RESEARCH PAPER

Exploring Mentorship as a Strategy to Build Capacity and Optimize the Embedded Scientist Workforce

Le mentorat comme stratégie pour le renforcement des capacités et pour l'optimisation de la main-d'œuvre scientifique enchâssée

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Abstract

Background: Mentorship plays a significant role in career development in academic and applied settings, but little is documented about its role in the experiential learning of academic trainees embedded in health system organizations. The experiences of the first cohort of Canada's Health System Impact (HSI) Fellowship program can provide insights into how mentorship in this innovative type of training can work.

Objectives: To understand the mentorship strategies that were used and to explore fellows' and supervisors' perspectives and experiences on the effectiveness and value of those strategies.

Methods: Data from the surveys of fellows and their supervisors and a panel rooted in the lived experience of the first HSI Fellowship cohort were used.

Results: Health system and academic supervisors developed a range of innovative, individualized and effective approaches for guiding their fellows, such as providing the fellow with a committee of mentors within the organization, holding regular meetings with the fellow and both the health system and the academic supervisor and leveraging their own network to expand the network and resources available to the fellow.

Conclusion: The results suggest that engaging senior leadership in health system settings has provided positive experiences for both fellows and their mentors.

Résumé

Contexte : Le mentorat joue un rôle important pour le développement de carrière dans les établissements universitaires ou de santé, mais il y a peu de documentation sur son rôle dans l'apprentissage expérientiel d'étudiants universitaires enchâssés dans des organismes de santé. L'expérience de la première cohorte de boursiers du programme des bourses d'apprentissage en matière d'impact sur le système de santé (BAIS) offre des pistes sur le fonctionnement du mentorat dans ce type novateur de formation.

Objectifs : Mieux comprendre les stratégies de mentorat utilisées et étudier les points de vue et expériences des boursiers et des superviseurs quant à l'efficacité et à l'importance de ces stratégies.

Méthode : Nous avons utilisé les données recueillies lors d'enquêtes auprès des boursiers et des superviseurs ainsi que celles d'un panel ancré dans l'expérience vécue par la première cohorte de boursiers.

Résultats : Les superviseurs universitaires et ceux des organismes d'accueil ont développé une gamme d'approches novatrices, personnalisées et efficaces pour guider les boursiers, telles que leur permettre d'accéder à un comité de mentors au sein de l'organisme, la tenue de rencontres régulières et la mise à profit de leurs propres réseaux afin d'accroître le réseau et les ressources pour les boursiers.

Conclusion : Les résultats font voir que l'engagement de la haute direction dans l'organisme d'accueil se traduit par une expérience positive pour les boursiers et leurs mentors.

Background

Canada's Health System Impact (HSI) Fellowship program provides a new type of training for highly qualified post-doctoral (and now doctoral) students to support their experiential learning and enriched competency development within health system organizations. Its primary goal is to enhance the career readiness of health services and policy research (HSPR) doctoral graduates and elevate their capacity to make an impact on our healthcare systems in careers within and beyond the academy. It is led by the Canadian Institutes of Health Research's Institute of Health Services and Policy Research (CIHR-IHSPR) in collaboration with many partner organizations and is a key initiative of Canada's HSPR Training Modernization Strategy (CHSPRA TMWG 2015a).

Each fellowship is co-sponsored by a health system (i.e., partner) organization. The partner organization provides an embedded position inside its structure for a period of one or two years. A key feature is a dual supervision and mentorship approach in which each fellow receives supervision and guidance from a senior decision-maker from the partner organization (the health system supervisor [HSS]) and an academic [the academic supervisor [AS]) at a Canadian university (see McMahon et al. 2019 for a detailed program overview). Although there is considerable literature on mentorship in academic and non-academic organizations (Allen et al. 2004; Claman 2010; Eller et al. 2014; Gagliardi et al. 2014; Pfund et al. 2014; Sambunjak et al. 2006, 2010; Sherrill et al. 2012; Tjan 2017; Tong and Kram 2013; Walsh and Borkowski 1999), less is known about mentorship in the experiential learning of doctoral and post-doctoral trainees embedded in health system organizations (including this dual mentorship approach [Halvorson et al. 2015; Hamelin and Paradis 2018]).

