

Strategies for Supporting Physician–Scientists in Faculty Roles: A Narrative Review With Key Informant Consultations

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Abstract

Purpose

Physician–scientists are a population in decline globally. Solutions to reverse this decline often have focused on the training pipeline. Less attention has been paid to reducing attrition post training, when physician–scientists take up faculty roles. However, this period is a known time of vulnerability because of the pressures of clinical duties and the long timeline to securing independent research funding. This narrative review explored existing knowledge regarding how best to support physician–scientists for success in their faculty roles.

Method

The authors searched the Medline, Embase, ERIC, and Cochrane Library

databases for articles published from 2000 to 2016 on this topic and interviewed key informants in 2015 to solicit their input on the review results.

Results

The authors reviewed 78 articles and interviewed 16 key informants. From the literature, they developed a framework of organizational (facilitate mentorship, foster community, value the physician–scientist role, minimize financial barriers) and individual (develop professional and research skills) strategies for supporting physician–scientists. They also outlined key knowledge gaps representing topics either

rarely or never addressed in the reviewed articles (percent research time, structural hypocrisy, objective assessment, group metrics, professional identity). The key informants confirmed the identified strategies and discussed how the gaps were particularly important and impactful.

Conclusions

This framework offers a basis for assessing an organization's existing support strategies, identifying outstanding needs, and developing targeted programming. The identified gaps require attention, as they threaten to undermine the benefits of existing support strategies.

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Physician–scientists—academic physicians who devote a substantial proportion of their time to conducting research—are a population in decline globally.^{1,2} U.S. data suggest that physician–scientists have been a decreasing proportion of the overall physician population since 1980^{2,3} and that this group is both aging and 25% smaller than it was two decades ago.^{2,4} This decline threatens scientific discovery

and its translation into disease diagnosis and treatment.^{1,2,5,6}

The causes of this decline have been well characterized in the literature. They include the lower income of physician–scientists compared with their clinical peers,² a lack of resources for research,^{2,5} the difficulty of balancing clinical and scientific commitments,⁷ and a lack of organizational support for the research enterprise.^{2,6} Solutions to reverse this decline have tended to focus on the physician–scientist training process, also known as the pipeline. To reduce attrition at vulnerable points in this pipeline, strategies have been developed to address the problems that exist before training begins,⁸ those during medical school,^{9–11} and those during residency.¹²

Much less attention has been paid to reducing this attrition post training, when physician–scientists have taken up faculty roles. However, this period is a known time of vulnerability because of the pressures of clinical duties and the long timeline to securing independent research funding, which on average

occurs when physician–scientists are in their mid-40s.^{13,14} Our search of the literature did not reveal any existing reviews of the state of knowledge regarding how to support physician–scientists who are already in their faculty roles. As part of a local, strategic mandate to promote the physician–scientist role and strengthen our medical school's research culture, we sought to inform future approaches and research by synthesizing the findings of studies that examined strategies for supporting physician–scientists in faculty roles and identifying where knowledge gaps exist.

Method

We used a narrative review approach¹⁵ to thematically synthesize the current literature and identify gaps in existing knowledge. We supplemented that review with consultations with key informants.

Literature search

In November 2014, we searched the Medline, Embase, Educational Resources Information Centre (ERIC), and Cochrane Library databases for articles

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on three key concepts—new faculty, support, and physician–scientists. As the early 2000s have been identified as a global crisis point in the development and maintenance of a population of physician–scientists,^{13,16} we restricted our search to the literature published after 2000 to capture information that was relevant to the contemporary state of support for physician–scientist faculty.

