

Multi-institution Research Centers: Planning and Management Challenges

Catherine Spooner

Centre for Primary Health Care and Equity, UNSW Australia

Lisa Lavey

School of Rural Health, Monash University

Chilandu Mukuka

Australian Primary Health Care Research Institute, Australian National University

Roslyn Eames-Brown

Centre for Primary Health Care and Equity, UNSW Australia

Abstract: *Funding multi-institution centers of research excellence (CREs) has become a common means of supporting collaborative partnerships to address specific research topics. However, there is little guidance for those planning or managing a multi-institution CRE, which faces specific challenges not faced by single-institution research centers. We conducted qualitative research to identify the challenges faced by an Australian program of multi-institution CREs with a view to identifying lessons for the future. This paper describes two of the most significant challenges: administrative complexity and investigator engagement. Administrative tasks (e.g.: establishing partner contracts and recruitment) were significantly more complex and time-consuming in the multi-institution CREs than single-institution research centers. Investigator engagement was hampered by a range of factors, including differing expectations within the investigator team and between the team and the funding body in relation to investigator roles as well as investigator capacity. We conclude with a discussion of key strategies that cut across the challenges: 1) early planning, 2) communication and 3) management capacity.*

Keywords: collaboration, multi-institution, university research centers, research collaborations, organizational design, virtual organizations

Introduction

A range of collaborative models is increasingly used in the research field because of the benefits collaboration can provide (Bozeman & Boardman, 2003; Jones, Wuchty, & Uzzi, 2008; van Rijnsoever & Hessels, 2011; Wuchty, Jones, & Uzzi, 2007). The model might include researchers and people or organizations that might use or be affected by the research (e.g. communities, policy makers, health providers). In such cases, collaboration aims to increase the appropriateness

and feasibility of research, and to increase the likelihood that the research will be implemented (Edelstein, 2015). The model might include researchers that differ in some way to each other, for example, in disciplinary background, research experience and/or location. This can provide interdisciplinary perspectives to complex problems, broaden the geographic spread of data collection sites and networks, and increase the range and depth of research experience brought to the project (Bindler, Richardson, Daratha, & Wordell, 2012; Wagner et al., 2011).

A Center of Research Excellence (CRE) is a type of research collaboration that conducts research in a defined area. Not all CREs are the same. The CRE funding scheme objectives, duration and amount of funding, requirements, allowable expenses (e.g. direct research costs, capacity building and knowledge translation and exchange (KTE)) and expected outputs are some of the areas in which the schemes vary. There are multiple funders of CREs focusing on health issues around the world, each with their own funding rules. Examples of funders include the National Institutes of Health in the United States of America, and the British Heart Foundation and Networks of Centers of Excellence of Canada. In Australia, the largest funder of CREs relating to health is the National Health and Medical Research Council (NHMRC). The NHMRC awarded grants for 19 new CREs in 2015 alone (NHMRC, 2015).

As part of the Australian Government's Primary Health Care Research, Evaluation and Development (PHCRED) Strategy Phase 3 (2010-2014), (Australian Government Department of Health and Ageing, 2010), a specific CRE-funding scheme was established to facilitate research and to build the capacity of the primary health care research sector.

Nine CREs were funded under this scheme, which was administered by the Australian Primary Health Care Research Institute (APHCRI) at the Australian National University (ANU). The APHCRI CREs had to be a collaboration of two or more institutions and could be virtual organizations. Funding was not recurrent and generally limited to four years. One university in the partnership was the administering institution who signed the head agreement with the ANU and received the CRE funding. The administering institution had contracts or agreements with other partner organizations that guided the nature of their relationships including reporting arrangements and disbursement of funds. The distribution of the funds between the partners did not need to be established as part of the head agreement.

Unlike many CRE-funding schemes, substantial funding was provided for direct research costs and for KTE, which was considered a priority. Another distinctive feature of the scheme was that the funding body (APHCRI) established and managed a network of the nine CREs to promote relationships with, and between, the CREs and the key stakeholders (APHCRI Research Advisory Board, Department of Health, Primary Health Care Research and Information Service). The APHCRI CREs are the focus of this paper.

A model of an APHCRI multi-institution CRE with four partners is presented in Figure 1. The number of partner institutions within Australia in these CREs ranged from three to 14. Most of the CREs had international partners who were not expected to be as involved as local institutions.