The HSI Fellowship program has now funded two cohorts (see Table 1 for key details). There is considerable heterogeneity in the types of partner organizations involved (e.g., government, delivery organizations, health charities, pan-Canadian health organizations, small not-for-profit organizations), their organizational characteristics (e.g., size and complexity) and their existing research infrastructures (Ellen et al. 2011). The range of HSSs includes CEOs of major provincial and regional health systems, hospitals and associations of health professionals to directors of units within small, medium and large health organizations. Table 1 identifies HSS's educational, research and clinical backgrounds.

CIHR-IHSPR emphasized the importance of the mentorship dimension in all stages of the program – including from the initial funding opportunity peer review criteria (CIHR 2017) to the professional development plans required by fellows and supervisors at regular intervals throughout the fellowship – but did not define mentorship or prescribe what the mentorship plans should look like or how they were to be implemented. Flexibility in the approach was intended to allow each fellowship to be adapted to the individual fellow's goals and to the partner organization's context.

TABLE 1. Health System Impact Fellowship: description of cohorts

	Round 1 (2017)	Round 2 (2018)
Number of funded fellows	46 post-doctoral fellows • 24 1-year fellows • 22 2-year fellows	49 fellows • 20 doctoral fellows (1-year) • 29 post-doctoral fellows (2-years)
Number of host partner organizations	38 organizations • 6 (16%) healthcare delivery sector • 17 (45%) public sector • 14 (37%) not-for-profit sector • 1 (3%) private sector	39* • 4 (10%) healthcare delivery sector • 21 (54%) public sector • 13 (33%) not-for-profit sector • 1 (3%) private sector
Number of health system supervisors	43	47**
Educational background of health system supervisor	• PhD: 15 (35%) • MD: 10 (23%) • Other clinical degree: 6 (14%) • Master's–research***: 16 (37%) • Master's–non-research: 10 (23%) • Other professional degree: 1 (2%)	• PhD: 17 (36%) • MD: 13 (28%) • Other clinical degree: 4 (8%) • Master's–research***: 12 (25%) • Master's–non-research: 6 (13%) • Other professional degree: 5 (11%)
Number of academic training programs	17	19
Number of academic supervisors	44	49

*36% of host partners participated in Round 1.
**15% also supervised a fellow in Round 1.
***Includes MDs with MSc.

The objective of the present study was to examine the mentorship approaches used by HSSs in the HSI Fellowship program, identify those that were perceived to be effective by fellows and supervisors and ascertain the benefits and impacts that supervisors observed from participating in the program. The overall goal is to contribute to our understanding of the role and value of mentorship in embedded fellowships and to help identify promising practices that can be used to improve this and similar programs moving forward.

Methods

The initial design of the fellowship program was informed by a review of the literature on the changing profile of graduate education and on experiential training programs in the US, Europe and elsewhere (summarized in CHSPRA TMWG [2015a,b]). Delineation of the core issues about the mentorship component was based on a review of the literature on the role of mentorship in career development in business organizations, health systems and universities (Allen et al. 2004; Claman 2010; Eby et al. 2008; Eller et al. 2014; Gagliardi et al. 2014; Nowell et al. 2017; Sambunjak et al. 2006; Sherrill et al. 2012; Tjan 2017; Tong and Kram 2013; Walsh and Borkowski 1999). Given that the HSI Fellowship program set clear objectives regarding the importance of supervision and mentorship but did not prescribe the

details of what should be offered or how to do so, the Training Modernization Working Group (TMWG) identified an opportunity to study the initial years of the program in order to learn about the mentorship strategies that were used and to explore fellows' and supervisors' perspectives and experiences regarding the effectiveness and value of those strategies.

Informed by the mentorship literature and by the experience of the TMWG co-leads (S.B. and A.B.), a set of questions was developed (Box 1) around which this study's efforts were structured. The approach involved four components and the inaugural cohort of fellows (n = 46) and supervisors (n = 87):

BOX 1. Key questions posed to mentors

1. Why did you get involved in the HSI Fellowship program? What were your primary motivations?
2. What were your "essential ingredients" to your mentorship approach (what did you do that worked well)?
3. Were there any challenges? What would you do differently next time?
4. Fellows also have an academic supervisor. To what extent do you and the academic supervisor collaborate to support the fellow? What are some of the benefits of this joint health system and academic involvement in the fellowship (benefits to the fellow, to you, to your organization)?
5. What were the impacts (instrumental, conceptual, symbolic) for you as a mentor and for your organization?

