ORIGINAL RESEARCH

Measuring Research Capacity: Development of the PACER Tool

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Evaluating research activity in research departments and education programs is conventionally accomplished through measurement of research funding or bibliometrics. This limited perspective of research activity restricts a more comprehensive evaluation of a program's actual research capacity, ultimately hindering efforts to enhance and expand it. The objective of this study was to conduct a scoping review of the existing literature pertaining to the measurement of research productivity in research institutions. Using these findings, the study aimed to create a standardized research measurement tool, the Productivity And Capacity Evaluation in Research (PACER) Tool. The evidence review identified 726 relevant articles in a literature search of PubMed, Web of Science, Embase, ERIC, CINAHL, and Google Scholar with the keywords "research capacity" and "research productivity." Thirty-nine English-language studies applicable to research measurement were assessed in full and 20 were included in the data extraction. Capacity/productivity metrics were identified, and the relevance of each metric was data-charted according to 3 criteria: the metric was objective, organizational in scale, and applicable to varied research domains. This produced 42 research capacity/productivity metrics that fell into 7 relevant categories: bibliometrics, impact, ongoing research, collaboration activities, funding, personnel, and education/academics. With the expertise of a Delphi panel of researchers, research leaders, and organizational leadership, 31 of these 42 metrics were included in the final PACER Tool. This multifaceted tool enables research departments to benchmark research capacity and research productivity against other programs, monitor capacity development over time, and provide valuable strategic insights for decisions such as resource allocation. (J Am Board Fam Med 2024;00:000–000.)

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Introduction

Effective research can have a profound impact, leading to significant advancements in new technologies, medicines, and evidence-based policies. In recent years, the use of research metrics has gained significant attention as a way to assess the quality and impact of research, leading to improved ability to increase research productivity and capacity in primary care.[1,2] Measuring the impact and quality of scientific research, however, remains a challenge for researchers, institutions, and funding agencies.[3–6]

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There are no standard guidelines for which research metrics are most informative, making it difficult to assess the relative effectiveness of different research organizations.[1] A standardized data set would allow for comparison between research organizations, and within organizations over time.

As a solution to this problem, the Building Research Capacity (BRC) Steering Committee commissioned a study to form a panel of research metrics. BRC comprises members from the North American Primary Care Research Group and the Association of Departments of Family Medicine. Since 2016, BRC has been engaged in offering resources to departments of family medicine to enhance and expand research, including consultations and leadership training through a research leadership fellowship.[7] The development and monitoring of research capacity is a topic of significant practical interest to the committee, which has compiled a list of research metrics that have proved useful in providing consultations to clinical research departments and teaching fellows. Starting with this list as a template, the BRC Steering Committee commissioned a scoping review to investigate other metrics in the scientific literature that have been shown to be relevant and to collect a list of research assessment resources. The objective of this review was to generate a structured collection of metrics, termed the *Productivity And Capacity Evaluation in Research (PACER) Tool*.

Methods

We performed a scoping review using the method outlined by Arksey and O'Malley that was further developed by Levac et al.[8,9] We aimed to identify previously reported metrics or tools that have been used as indicators to track, report, or develop research capacity and productivity in medicine. Arksey and O'Malley[8] identified a process consisting of 6 steps: 1) identifying the research question, 2) identifying relevant studies, 3) selecting studies, 4) charting the data, 5) collating, summarizing, and reporting results, and 6) consulting (optional). The scoping review checklist described by Cooper et al[10] was used to guide the process.

A medical librarian performed a literature search of relevant databases to identify other citations in PubMed, Web of Science, Embase, ERIC, CINAHL, and Google Scholar by using the keywords "research capacity" and "research productivity"; further search details are given in the Supplemental Material. Further forward and backward citation searching was performed to identify any additional articles. No timeline restrictions were imposed, and only peer-reviewed articles were included. Deduplicator in the Systematic Review Accelerator package was used to remove duplicates from the results of the above database searches, producing a final list of citations, which were then uploaded to Rayyan, a web and mobile app for systematic reviews.[11] This article follows the PRISMA-ScR checklist.[12]