Articles that described or evaluated existing strategies for supporting physician–scientists in faculty roles post training, that proposed strategies that could benefit such scientists, or that explored the issue of support for physician–scientist faculty in a manner that highlighted existing or potential solutions were included for review. Descriptive articles that elaborated on the problems facing physician–scientists but did not describe methods of improvement or support were excluded. Given our focus on physician–scientists, articles addressing other clinician–scientist groups (e.g., nurse scientists)

also were excluded. In addition, we excluded articles that focused exclusively on the training pipeline and did not substantively consider posttraining faculty experiences and support. Where training and faculty support overlapped, such as in articles considering fellowship positions for physician–scientists, we included the articles. Any publication type and study design were considered eligible for inclusion. Our complete article review and selection process is described in Figure 1.

We extracted data pertaining to demographic and study-level characteristics (e.g., publication year, publication type, study design) from the included articles. For empirical articles, we categorized the study design according to the article’s description of its overarching methodology or its data collection process. Our thematic analysis involved identifying all physician–scientist faculty support strategies described in the included articles and analyzing them for recurring

themes, which we used to group similar strategies. For instance, we grouped all strategies related to mentorship (e.g., training mentors, establishing formal mentorship programs, rewarding mentors, gender in mentoring) within the theme *facilitate mentorship*. Finally, we sorted these thematic groupings into either organizational or individual strategies. We defined organizational strategies as those that targeted structures or processes at the department, faculty group, hospital, or national funding system level to support the transition, development, retention, and success of physician–scientist faculty. We defined individual strategies as those that focused on the development of skills in individual physician–scientist faculty members. We used NVivo 10 (QSR International, Doncaster, Australia) to organize our thematic analysis.¹⁷

In September 2016, we updated our literature search from 2014 to the present. Given that all the articles included in our initial 2000–2014 search were available in Medline, we restricted our update to this one database. We applied the same thematic framework of strategies and gaps to this updated list of articles, with attention to emergent issues that could refine the framework.

Key informant consultations

We included a consultation phase in our study to solicit expert opinions on the patterns and gaps we identified in our narrative review of the literature. Reflecting our aim to improve support for physician–scientist faculty in our local institutional context, we used a combination of purposive and convenience sampling to recruit local stakeholders representing currently active physician–scientists from a variety of clinical backgrounds and career stages and, in some cases, with comparative experience in a physician–scientist role at more than just our organization. We also included in this sample a selection of department and faculty leaders with the ability to influence physician–scientist faculty experiences. Beyond this local sample of institutional stakeholders, we used convenience sampling to recruit a small selection of the authors of the articles included in our review. These stakeholders were viewed as experts who might challenge or elaborate on our findings based on their own knowledge of new or unpublished work about support for physician–scientist faculty. Finally, we used