1. a questionnaire sent to the inaugural cohort of fellows inviting them to nominate an "outstanding health system and/or academic mentor";
2. sharing of the structured questions with the nominated mentors for response and inviting them to participate on a mentorship panel at the National Cohort Retreat and contribute to the present study to incorporate their lived experience;
3. including in the fellows' 12-month competency assessments a set of 13 Likert-scaled questions about their satisfaction with various aspects of the program and mentorship received; and
4. including in the supervisors' 12-month competency assessments of their fellow(s) three of the questions in Box 1 (#2, #3 and #5) and a question about how frequently they had met with their fellow to discuss professional development.

Results

The results are structured around the five key questions that informed this work (see Box 1) and draw primarily on the experiences of the HSSs (n = 43) given the program's emphasis on experiential learning within health system organizations.

Motivation for involvement

The primary motivation for HSS's involvement was to add research capacity in a partnered and cost-effective manner to address organizational priorities and to implement studies and program evaluations that they would not otherwise be able to undertake. Several panelists and survey respondents noted that adding university-affiliated research capacity and a partnership with well-established academic experts would give their reports and

recommendations added credibility in the eyes of key stakeholders. Several contributors used the term "learning health system" and indicated that they hoped that having researchers and research projects active within their organization would increase awareness among their colleagues of the importance of evidence and of academic partnerships in supporting effective decision-making. One participant noted that he/she regularly hired new post-graduate employees and hoped that the HSI Fellowship could generate lessons about a more codified, efficient and effective approach to training graduates for success within health system organizations.

Mentorship techniques: essential ingredients

HSSs emphasized regular, frequent, face-to-face meetings (ranging from weekly to every few months) with their fellow as a crucial element in effective mentorship, and many noted the importance of meeting simultaneously with the fellow and the AS. Several panelists and survey respondents, especially among the HSSs, emphasized the importance of having an open-door policy so that the fellow had good access to them. A number of HSSs were adamant that the key to effective mentorship with their fellows was listening.

HSSs noted the importance of "co-creating" the fellow's project as a key to developing a productive partnership. They emphasized the importance of getting off to a good and quick start through intensive upfront involvement with the fellow and the AS. Supervisors whose fellows were funded for one year identified designing a project with a feasible scope to ensure completion as critical. Also perceived as important was providing positive and encouraging feedback, especially when a new fellow was grappling with the complexity of the challenges involved in combining academic and applied work. Many supervisors recommended seeking to understand the fellow beyond academic credentials and interests in order to attain an enhanced understanding of the fellow's motivation and potential. HSSs placed considerable emphasis on working to integrate the fellow effectively into the regular operations of their organization by actively brokering relationships, leveraging the supervisor's own network of contacts to expand the people and resources available to the fellow and involving the fellow in initiatives other than the fellow's primary project, including giving the fellow leadership opportunities in some of these activities. Some HSSs involved other key figures in the organization to collaborate in providing the fellow with a committee of mentors in the organization. There was variation in the frequency and style of HSS's approaches to engaging with their fellow: some met often and regularly, others met at specific intervals and others encouraged their fellow to identify when support and guidance were needed.

The challenges

Most of the panelists and survey respondents felt things were working well and identified few challenges. Some HSSs said that, in the future, they would not accept any post-doctoral fellow for less than two years. A number of HSSs said they would work harder at start-up, beginning with a careful three-way planning session involving the fellow and the AS to

agree on project deliverables and role expectations right away; paying more attention to the availability of space and resources; and introducing the fellow early on to the organization's executive team. Several HSSs admitted that they had not devoted sufficient time to their mentorship role because of a demanding schedule or done enough to integrate the fellow into the ongoing activities of their organizations. Others, particularly those more junior in their organizations, acknowledged that they had not done enough to secure buy-in from their organization's top leadership to the embedded fellow and his or her project. Several HSSs and ASs noted that their fellow's project had run into unexpected roadblocks and that they should have done a better job to help develop mitigation plans and alternative projects.