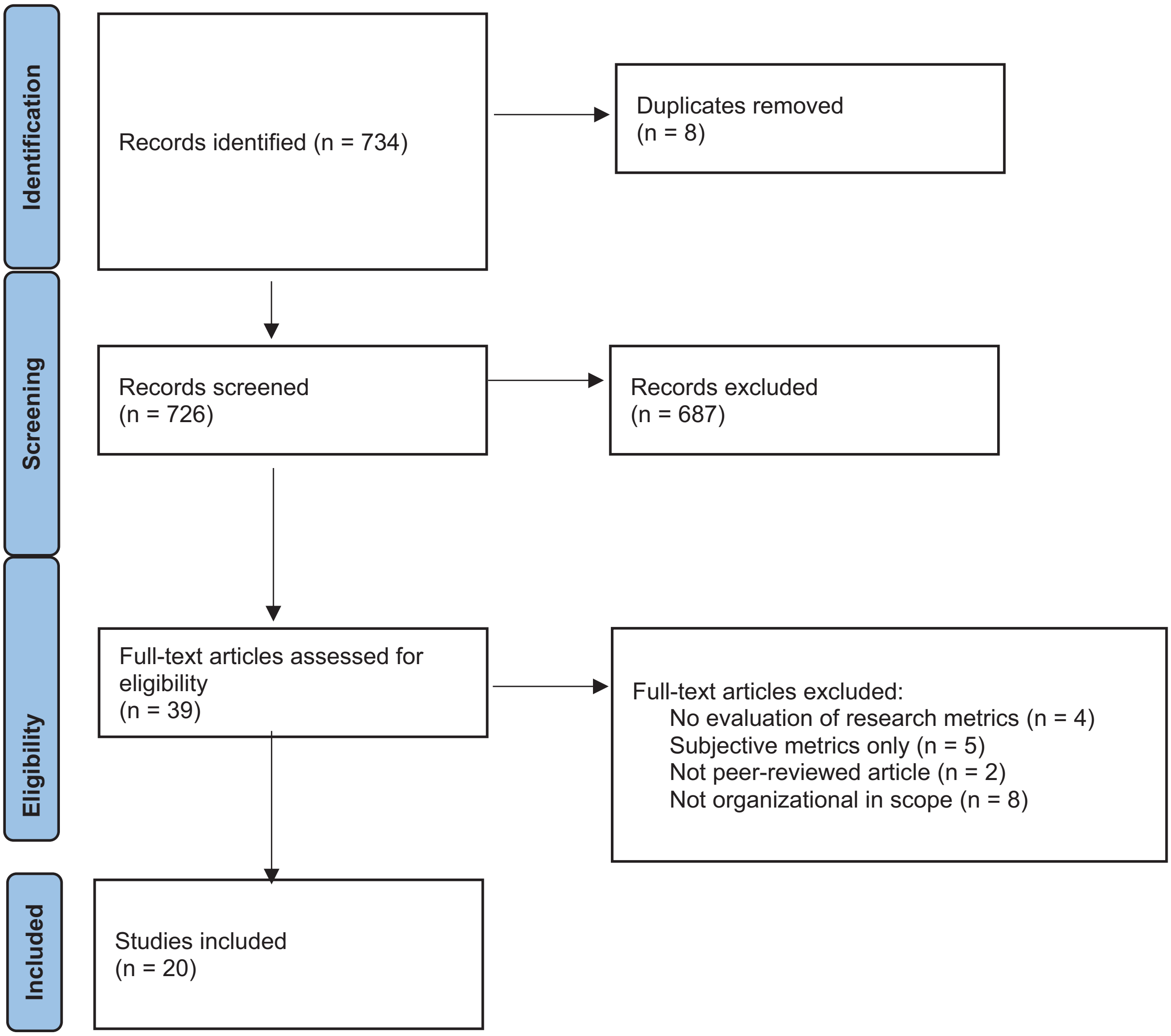
Results

For the study selection for the scoping review, 2 authors (SKS and PC) screened the titles and abstracts of 726 articles to determine their relevance to research capacity and/or productivity (Figure 1). Articles were selected if they met 3 metrics: 1) they developed or assessed a research tool or metric; 2) the tool or metric was objective in nature; and 3) the assessment was organizational in scope. If the primary screeners disagreed, a third screener (CM) adjudicated. Before article screening, the authors completed training to ensure consistency.