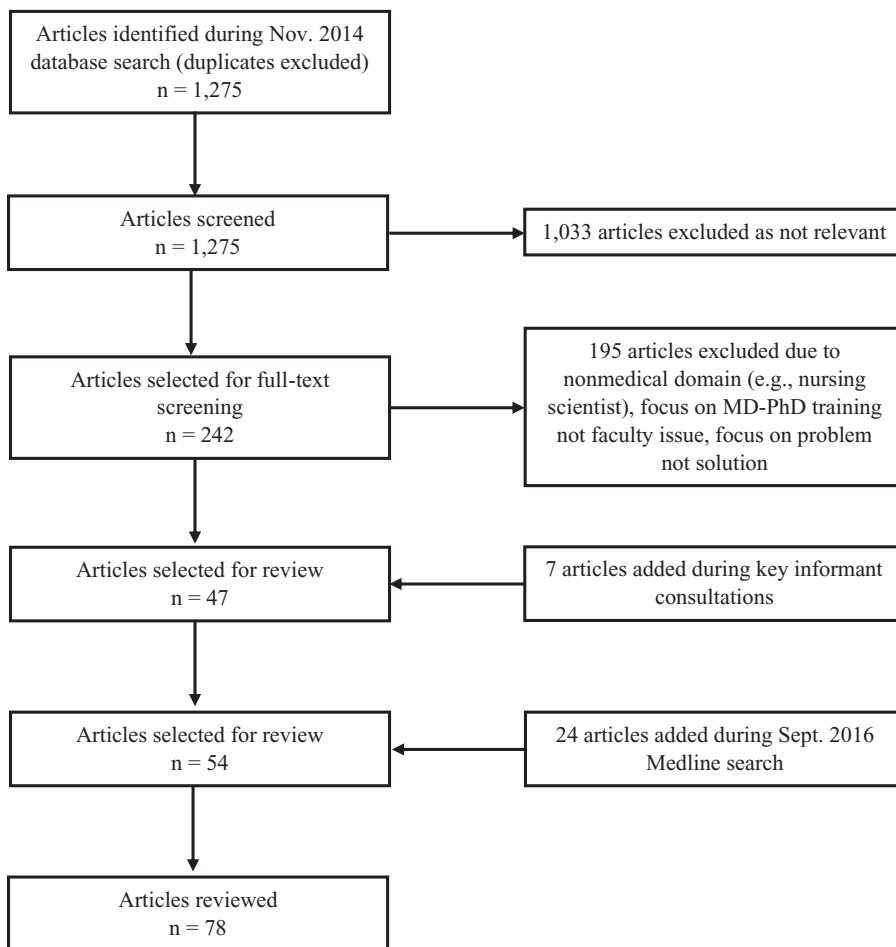


Figure 1 Article search and selection process for a narrative review of the literature on strategies to support physician–scientist faculty, 2000–2016.

snowball sampling to recruit individuals recommended by other stakeholders as having relevant insights into this topic.¹⁸ Our interview sample was not intended to be representative or comprehensive of all potential stakeholder perspectives, and resource constraints restricted the sample size. Rather, we purposefully selected key informants who might have particular insight into our study questions and narrative review results based on their roles and career experiences.

We used open-ended questions to guide the key informant interviews and to prompt reflection and conversation. The interviews were conducted between April and July 2015 by one researcher (L.L.) either in person, by telephone, or by Skype; interviews lasted 35 to 70 minutes and were either audio-recorded or reconstructed from handwritten notes made by the interviewer using standard interview reconstruction techniques.¹⁹ Each interview asked the participant to describe experiences with/ as a physician–scientist faculty member and then solicited opinions regarding the faculty support strategies identified in our review, as well as perspectives on the knowledge gaps we identified. In addition to commenting on the patterns and gaps we identified in our thematic analysis, participants identified additional relevant articles, largely from the gray literature (i.e., outside the peer-reviewed academic literature), for inclusion in our review. Interview data were analyzed iteratively and thematically (L.L.), following constant comparative techniques.

The Western University research ethics board provided ethical approval for the key informant interviews.

Results

Our initial November 2014 literature search and screening process identified 47 articles for full review; stakeholders drew our attention to an additional 7 articles, and our September 2016 Medline update identified another 24 articles, for a total of 78 articles (see Figure 1 and Supplemental Digital Appendix 1, available at <http://links.lww.com/ACADMED/A473>, for a complete list of all included articles). One of the 2016 articles we included was a systematic review and narrative synthesis focusing on the factors that facilitated or constrained translational research.²⁰ While relevant to our inquiry, this review did not

duplicate our efforts as it did not focus specifically on physician–scientist faculty and strategies to support those in this role.

Description of included articles

In terms of publication type, most of the included articles were empirical studies (33) or commentaries (24); white papers (4), book chapters (7), editorials (6), and letters (2) were also represented, as were 1 presidential address and 1 published abstract. The empirical studies included a range of study designs, most commonly a survey method (13) design but also an interview (4), focus group workshop (4), cohort comparison (4), database research (5), systematic review (2), or randomized controlled trial (1) design.

Framework of strategies to support physician–scientist faculty

From our thematic analysis, we created a framework of four organizational and two individual strategies for supporting physician–scientist faculty (see Figure 2). Organizational and individual support strategies recurred across the 78 included articles; we made no changes to the framework as a result of our September 2016 Medline update. Below, we describe the organizational strategies followed by the individual strategies we identified, defining each and providing selected representative examples from the included articles.

