e-mail: k.elbairi@ump.ac.ma.

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Conception and design: Khalid El Bairi, Said Afqir

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Collection and assembly of data: Khalid El Bairi, Ouissam Al Jarroudi
Manuscript writing: All authors
Final approval of manuscript: All authors
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AUTHORS’ DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST
The following represents disclosure information provided by authors of this manuscript. All relationships are considered compensated unless otherwise noted. Relationships are self-held unless noted. I = Immediate Family Member, Inst = My Institution. Relationships may not relate to the subject matter of this manuscript. For more information about ASCO’s conflict of interest policy, please refer to www.asco.org/rwc or ascopubs.org/go/authors/author-center.

Open Payments is a public database containing information reported by companies about payments made to US-licensed physicians (Open Payments).

No potential conflicts of interest were reported.
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APPENDIX

### TABLE A1. Recommended Reading

| References | DOI          |
|------------|--------------|
| Govindarajan R, Narayanaswami P: Evidence-based medicine for every day, everyone, and every therapeutic study. *Muscle Nerve* 58:486-496, 2018 | 10.1002/mus.26142 |
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| Janiaud P, Serghiou S, Ioannidis JPA: New clinical trial designs in the era of precision medicine: An overview of definitions, strengths, weaknesses, and current use in oncology. *Cancer Treat Rev* 73:20-30, 2019 | 10.1016/j.ctrv.2018.12.003 |
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### TABLE A2. Nonexhaustive List of Trusted Academic Publishers of Oncology Journals

| Publisher | Web Site/Bibliographic Database |
|-----------|---------------------------------|
| Springer Nature | [https://www.springernature.com/gp](https://www.springernature.com/gp) [https://link.springer.com/](https://link.springer.com/) [https://www.nature.com/](https://www.nature.com/) [https://www.biomedcentral.com/](https://www.biomedcentral.com/) |
| Elsevier | [https://www.sciencedirect.com/](https://www.sciencedirect.com/) [https://www.elsevier.com/en-xm](https://www.elsevier.com/en-xm) [https://www.cell.com/](https://www.cell.com/) [https://www.em-consulte.com/](https://www.em-consulte.com/) [https://www.scopus.com](https://www.scopus.com) |
| AACR Journals | [http://aacrjournals.org/](http://aacrjournals.org/) |
| PLoS | [https://www.plos.org/](https://www.plos.org/) |
| Taylor and Francis | [https://www.tandfonline.com/](https://www.tandfonline.com/) |
| Wiley | [https://onlinelibrary.wiley.com/](https://onlinelibrary.wiley.com/) |
| Oxford University Press | [https://academic.oup.com/journals](https://academic.oup.com/journals) |
| Hindawi | [https://www.hindawi.com/](https://www.hindawi.com/) |
| BMJ | [https://www.bmj.com/](https://www.bmj.com/) |
| Wolters Kluwer | [https://journals.lww.com/pages/default.aspx](https://journals.lww.com/pages/default.aspx) |
| Karger | [https://www.karger.com/](https://www.karger.com/) |
| SAGE Publishing | [https://uk.sagepub.com/en-gb/af/journals](https://uk.sagepub.com/en-gb/af/journals) |
| Frontiers Media | [https://www.frontiersin.org/](https://www.frontiersin.org/) |
| Future Medicine | [https://www.futuremedicine.com/](https://www.futuremedicine.com/) |

Abbreviation: AACR, American Association for Cancer Research.
### TABLE A3. Recommended Reading on Predatory Journals

| References | DOI |
|------------|-----|
| For English-speaking readers | |
| Memon AR: Predatory journals spamming for publications: What should researchers do? *Sci Eng Ethics* 24:1617-1639, 2018 | https://dx.doi.org/10.1007/s11948-017-9955-6 |
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| For French-speaking readers | |
| Laccourreye O, et al: Les revues prédatrices à l’assaut de la presse médicale scientifique. *Ann Fr Otorhinolaryngol Path Cervicofac* 135:40-42, 2018 | https://doi.org/10.1016/j.aforl.2017.07.001 |
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| For Spanish-speaking readers | |
| Bertoglia AMP, Águila AA: Revistas depredadoras: una nueva amenaza a las publicaciones científicas. *Rev Med Chil*146:206-212, 2018 | http://dx.doi.org/10.4067/s0034-98872018000200206 |
| Dal-Ré R: Publicaciones en revistas potencialmente depredadoras. *An Pediatr (Barc)* pii: S1695-4033(19)30027-X, 2019 | https://doi.org/10.1016/j.anpedi.2019.01.010 |