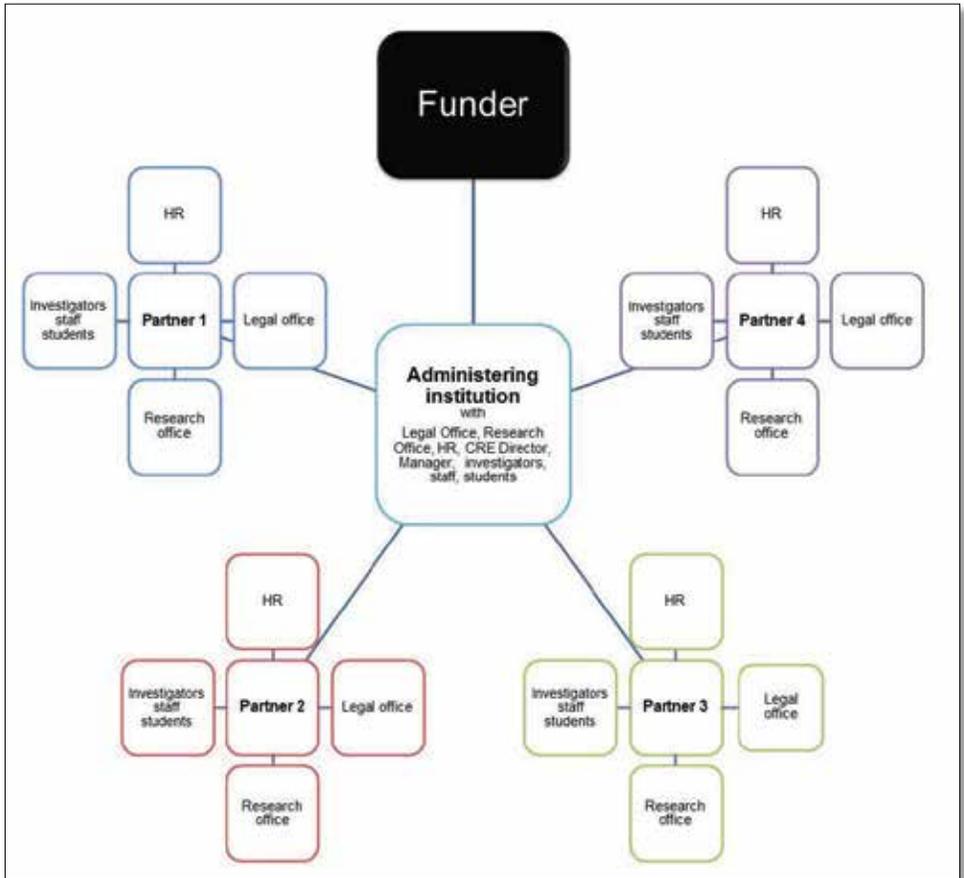


Figure 1. Model of an APHCRI multi-institution CRE

Multi-institution CREs have certain strengths but they also present particular challenges that need to be effectively managed. For example, differences between partners’ viewpoints and expectations can lead to conflict which can prevent people from working together effectively (Bammer, 2008b) and collaborative research requires substantial transaction costs (Landry & Amara, 1998).

Literature to guide the establishment and management of a multi-institution research center is sparse. Universities often provide their staff with guidance on establishing a single-institution research center and literature exists on managing collaborative partnerships and projects, (Bammer, 2008a; Chung, Song, & Group, 2010) managing virtual (business) teams, (Ale Ebrahim, Ahmed, & Taha, 2009; Hertel, Geister, & Konradt, 2005; Hunsaker & Hunsaker, 2008) and (more generally) project management (Project Management Institute, 2013). However, these sources do not address the confluence of issues of a multi-institution research center.

One resource with this focus was developed by staff of Engineering Research Centers (ERCs) funded by the National Science Foundation in the USA, based upon their experience of multi-institution research centers (Engineering Research Centers, 2012). The ERC resource described administrative challenges they considered unique to multi-institution research centers. These challenges related to the highly complex structure of the institution that comprised a large number of stakeholders, widely diverse research priorities and agendas, different institutional cultures, and institution specific administration processes. The organizational and administrative complexity and the time and effort dedicated to developing consensus and communication between stakeholders required highly sophisticated administrative structures and additional resources to support the work.

Other problems identified by the ERC resource related to the determining of partnership agreements between and among institutions, conflicts involving the scheduling of multi-institution activities due to the demands of different academic calendars, and substantial travel-related costs for Center-wide events. The resource proposed that effective communication is key to achieving multi-institution cohesiveness and focus and that meetings via teleconference or videoconference are critical to operational success. While this resource is useful, it might not be applicable to the APHCRI multi-institution research centers with their different context (Australia) and focus (primary health care). Further, it was informally compiled, so was not representative of all ERC experiences.

This paper presents the key findings of an Australian qualitative study that examined the challenges experienced when establishing and managing APHCRI CREs. The exploration of this issue was triggered when two APHCRI CREs managers (CS and LL) noticed that other APHCRI CRE managers were dealing with similar management problems that seemed to stem from the CRE multi-institutional structure. Managers, however, did not usually discuss these problems or their solutions between themselves. Consequently, CS and LL drafted a record of the challenges faced and the lessons learned in establishing and managing their CREs to guide the development of a resource for investigators and managers involved in establishing other multi-institution CREs. To ensure the data summary table record reflected the experience of all nine multi-institution CREs, a qualitative research study was undertaken.