After the screening round, 39 articles were selected to assess for eligibility. These articles were retrieved in full and underwent independent analysis by 2 authors (SKS plus MS-S, PC, JWL, CM, TTC, or PHS) to determine study inclusion. Conflicts between the reviewers in the independent analysis were resolved by discussion between researchers. Reasons for exclusion included no evaluation of research metrics (n = 4), subjective metrics only (n = 5), not peer-reviewed article (n = 2), and not organizational in scope (n = 8). Ultimately, 20 articles were selected for data extraction (Figure 1).

For the 20 included studies, the following information was recorded on a data-charting form: article title, authors, publication year, study objective, study type, target population, sample, data collection method, study duration, location of study, and study limitations. For studies that evaluated a tool or instrument for research capacity evaluation, the following additional data were recorded: name of tool/instrument, whether the tool/instrument was original or adapted, description of the tool, how it was developed, if and how it was validated, number of metrics captured, description of metrics, and how the tool performed. Key takeaways from the data extraction are summarized in Table 1. These data were used to generate an initial list of metrics

Figure 1. PRISMA flow diagram.



that were objective, organizational in scale, and relevant to varied research domains. From the included articles, we extracted a set of 42 separate items that formed the first draft of the PACER Tool. Through qualitative content analysis, each of the 42 metrics was grouped into 8 domains of research capacity. These categories are

1. Bibliometrics
2. Impact
3. Ongoing research
4. Collaboration activities
5. Funding
6. Personnel
7. Education/academics
8. Recognition

Using the Delphi method, we submitted the initial tool to a panel of 31 research leaders (eg, deans, administrators, department chairs) to provide feedback, content expertise, and additional perspectives on the preliminary draft.[31] The panel was chosen from among experts known to the BRC Steering Committee, and represented various expertise areas, including medicine (n = 21, from family medicine, internal medicine, psychiatry, pain and addiction medicine, and sports medicine), business administration (n = 2), finance (n = 1), research operations (n = 3), and population health (n = 4). The feedback from the Delphi panel was discussed by the authors. Unanimous consensus by the authors of necessary changes led to a second draft of the PACER Tool. This was then sent to the panel for further comment. The process was repeated a third time.

Table 1. Summary of Findings from Data Extraction

Title	Author	Publication Year	Location	Key Takeaway
A metric for academic performance applied to Australian universities 2001 to 2004	Sandstrom and Sandstrom[13]	2007	Australia	Use of a performance-related model that combines productivity with quality measures using a single database. Measured bibliometric data such as number of publications.
A simple, generalizable method for measuring individual research productivity and its use in the long-term analysis of departmental performance, including between-country comparisons	Wootton[6]	2013	Norway	Development of an indicator of individual research output based on grant income, publications, and numbers of PhD students supervised.
Assessing research activity and capacity of community-based organizations: refinement of the CREAT instrument using the Delphi method	Humphries et al[14]	2019	US	Development of the Community REsearch Activity Assessment Tool (CREAT) instrument using a structured Delphi panel. Most metrics are subjective. Objective, numeric measurements include staff and budget.
Assessing research capacity in Victoria's south-west health service providers	Gill et al[15]	2019	Australia	Implementation of the Research Capacity and Culture (RCC) tool which had previously been developed by Holden et al, 2012.[16]
Assessment of health research capacity in western Sydney local health district (WSLHD): A study on medical, nursing and allied health professionals	Lee et al[17]	2020	Australia	Implementation of the RCC tool, demonstrating differences between various professionals.[16]
Biomedical research productivity: factors across the countries	Rahman and Fukui[18]	2003	Japan	Analyzed country of origin for published articles to determine significant factors relating to research output defined as publications per million population per year. Significant factors included gross national product per capita, research and development expenditure, number of science and engineering students, and number of physicians.
Building research collaboration networks: an interpersonal perspective for research capacity building	Huang[19]	2014	Singapore	Highlights the value of research collaboration networks as evidence of research capacity.
Common metrics to assess the efficiency of clinical research	Rubio[20]	2013	US	Identification of metrics to assess the efficiency of clinical research processes and outcomes. They identified 15 metrics in 6 categories. Objective, numeric metrics include time for IRB submission to approval, time to publication, and number of technology transfer products. Categories included processes, careers, services, economic return, collaboration, and products.
Developing indicators for measuring Research Capacity Development in primary care organizations: a consensus approach using a nominal group technique	Sarre and Cooke[21]	2009	England	Development of a list of indicators to measure research capacity development at an organizational level using workshops and modified nominal group technique. Individual metrics include research personnel, funding, membership in research alliances, number of projects, and awards. They were grouped by category according to the model developed by Cooke.[22]
Development and use of a research productivity assessment tool for	Ekeroma et al[4]	2016	Fiji, Samoa, Tonga, Vanuatu,	Focus group discussions to obtain viewpoints on meaningful research indicators. They developed a tool of 21