Collaboration between health system and academic supervisors

Many of the HSSs stated that developing new contacts in the academic world was a key benefit of the fellowship program. Some indicated that they had not devoted sufficient time to interacting with their AS or HSS counterpart and would have liked to hold more frequent three-way meetings.

Benefits for health system supervisors and their organizations

The HSSs emphasized the positive impacts of the mentorship experience on themselves and on their organizations. The main personal benefits included expanded linkages to academic partners, development of mentorship skills and learning more about the core competencies and supports available within their organizations for cultivating the competencies. At the organizational level, many HSSs noted that their organizations had gained capacity in the analysis and evaluation of programs and policies that they would not otherwise have had. Collaboration with skilled academic trainees and their supervisors provided valuable learnings to the organization through studies, reports, conference papers and publications with enhanced credibility for policy recommendations and/or advocacy positions. Several respondents observed that the highly visible activities with their fellow and the fellow's project(s) sent a message to the organization about the importance of research and academic partnerships. One participant noted that the involvement of a number of senior leaders with the fellow and his or her research made for a shared focus among them that had previously been limited or absent. Another observed that involvement with the fellow's high-quality work allowed him or her to make an enhanced contribution to population health and to the quality of the provincial health system.

The fellows' experience

Table 2 illustrates that fellows identified mentorship from both supervisors as very important to their professional growth and reported, on average, high satisfaction with the quality of the mentorship they received. However, a small number of fellows ($n = 3$) reported mediocre to low satisfaction (a rating of 3 or lower on the 5-point scale), which signals the need at the program level to understand the factors underlying the rating. An area for improvement

appears to be in fostering meaningful team-based co-mentorship given that a small subset of respondents (n = 4/38) reported that they had not experienced co-mentorship from their HSS and AS. Similarly, other embedded research training programs have found that some of their trainees had suboptimal mentorship experiences and learned through program exit interviews that challenges can arise when the trainee perceives that the mentor is not available enough, does not understand his or her role as a mentor or does not engage the trainee in team meetings and when the embedded project is not a priority for the organization (Hamelin and Paradis 2018).

TABLE 2. Fellows' assessments of their mentorship experience

Fellows' assessments of mentorship	n	Mean rating (SD)
1- and 2-year fellows: Rate the importance of the following enablers to your competency development (scale: 1 [low]–5 [high])		
The mentorship and support for professional growth that I received from my health system supervisor	38	4.35 (0.98)
The mentorship and support for professional growth that I received from my academic supervisor	38	4.24 (0.95)
Co-mentorship (team-based approach) from my health system and academic supervisors	38	4.12* (1.19)
1-year fellows only: Co-mentorship and supervision from health system and academic leaders to enhance career preparedness are a core element of the HSI Fellowship program. Rate your satisfaction with the following (scale: 1 [low]–5 [high]):		
The mentorship and support for professional growth that I received from my academic supervisor	19	4.63 (0.83)
My supervisor's interests in and support for my career pursuits	19	4.58 (0.84)
The supervision, guidance and feedback in relation to my academic research from my academic supervisor	19	4.47 (0.70)
The mentorship and support for professional growth that I received from my health system supervisor	19	4.42 (0.90)
The people and networks my supervisors exposed me to	19	4.42 (0.69)
The efforts my health system supervisor took to integrate me into the organization	19	4.37 (0.89)
The supervision, guidance and feedback in relation to my embedded program of work from my health system supervisor	19	4.37 (1.01)
Opportunities to participate in projects beyond what was proposed in my fellowship application	19	4.32 (0.82)
The resources (e.g., equipment, data, people) that my partner organization made available to support me and my program of work	19	4.16 (1.01)

*Four of 38 respondents indicated "N/A: did not experience co-mentorship."

The fellows' qualitative responses about the most valuable aspect of the mentorship they received suggest that they value the efforts their HSSs took to meaningfully integrate them within the organization, include them in team meetings, provide them with exposure to executive management and support and encourage their professional development. Regarding

advice to future supervisors, fellows recommended meeting early on as a team with the fellow to jointly agree upon project scope and deliverables and having frequent meetings and open communication thereafter.