Organizational strategies. Organizational strategies were those that centered on structures or processes in the organization or system that could support the transition, development, retention, and success of physician–scientist faculty.

We identified four main categories of organizational support strategies.

The most popular and well-supported organizational strategy was to *facilitate mentorship*. More than half of the articles subscribed to the position that mentorship was invaluable for physician–scientists' success, describing existing mentorship programs and strategies to improve and reward mentorship. Incentives for mentorship have been proposed to increase the dedication of effective mentors, attract new mentors, and inculcate a culture of mentoring excellence.²¹ For instance, the K24 career development award can be used to reward mentorship, although it is reported to be underutilized.¹² Another proposed strategy was to fund late-career physician–scientists who focused their attention on mentoring their early-career colleagues.²² Discussions of mentorship quality included considerations of how to improve mentoring skills, which can be taught.²³ Gender was an important factor in mentorship; women prioritized different skills in their mentors than men, and gender tensions in mentoring relationships caused female physician–scientists to leave that career path.²⁴ Mentoring programs also were instituted to explicitly support physician–scientists from underrepresented backgrounds,²⁵ and longitudinal mentorship was recognized as important.²⁶ Finally, the role of mentorship as a matter of culture and the need to consistently reinforce the importance of mentorship and align incentives to improve it were described as keys to higher participation in and higher quality of mentorship.^{22,27}

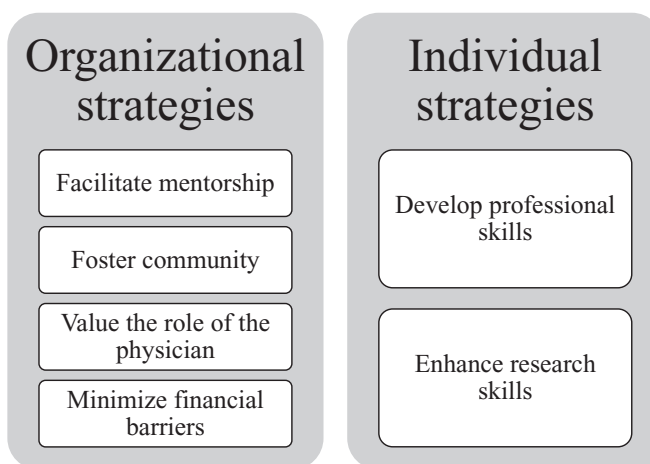


Figure 2 Framework of organizational and individual strategies to support physician–scientist faculty, identified during a narrative review of the literature, 2000–2016.

Another organizational strategy well represented across the reviewed articles was to *foster community*. This strategy was aimed at ensuring that physician–scientists were not isolated, and it included involving them in relevant networks and groups based on the evidence that well-resourced teams of talented and highly focused scientists produce the majority of significant research discoveries²⁸ and that multidisciplinary collaboration can increase the productivity of a physician–scientist.²⁹ In addition, community can be fostered by establishing structural collaborations between departments and institutions to bridge the clinical and scientific worlds. Program-level structures, such as fellowships, were one recommended approach to building these bridges.^{13,16} For example, the Doris Duke Clinical Scientist Development Award nurtures long-term commitment to research in early-career physician–scientists.³⁰ Promoting a research culture was another facet of fostering community that was discussed in the literature. According to one report, programs can demonstrate their research culture when they “value research, nurture those who perform it, provide resources for its conduct, and create an environment in which clinical investigation is integrated into the fabric of professional life.”³¹ Finally, a physician–scientist career development office was recommended as a structure for fostering community.³²