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Table 1. Continued

Title	Author	Publication Year	Location	Key Takeaway
clinicians in low-resource settings in the Pacific Islands: a Delphi study			Cook Islands, Solomon Islands	subjective and objective indicators. Example metrics include bibliometrics, funding, recognition, collaboration, and personnel.
Evaluating health research capacity building: an evidence-based tool	Bates et al[23]	2006	Ghana	Development of a tool to measure clinical research capacity–building programs. The framework was based on reported literature then adapted to the local context through an internal working group. Their resulting tool consisted of a mix of 12 objective and subjective measurements. Sample numeric metrics include bibliometrics, research funding, and researcher remuneration.
Evaluation of the research capacity and culture of allied health professionals in a large regional public health service	Matus et al[24]	2019	Australia	Evaluation of research among allied health professionals working in a large regional health service using the Research Capacity and Culture (RCC) tool.[16] Principal component analyses to determine key components that influence differences between various professional groups.
How has healthcare research performance been assessed?: a systematic review	Patel et al[25]	2011	Articles from several countries were included	Systematic review of indicators of health care research, along with evidence supporting their use. Indicators include publications, citations, impact factor, funding, authorship, population size, h-index, peer reviews, presentations, patents, doctoral students, and editorial responsibilities.
Indicators for tracking programs to strengthen health research capacity in lower- and middle-income countries: a qualitative synthesis	Cole et al[26]	2014	Canada, UK, Switzerland	Qualitative evaluation of research evaluations to identify key indicators of research productivity. Quantitative indicators include awards, trainees with a mentor, workshop attendance, courses run by educational institutions, course attendance, collaboration activity attendance, joint projects, and bibliometrics.
Measuring research capacity development in healthcare workers: a systematic review	Bilardi et al[27]	2021	UK, Australia, Italy	Systematic review and narrative synthesis of articles containing tools to measure health care workers' individual research capacities. Many articles contained data on team and organizational level. Many domains of assessment were identified, including skills, motivations, bibliometrics, informatics, communication, collaboration activities, studies, ethics, quality, support, skills, infrastructure, leadership, efficiency, dissemination, culture, and sustainability.
Measuring, analysis and visualization of research capacity of university at the level of departments and staff members	Kotsemir and Shashnov[28]	2017	Russia	Literature review on methods of research capacity in the university. Their analysis focuses primarily on bibliometrics, including number of publications, h-index, impact factor of published studies, and articles with evidence of collaboration.
Nine criteria for a measure of scientific output	Kreiman and Maunsell[29]	2011	US	Identification of qualities that define an effective research metric. They advocate that metrics should be quantitative, based on robust data,

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Table 1. Continued

Title	Author	Publication Year	Location	Key Takeaway
				rapidly updated and retrospective, presented with CIs, normalized by number of contributors, career stage and discipline, impractical to manipulate, and focused on quality over quantity.
Rehabilitation Medicine Summit: building research capacity	Frontera et al[5]	2006	US	Outcomes of a summit convened to advance and promote research in medical rehabilitation. They identified several important domains of research capacity, including research environment, infrastructure, and culture. Objective indicators they identified include bibliometrics and funding.
Research capacity building frameworks for allied health professionals - a systematic review	Matus et al[30]	2018	Australia	Systematic review of 5 databases to identify models and frameworks for research capacity building. They identified 3 main themes: supporting clinicians in research, working together, and valuing research for excellence.
Validation of the research capacity and culture (RCC) tool: measuring RCC at individual, team and organization levels	Holden et al[16]	2012	Australia	Development of the Research Capacity and Culture (RCC) tool based on literature review and expert guidance. Validation performed for internal consistency and test-retest reliability. Indicators include funding, bibliometrics, age of researchers, evidence of partnerships and dissemination.

Abbreviation: IRB, institutional review board.

After consensus was achieved by incorporating panelists' feedback, the final PACER Tool was created.