Discussion

Given the strong focus on the comments of five HSSs and reliance on the responses of our heterogeneous cohort of fellows and supervisors, this summary should be treated as emerging evidence whose generalizability to other programs remains to be tested. What it does suggest are the following key points:

- The dual mentorship approach has demonstrated positive impacts for fellows, supervisors and partner organizations.
- The HSSs play a role not only in guiding the practical work of the fellow on a project or projects linked to the objectives of the organization but also in mentoring the fellow for future career preparedness, helping to foster the fellow's enriched core competency development and assessing the fellow's progress in developing and utilizing the enriched core competencies. The HSS's assessment of the fellow's enriched core competency development is a natural component of a relationship that is partly one of employer to employee, partly one of supervisor to trainee, but mainly one of mentor to mentee. This ongoing interaction is primarily intended to benefit the fellow's development but also contributes to the success of the embedded project and the advancement of the health system organization's impact goal. Some HSSs reported that their relationship with the fellow has also benefited their learning and growth as a mentor. Future research should examine whether this ongoing interaction helps the organization develop a learning health system approach and culture.
- In the future, the value and impact for the AS and the university should also be assessed. Additionally, efforts to strengthen the collaboration between the HSS and AS in support of the fellow may generate added value for all involved. Providing mentorship guidance to fellows and supervisors at the beginning of the fellowship and creating routine opportunities (e.g., online webinars) to share tips and pool experiences may also be helpful. Other studies have identified the provision of formal mentorship training as an important contributor to a positive trainee experience (Hamelin and Paradis 2018; Keyser et al. 2008; Pfund et al. 2014).
- The HSSs developed a range of innovative approaches to managing the opportunities and challenges of this new embedded fellowship program. Variation in mentorship strategies, in the ways that individual projects were launched and implemented within organizations and in the methods used to integrate the fellows into the partner organizations' structures and activities is likely due to the individual styles and preferences of the supervisors and fellows and reflective of the variation in organizational norms and

processes of the heterogeneous partner organizations. Future evaluations could help characterize whether and how these approaches and contextual differences impact the fellowship experience.

- There appears to be a strong consensus among this first cohort of HSSs that the HSI Fellowship program provides good value for their money and time as well as a substantial number of personal and organizational benefits. Many HSSs reported having acquired new linkages to the academic world and enhanced mentorship skills. Many also reported that the presence of a fellow provided missing skills to their organization and an opportunity to advance their organization's mandate through research and evaluation.
- The inaugural cohort of fellows appears very satisfied with the program, particularly with the mentorship provided by both supervisors, although some reported lower satisfaction with the level of interaction between the two supervisors. There may be a need to develop supportive program-level guidelines and resources to foster collaborative co-mentorship approaches.

The HSI Fellowship aims to train a new cadre of PhD graduates with the skills, experience and relationships to drive evidence-informed health system improvement. Although the evaluations of the HSI Fellowship program and its mentorship component are strongly positive, future work should focus on improving and strengthening the relationships among the HSS and the AS, between supervisors and fellows, between the fellows themselves by way of peer mentorship and alumni mentorship opportunities and perhaps even between different types of mentors, in line with emerging evidence in support of mentorship "boards" and similar team mentorship ideas (Claman 2010; Halvorson et al. 2015). Ellen and Brown (2016) suggest that game theory insights emphasize the importance of trusted relationships to effective knowledge transfer.

Conclusion

The results reported in this study suggest that the HSI Fellowship has demonstrated success for both fellows and supervisors. It is important to note, however, that comments both critical and constructive tend to focus on the opportunity for fellows and supervisors to develop a relationship. Hopes for longer fellowships and praise for the networks of contacts brought by the program suggest that future iterations should focus on the nature, sustainability and intensity of relationships as key determinants to the success of the program and, ultimately, to the creation of a learning health system.

Acknowledgements

This study reflects the views of five HSI Fellowship health system supervisors, but the authors would like to acknowledge and thank all of the health system and academic supervisors and the fellows involved in the program.

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