A third organizational strategy we identified in the literature was to *value the role of the physician–scientist*. This strategy was twofold—the organization must view physician–scientists as important members, and it must be willing to tangibly support their research efforts. A common strategy for valuing the role of the physician–scientist was to offer substantial protected research time.^{30,33} For example, one study proposed that academic institutions should “accept 80% research commitment of a 40-hour week, with only 8 hours for clinical, teaching, and committee activities,”³⁵ while another proposed no more than 8 weeks of clinical service annually for physician–scientists.³⁴ Similarly, more than 75% protected research time for physician–scientists was a common benchmark in the literature.² In addition, another

strategy for valuing the role of the physician–scientist was to offer professional development programs to facilitate the success of this population. These offerings included programs that helped physician–scientist trainees transition to faculty positions, such as the physician–scientist training program at Washington University School of Medicine in St. Louis, which reported a physician–scientist retention rate of 80%.³⁵ Other articles described efforts to improve public recognition for physician–scientists as a way of demonstrating their value; examples included the creation of internal awards and garnering publicity regarding the scientific progress led by these scientists.^{2,36}

The last organizational strategy identified in our review was to *minimize financial barriers*. This strategy entailed providing physician–scientists with the financial incentives to commit to a research career and the financial resources to succeed in doing so. Some articles took a strong stance on this strategy, arguing for equal compensation for physicians and physician–scientists so that disparate salaries would not negatively impact career decisions.² One article explored the implications of three academic practice plan models in terms of providing meaningful support for physician–scientists.³⁷ Other funding strategies were aimed at making a physician–scientist career financially attractive and facilitating the financial transition from trainee to faculty.³⁸ Bridge funding programs, for instance, have had some success. Vanderbilt

School of Medicine’s physician–scientist faculty development program, which included bridge funding, resulted in more independent funding awards and at an earlier age but not consistently more publications.³³ Debt relief also was implemented as a way of minimizing the financial barrier associated with lower physician–scientist salaries relative to those of their clinical colleagues.³⁹ In addition, career or salary awards positively impacted physician–scientists’ success, as measured by subsequent national funding awards such as R01 awards from the National Institutes of Health and by promotion rates and the assumption of leadership positions.⁴⁰ Finally, intramural, extramural, and seed funding programs had a positive impact on physician–scientists’ success.^{41–43}

Individual strategies. The two individual strategies we identified targeted the development of skills in individual physician–scientist faculty members.

The first individual strategy was to *develop professional skills* to support physician–scientists’ success. Time management was a central skill that physician–scientists needed to hone, given the unique time demands associated with balancing research and clinical duties, particularly when expectations for the latter were perceived to be increasing.³⁵ Additionally, the ability to collaborate with other researchers was identified as a necessary skill that physician–scientists may not have developed

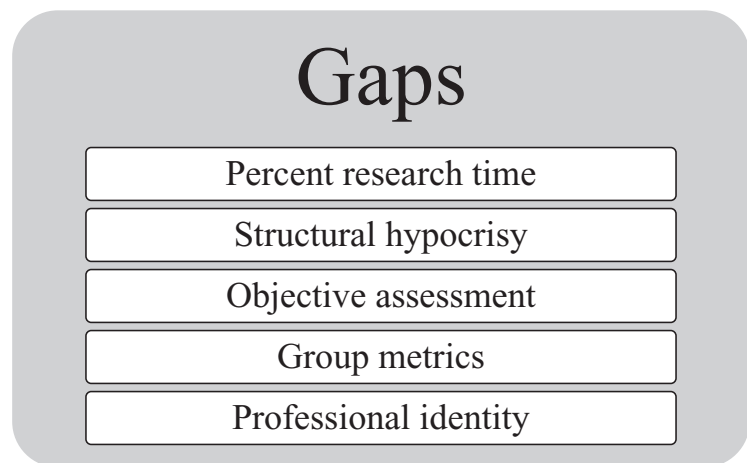


Figure 3 Gaps in the literature on strategies to support physician–scientist faculty, identified during a narrative review of the literature, 2000–2016.

fully during training.²⁸ The ability to collaborate across disciplines was another important emerging skill that physician–scientists may need to develop, given the emphasis on being interdisciplinary in many funding mandates. Finally, teaching was identified as a professional skill that physician–scientists may need to develop further to advance their careers.⁴⁴