The Delphi panel reported that the initial tool was too complex and requested simplification. This resulted in the removal of thirteen metrics, including items such as internal publications, nonpeer-reviewed publications, and book chapters. The "recognition" category of metrics was removed after the Delphi panel determined that each of the identified metrics in that category (eg, internal awards and speaking invitations) was either infeasible or irrelevant. There was also feedback from panel members that we needed to include more data surrounding the impact of research. As a result of that feedback, we added "number of citations" and "median h-index" to the PACER Tool. They gave feedback on how each metric is described, which led to revisions in the clarity of each description. The Delphi panel also suggested we make it clear that organizations should not be expected to track every metric in the PACER Tool simultaneously as this would be infeasible for most of them.

The final PACER Tool consists of 31 numeric metrics that, when taken as a whole, shed light on domains of research capacity and productivity that are amenable to such analysis (Table 2).

Discussion

Research metrics are important for academic institutions because they allow institutions to evaluate the productivity and impact of departments, teams, and individual researchers.[2,22] By following relevant metrics, institutions are able to identify strengths and weaknesses and allocate resources more effectively. Bibliometric indicators, including citation counts, h-index, and impact factor, have become widely accepted measures of scientific productivity.[32,33] However, they do not reflect the quality or validity of the research, and they can be influenced by factors such as the popularity of the research

Table 2. Productivity and Capacity Evaluation in Research (PACER) Tool

Item	Description
Time frame	The time frame intended for monitoring is up to each department to determine.
Bibliometrics	Each publication, presentation, or patent is counted once regardless of the number of authors.
1. Peer-reviewed publications	Number of new original research articles published in the peer-reviewed literature.
2. Publications other than peer-reviewed	Number of new original research contributions published outside of the peer-reviewed literature (eg, book chapters).
3. Presentations (oral and poster)	Number of new oral and poster presentations given at regional, national, or international meetings or conferences. Presentations may be counted more than once if they are delivered more than once.
4. Number of published faculty	Total number of faculty who were listed authors on a publication in the peer-reviewed literature.
5. Number of presenting faculty	Total number of faculty who gave an oral or poster presentation at a regional, national, or international meeting or conference.
6. Patents filed	Number of new patents filed.
7. Patents issued	Number of new patents issued.
Impact	Researchers include doctoral level and other research faculty as defined under "Personnel."
8. New citations	Number of new citations in peer-reviewed literature of articles written by researchers in the department. This includes new citations for all articles of current researchers, regardless of when the article was published.
9. Median h-index	Median h-index for researchers in the department.
Ongoing research	Ongoing research includes projects approved or deemed exempt by an IRB.
10. New projects with IRB approval	Number of projects newly approved or deemed exempt within the past year.
11. Active projects with IRB approval	Number of projects actively under way. This includes new projects listed above.
Collaboration activities	Activities involving participation with organizations outside the department.
12. Joint activities with other research organizations	Number of activities as described under "Bibliometrics" or "Ongoing research" which involved direct participation from researchers outside the department (eg, other departments, other schools, or other organizations).
13. Peer-review panels for research funding proposals	Number of department faculty who have served on a peer-review panel at the national or international level for extramural/external research or research training funding proposals in the past year.
14. Personnel participating in national/international research leadership	Number of department faculty serving in leadership roles in national or international research-focused organizations. This can include committee service with regular meetings (at least twice yearly), committee chair, board of directors, or similar level of leadership.
Funding	Funding is defined as total direct dollar or in-kind support for activities intended to lead to external and peer/editorially reviewed presentations, publications, and dissemination. This includes start-up costs, bridge funding, core funding, pilot project funding, staff time, investigator support, consultation, and supplies.
15. Internal funding	Funding that the department or institution contributed to research activities.
16. External funding (including grants)	Funding-derived sources external to the department and external to the institution such as outside grants, industry funding, contracts, or philanthropy designated for research.
17. Other funding	Funding that does not fit in the above categories (eg, endowments, royalties).
18. Total funding	Sum of the 3 funding sources listed above.
Personnel	One research FTE includes 40 hours of work per week from personnel in the department whose time is intended to lead to external and peer/editorially reviewed presentations, publications, and dissemination.
19. Doctoral level research FTE	Total research FTE of doctoral-level faculty (not including trainees) with primary academic appointments in the department. This includes FTE (paid time designated or paid effort allocated) directed toward research, regardless of the funding source, for their salary compensation in the specified time frame.
20. Other research faculty FTE	Total research FTE of other research faculty with bachelor's or master's level degree (not including trainees) with primary academic appointments in the department. This includes FTE (paid time designated or paid effort allocated) directed toward research, regardless of the funding source, for their salary compensation in the specified time frame.