### TABLE A4. List of Working Groups, International and Recognized Cancer Organizations, and Societies

| Organization or Center | Website Links |
|-----------------------|---------------|
| ESMO | https://www.esmo.org |
| ASCO | https://www.asco.org |
| AACR | https://www.aacr.org |
| UICC | https://www.uicc.org |
| EACR | https://www.eacr.org |
| European Organisation for Research and Treatment of Cancer | https://www.eortc.org |
| International Immuno-Oncology Biomarker Working Group on Breast Cancer | https://www.tilsinbreastcancer.org |
| American Institute for Cancer Research | https://www.aicr.org |
| Cancer Research UK | https://www.cancerresearchuk.org |
| Memorial Sloan Kettering Cancer Center | https://www.mskcc.org |
| MD Anderson Cancer Center | https://www.mdanderson.org |
| NIH National Cancer Institute | https://www.cancer.gov |
| The British Association for Cancer Research | https://www.bacr.org.uk |
| Cancer research working groups by cancer type | https://www.esmo.org/research/research-groups-tools-and-database/Cancer-research-groups-by-type |
| Other links of national and international organizations | http://www.cancerindex.org/clinks7.htm |

Abbreviations: AACR, American Association for Cancer Research; EACR, European Association for Cancer Research; ESMO, European Society for Medical Oncology; NIH, National Institutes of Health; UICC, Union for International Cancer Control.
**TABLE A5.** Currently Available Free Peer-Review Training Courses, Resources, and Webinars

| Resource                                      | Website Links                                                                 |
|-----------------------------------------------|-------------------------------------------------------------------------------|
| Publons Academy*                             | https://publons.com/academy/                                                  |
| Wiley Author Learning and Training Channel   | https://authorservices.wiley.com/author-resources/Journal-Authors/Prepare/webinars/index.html |
| The EASE Training                            | http://www.ease.org.uk/publications/peer-reviewer-toolkit/training/          |
| Nature MasterClasses Training                 | https://masterclasses.nature.com/users/4925-claire-hodge/posts/20006-free-online-course-on-peer-review |
| ACS Reviewer Lab*                            | https://www.acsreviewerlab.org/                                              |
| BMJ Training Material                        | https://www.bmj.com/about-bmj/resources-reviewers/training-materials          |
| Elsevier Researcher Academy                   | https://researcheracademy.elsevier.com/navigating-peer-review/fundamentals-peer-review |
| Equator-Network Peer-review Toolkit*         | http://www.equator-network.org/toolkits/peer-reviewing-research/peer-review-training-and-resources/ |

NOTE. For more information on peer-review, see https://www.elsevier.com/reviewers/what-is-peer-review.
Abbreviations: ACS, American Cancer Society; EASE, European Association of Science Editors.
*Highly recommended.

**TABLE A6.** Trusted Web Sites and Online Resources of Cancer Research News

| Resource          | Website Links                                      |
|-------------------|---------------------------------------------------|
| ASCO Post         | http://ascopost.com                               |
| Medscape          | https://www.medscape.com/oncology                 |
| Prime Oncology    | https://www.primeoncology.org                     |
| E-Cancer          | https://ecancer.org                               |
| OncLive           | https://www.onclive.com                           |
| OncNet            | https://www.oncnet.com                            |
| ESMO Oncology News| https://www.esmo.org/Oncology-News                |
| EurekAlert        | https://www.eurekalert.org/cancer/news/           |
| Cancer.org        | https://www.cancer.org/latest-news.html           |
| CancerResearchUK  | https://www.cancerresearchuk.org/about-us/cancer-news |
| GenomeWeb         | https://www.genomeweb.com                          |
| PracticeUpdate    | https://www.practiceupdate.com/explore/           |
| CancerNetwork     | https://www.cancernetwork.com                     |
| 2MinuteMedicine   | https://www.2minutemedicine.com/category/all/cancer/ |
| TargetedOnc       | https://www.targetedonc.com                       |
| Oncology Central  | https://www.oncology-central.com                  |
| The Scientist     | https://www.the-scientist.com                     |

Abbreviation: ESMO, European Society for Medical Oncology.