The second individual strategy was to *enhance research skills*. These research skills included lab management, grant writing, and the ability to prioritize research questions.⁴⁵

Knowledge gaps

In addition to thematically categorizing the existing strategies for supporting physician–scientist faculty, we also identified gaps in the literature (see Figure 3). These gaps referred to topics that were only rarely or never considered in the articles we reviewed or were flagged during our analysis as relevant but missing from the literature. *Percent research time* referred to the lack of critical discussion of or evidence for the commonly reported standard of 75% research time for physician–scientist faculty. *Structural hypocrisy* referred to the literature’s failure to critically grapple with the widely recognized tension between clinical and research priorities and between the physician–scientist role on paper versus in practice. *Objective assessment* referred to the paucity of data regarding physician–scientists’ performance. *Group metrics* pointed to the disconnect between the literature’s persistent recognition of the importance of a research culture and its exclusive focus on individual performance metrics. *Professional identity* pointed out that, while the literature discussed the physician–scientist as though it were a recognizable and stable identity, very few articles explicitly considered how that identity is formed⁴⁶ or the nature and limitations of its conventional definition.⁴⁷ We elaborate on these five gaps in the next section on the findings from our key informant interviews.

Key informant consultations

We contacted 19 key informants (KIs), 16 of whom responded and were interviewed. Characteristics of this group included the following: 6 authors of reviewed articles; 10 local, 3 national,

and 3 international participants (2 from the United States, 1 from the United Kingdom); 5 physician–scientists within 3 years of their first faculty appointment, 5 physician–scientists with comparative institutional experience (3 in Canada, 2 in the United States), 4 senior physician–scientists with more than 15 years since their first faculty appointment; and 7 individuals with leadership roles (e.g., deaconal role, department chair). All key informants came from institutions with a professed interest in promoting research as part of the academic medical culture and mandate.

When presented with the support strategies we identified during our review, the key informants reported that they were “reasonable” and “unsurprising” (KI1) and “bread and butter stuff” (KI5). The key informants confirmed the importance of mentorship and shared their own experiences with mentorship programs; they also agreed with the importance of fostering community and the danger of isolating physician–scientists. In addition, the support strategies focused on protecting and valuing the physician–scientist role resonated with them, and they expressed strong opinions about financial strategies to achieve equity and discussed how these were complicated by different incentive systems for clinical and research work within different institutions, departments, and divisions. Finally, they supported the premise that early-career physician–scientist faculty need to continue to develop their professional and research skills.

Amid the key informants’ strong confirmation of many of the support strategies we identified, they also expressed some differences of opinion in how to operationalize these efforts. For instance, while the organizational strategy of minimizing financial barriers resonated with all the key informants, they took different stances on operationalizing this strategy. Some asserted that “you must financially reward research and clinical activities at the same level. It won’t work otherwise” (KI3). Others argued that “‘equitable’ does not mean the same money for clinical and research; it means allowing people the privilege of doing research—those slugging away clinically should earn more” (KI2). Operationalizing mentorship programs also sparked

divergent views. Some advocated for formal programs: “everyone needs to be matched, with regular meeting and reporting” (KI7), while others questioned the effectiveness of formal policies and programs: “We have a mentorship policy. And while I agree that’s important, it doesn’t guarantee good mentorship. Not at all” (KI4).

The key informants talked at length, and often passionately, about the gaps we identified in our review. They argued that these issues could make or break a physician–scientist’s career, regardless of the available support strategies such as mentorship policies, clear job descriptions, or financial equity. Below, we discuss in more detail each gap from the key informants’ perspectives.