Continued

Table 2. Continued

Item	Description
21. Nonresearch faculty FTE	Total nonresearch FTE of all department personnel at or above master's level education. This can include time spent for administration, teaching, patient care, or other activities.
22. Total research administration FTE	Total FTE for administrative time of all staff with research leadership roles.
23. Total faculty FTE	Total of the above 4 items
24. Total faculty	Total FTE for research activities of all faculty who perform or support research activities (even if not their whole job, not including trainees). This includes only faculty directly reporting within the department and does not include research faculty in other departments or organizations paid for with grant funds.
25. Total research support staff FTE	Total FTE for research activities of all staff who support research activities (even if not their whole job, not including trainees). This includes only staff directly reporting within the department and does not include research support staff in other departments or organizations paid for with grant funds. This may include statisticians, study coordinators, or research aides.
Education/academics	Trainee publications and presentations are included in this section, as well as in the "Bibliometrics" section. Each publication or presentation is counted once in this section regardless of the number of trainee authors.
26. Research trainees	Number of trainees who were actively involved in research during the past year, even if research is not the primary focus of their education. This includes trainees at all graduate levels who are actively contributing to ongoing research or publication activities and does not include trainees not participating in any such activities.
27. Trainee publications	Number of publications (peer-reviewed or other than peer-reviewed as defined above under Bibliometrics) with a trainee as a listed author.
28. Trainee presentations	Number of presentations (oral or poster) with a trainee as a listed author.
29. Faculty with rank of Assistant Professor	Number of research faculty with the academic rank of Assistant Professor or equivalent.
30. Faculty with rank of Associate Professor	Number of research faculty with the academic rank of Associate Professor or equivalent.
31. Faculty with rank of Professor	Number of research faculty with the academic rank of Professor or equivalent.

Abbreviations: FTE, full-time equivalent; IRB, institutional review board.

topic, the size of the research community, and the publishing practices of the field.[29,34,35] With enough data, each of these metrics could conceivably be normalized by discipline, career stage, and other factors. This could lead to more effective comparisons over time and between institutions.

Quantifying research capacity through measurements like bibliometrics or external funding often requires contextualization, which demands the collection of additional data.[36] To assess whether any such data would be useful, we must be able to evaluate their effectiveness in measuring excellence of scientific output.[25] Such an evaluation can seem circular, however, because it requires a prior definition of what constitutes excellence. Given the numerous possible metrics and the complex parameter landscape, it is worthwhile to define a priori what, at a minimum, may render a metric practical. In response to this, Kreiman and Maunsell[29] posited that useful research metrics should possess the following characteristics:

1. Quantitative
2. Based on robust data
3. Based on data that are rapidly updated and retrospective
4. Presented with distributions and CIs
5. Normalized by number of contributors
6. Normalized by discipline
7. Normalized for career stage
8. Impractical to manipulate
9. Focused on quality over quantity

These requirements necessitate that multiple metrics be obtained simultaneously. For example, to normalize quantitative bibliometric data by number of contributors or career stage, one would need to compare the data with additional data regarding the quantity and demographics of researchers. What is called for, then, is not a single metric but a panel of metrics that, when taken together, create a reasonably comprehensive picture of an organization's research productivity and capacity. To normalize research data by discipline, a panel of metrics would need to be widely used. Such data would also need to be available to researchers so research productivity could be compared within and across organizations to discover and track trends.

As the scientific landscape continues to evolve, research metrics will continue to have an increasingly important role in shaping the future of scientific research.[1,2] A robust research data set could serve multiple purposes, including 1) equipping department chairs and deans with a set of practical measures to monitor research development; 2) allowing third-party organizations to compare research productivity at the organization or network level; and 3) providing researchers with a data set to evaluate the research economy (ie, how scarce resources of funding, personnel, and publications are allocated).[2,37] Currently, no widely adopted set of research indicators exists that could serve these purposes.