Regarding the issue of *percent research time*, key informants did not accept unchallenged the standard of 75% research time for physician–scientists, and most asserted that this issue required more attention. Some identified specialty context as a factor that should be considered. For example, one participant explained that “75% for a surgeon is likely not possible” (KI8). Others questioned the tripartite structure of academic roles that include clinical, research, and teaching work: “It does not make sense to train a physician–scientist and then ask them to teach. Research supervision, yes; teaching, no” (KI15). A few participants remarked that 75% research time can make it difficult for physician–scientists to maintain their clinical competence, and they advocated for the benefits of a narrowly defined, rather than generalist, scope of clinical practice for these faculty. Finally, some participants conceptualized percent research time as something that should change over a physician–scientist’s career.

The *structural hypocrisy* gap resonated strongly with all the key informants. They acknowledged the fundamental tension between clinical and research priorities at the organizational level. One department chair provocatively asked: “That 75% ‘protection’—what does it really mean if clinic is full?” (KI7). Another participant explained that “a new faculty [member] will always feel pressure to be a good citizen if their ARC [academic role category] is impossible given clinical service needs” (KI12). Similarly, some key

informants argued that support strategies need to reflect the reality that “it’s ultimately the clinical unit that decides [the physician–scientist’s] fate” (KI14). Such comments reinforced our sense of a gap in the literature regarding the tension between physician–scientists’ clinical and research roles. The literature referenced this issue but rarely moved beyond a discourse about how individuals effectively balance their multiple roles.⁵

Regarding the *objective assessment* gap, the key informants confirmed and bemoaned the lack of information about the health of the physician–scientist population, in their own institutional settings and beyond. Those in leadership roles were particularly concerned about how this gap impeded their ability to monitor the progress of their faculty: “We need a clearer description for what excellence looks like, or what average looks like, for physician–scientists at various career points” (KI8). Similarly, they perceived that this lack of objective assessment limited their ability to compare their physician–scientists with those in other groups. One participant explained how her or his institution had addressed this problem: “Most of us had no idea—how do my physician–scientists compare to those in other divisions? So now we do an annual review at the decanal level for all physician–scientists” (KI10).

The *group metrics* gap resonated less with the key informants than the other gaps. The most common metric used to assess the impact of support strategies was individual physician–scientist performance (e.g., average number of publications per year¹⁶ or competency in selected areas of research³⁷), but many support strategies were targeted at the group level rather than the individual level (e.g., strategies to foster mentorship culture or research culture). While the key informants acknowledged that they did not know of any group metrics in use, this gap did not elicit much interest, except regarding the impact of the clinical division culture on the success of physician–scientist faculty. As one participant put it: “Physician–scientists live or die according to divisional culture. How do we measure that?” (KI3).

The *professional identity* gap also did not immediately resonate with the key informants. This may have been because

it was a foreign term to many of those interviewed, who needed to ask what it meant. When the idea was explained, however, many participants made evocative comments about the physician–scientist identity and what it means to faculty survival and success:

What are you when you have this role? You’re neither fish nor fowl. (KI11)

You could be in clinic, where mostly patients will be satisfied and your colleagues will be grateful. You could feel so GOOD. But you’re in the lab reading another scathing rejection letter. Who does this? Why? You’d better know it inside, cause from the outside it’s just, well, crazy. (KI16)

Such comments suggested that how the dual role of the physician–scientist develops, and how it can be sustained in the face of organizational pressures and academic adversity, are important questions for the field to address in the future.

Discussion

The existing literature on strategies to support physician–scientist faculty is limited relative to the more extensive literature characterizing concerns about the physician–scientist workforce and arguing for solutions centered on the training process. Furthermore, empirical work on support for physician–scientist faculty is even more limited; only 33 of the 78 articles we reviewed were designed to systematically collect primary data and draw conclusions. A similar number of articles were commentaries, editorials, and letters, which suggests that the question of how to best support physician–scientist faculty is an area in need of further research.

From our September 2016 Medline search, we identified 24 additional articles, which represents a relative upswing in publication compared with the 47 articles we included from our initial 2000–2014 search. Given that our thematic framework based on our initial review accounted for the suggested strategies and salient gaps described in these more recent articles, this publication upswing seems more representative of a growing chorus of shared approaches regarding support for physician–scientists than an advance in new knowledge. Aside from one article targeting the issue of professional identity

and one exploring different models of academic practice plans for physician–scientists, the gaps we identified in the 2000–2014 literature largely remained in the 24 additional papers from 2015–2016 that we analyzed. Given this relative stasis, we hope that this narrative review inspires the field to take a necessary step forward by moving the conversation beyond descriptive, specialty-specific reports of accepted strategies, toward a more critical consideration of the gaps and tensions in our current knowledge.

Our findings suggest that certain organizational and individual strategies for supporting physician–scientist faculty are well accepted in the literature. The support strategies we identified generally resonated with the key informants we interviewed, although there were some divergent opinions about how to operationalize them. However, the key informants were more interested in discussing the gaps we identified during our review than exploring the existing support strategies. They emphasized the lack of evidence for the widely accepted standard of 75% research time for physician–scientist faculty, the problem of structural hypocrisy underpinning the tension between clinical and research expectations, and the lack of objective assessment data to monitor physician–scientists’ performance within and across institutions and countries. The key informants cautioned that these issues could undermine physician–scientists’ success even if support strategies, such as mentorship, protected time, and skills development, are in place. Therefore, more attention should be paid to these issues and to their interactions, such as the possible effect of structural hypocrisy on professional identity, as the field seeks to improve its support for physician–scientist faculty.

Gaps in the literature on group metrics and professional identity also require our attention. Many of the identified support strategies targeted group-level processes, such as mentorship culture and research collaboration, and robust evaluation of such initiatives cannot be achieved simply by measuring individuals’ performance. Evaluations at the group level are possible and have been used in other domains, such as patient safety and organizational change.³² We recommend looking to these domains for a model to follow. Finally, we need more theoretically

informed scholarship regarding how the professional identity of physician–scientists is formed and sustained. We must not only attend to the logistics of salary, job description, and performance metrics but also consider what it means to develop and sustain such an identity in today’s academic health sciences environment. Professional identity development has been recognized in the medical education literature as a key factor in physician socialization.⁴⁸ The question of how a coherent identity forms for physician–scientists is worthy of attention, particularly given the widespread recognition of a fundamental tension between the research and clinical dimensions of that identity.⁴⁶

Limitations

Our study had a number of limitations. First, the databases we used created a bias toward academic work; while we included a number of reports from the gray literature, which either were referred to us by the key informants or were picked up in our review of the references in the published work, a more comprehensive search and review of the gray literature would undoubtedly enrich our framework of available strategies for supporting physician–scientist faculty. Further, while we excluded articles relating to nonphysician–scientists to maintain our focus, we recognize that these articles may have contained relevant information regarding shared challenges among clinician–scientists. Next, we restricted our 2016 search to Medline. We made this decision because all of the published literature in our initial 2000–2014 search was indexed in this database; however, we may have identified other relevant literature if our update had included all four of the databases we originally searched. Finally, while our consultation with key informants was a strength of this narrative review, our key informant sample was limited and selective. We prioritized local stakeholders from our own institution, and our convenience and snowball sampling of authors and other physician–scientist leaders may have introduced unconscious bias. However, our experience here with key informant interviews supports recent arguments for adding a consultation phase to review methodologies.⁴⁹ Reviews tend to emphasize what is present in our current knowledge; adding a consultation phase could provide insight into what is absent or taken for granted.

Conclusions

From our narrative review of the literature, we created a framework of organizational and individual strategies to systematically support physician–scientist faculty. However, given the limited empirical data we found, we are unable to recommend a particular constellation of strategies that most likely would be effective. Rather, we suggest this framework as a way of assessing an organization’s existing support strategies, identifying outstanding needs, and developing targeted programming. Attention to the gaps we identified will be particularly critical to moving our knowledge beyond existing support strategies to grapple with thorny issues, such as professional identity and structural hypocrisy. Finally, we encourage those working in this field to conduct systematic empirical studies that both describe the implementation and evaluate the impacts of their work.

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