The PACER Tool was developed to meet the need identified by our team and supported by our scoping review for robust and comprehensive research capacity measurement systems. It provides a system of metrics that can be used to benchmark, monitor, and compare research productivity and capacity in various research settings. In particular, the PACER Tool provides a way for research programs, funders, and researchers themselves to benchmark research capacity and productivity in a way that is standardized, allowing for comparison across programs and within programs over time.

Use of the PACER Tool will enable leaders to form a detailed evaluation of the capacity and productivity of their research enterprise and make evidence-based resourcing decisions for their own organizations. In addition, once such data become widely available, they could be used for benchmarking research enterprises across organizations. Consistent, widespread use of PACER data would allow researchers to find answers to important questions in research capacity development. For example, PACER data could be used to discover the average number of new publications an organization could expect if they were to focus resources on adding more junior researchers or having fewer senior researchers.

Although the PACER Tool provides an array of metrics, it may be infeasible for an organization to obtain all data contained within the tool. Many members of the Delphi panel agreed, with one commenting that "some [measures] might be zero or not adopted, such as patents and [institutional review board] applications." Another mentioned that using "a select subset of metrics would be best." In response to this, the individual metrics in the PACER Tool are grouped by category. This allows users to focus on obtaining data in the domains that are most important and/or practical to them and their organizations. For example, a department that is trying to assess whether increased funding leads to increased high-impact publications could monitor aspects of the Bibliometrics, Impact, and Funding categories of the PACER Tool. An organization that is concerned with increasing the proportion of faculty with academic rank may want to focus on the Personnel and Education/academics categories.

One limitation of this study is that it may not be applicable to commercial entities or countries with emerging research. All authors and Delphi panel members were from academic departments in the US and Canada. However, we tried to include perspectives from a wide array of experts in different, including nonmedical, disciplines. In addition, the review identified no non-English studies, which suggests a need for further research to extend these results to departments in non-English speaking countries.

A limitation of the PACER Tool itself is that it only conveys quantitative data. Many areas of research capacity building such as quality or leadership may be more amenable to qualitative analysis. In addition, the PACER Tool does not assess important indicators that may be more applicable to smaller units (eg, metrics that focus on personal or team growth) or scales larger than a single organization (eg, national policies or journal-level bibliometrics).

The ultimate goal of monitoring metrics such as those contained in the PACER Tool is to facilitate effective research. Organizations can use metrics in the PACER Tool to plot, trend, and compare data to generate a visible "research economy." The PACER Tool represents a robust, multidimensional set of metrics, but it is important to acknowledge that research assessment is a complex and evolving field. The tool should be viewed as a starting point and may require further refinement and adaptation to specific research contexts. Further contextualization with qualitative data will continue to be important. Ongoing feedback and evaluation from colleagues in multiple disciplines and organizations, as well as ongoing validation and improvement of the metrics, will help ensure the ongoing relevance and usefulness of the PACER Tool.

Conclusion

The PACER Tool offers an adaptable, multifaceted approach for monitoring research performance. By incorporating a diverse set of metrics across multiple domains, it addresses many of the limitations of existing research metrics that focus only on bibliometrics and funding. This will enable organizations to evaluate the productivity and impact of research departments, teams, and individual researchers more effectively.

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Appendix

Search Strategy

Databases searched: PubMed, Web of Science, Embase, ERIC, CINAHL, and Google Scholar. For PubMed, the following terms were used: ((research) AND (capacity building OR productivity [MeSH Terms])) AND (tool [Title/Abstract] OR indicator[Title/Abstract] OR metric [Title/Abstract]). For Embase, the following terms were used: ('research'/exp OR 'research') AND ('capacity building'/exp OR 'capacity building') AND ('tool':ti, ab OR 'indicator':ti, ab OR metric:ti,ab). For ERIC, the following were used: ((research) AND ((“capacity building”)) AND (((faculty)))) AND ((TI tool OR AB tool) OR (TI indicator OR AB indicator) OR (TI metric OR AB metric)). For CINAHL, the search utilized ((MH “Research+”) OR (MH “Publishing+”)) AND (“capacity building”) AND ((TI tool OR AB tool) OR (TI indicator OR AB indicator) OR (TI metric OR AB metric)). Finally, for Google Scholar via Publish or Perish, the following search was utilized: research AND medical AND faculty AND capacity AND tool.