An organizational partnership model was developed based on other models (Bryson, Crosby, & Middleton, 2006; Grudinski et al., 2013) to guide data collection and analysis. The model identified aspects that were outside the CRE's control (context and history), those aspects that could be planned and managed (governance structures, interpersonal processes and administrative processes), the impact of ways of managing a CRE on the type and nature of the collaboration, and the CRE outcomes for which the CRE was responsible (Figure 2).

This paper describes the qualitative study; presents the two key challenges for multi-institution CREs identified by the research, and proposes strategies for addressing the challenges.

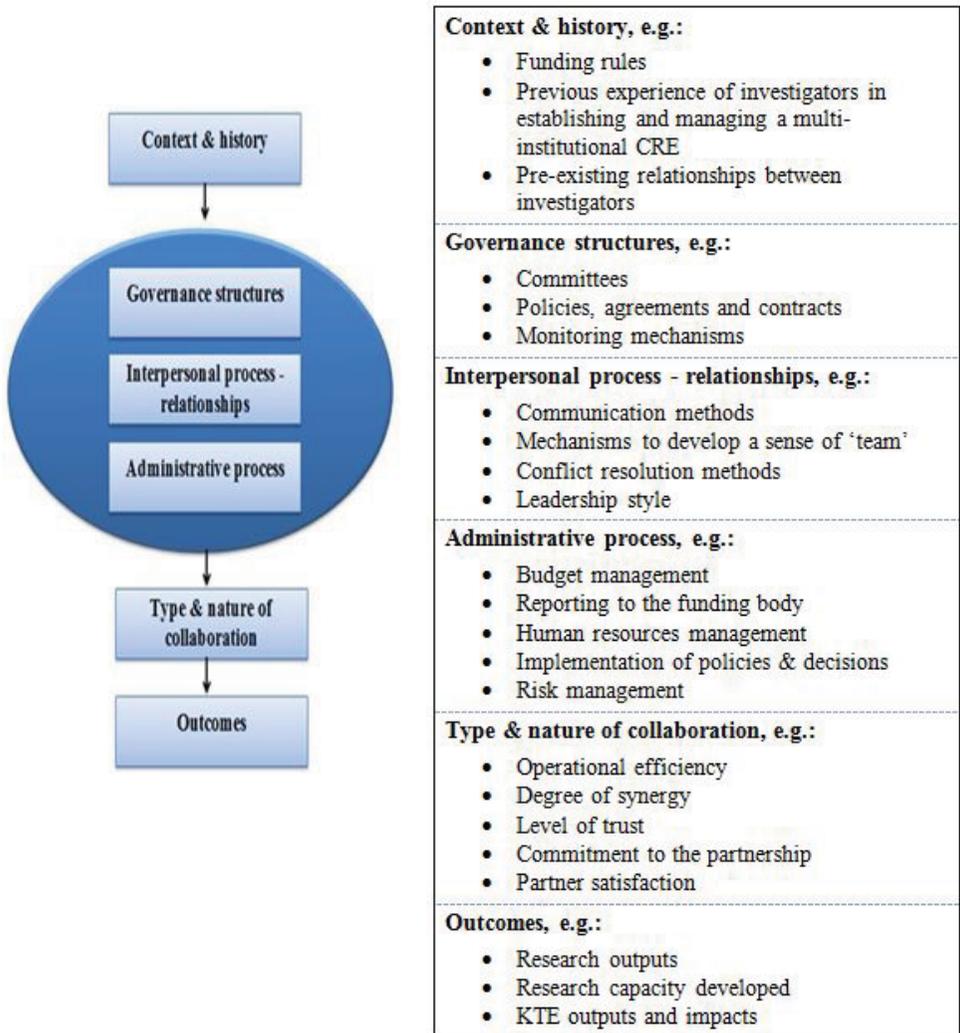


Figure 2. Conceptual model for a multi-institution CRE

Method

Design

The study adopted an insider active research approach. The defining feature of this approach is that a researcher examines a research phenomenon that arises inside his or her own work environment. The 'insider' status facilitates researchers' access to the experiences and insights of work colleagues in a way that subsequently shapes and informs the research. It "offers a unique perspective on

systems, precisely because it is from the inside. Insiders have a deep level understanding of the business context, its dynamics, its evolution and performance” (Coghlan, Shani, Roth, & Sloyan, 2014, p. 994). The research team LL, CS and CM were involved in the establishment and management of multi-institution CREs.

Ethics Clearance

UNSW Australia, Monash University and the Australian National University Human Research Ethics Committees provided ethical approval to conduct the study. Potential study participants received a Participant Information Statement and Consent Form that they read and signed. Their participation was voluntary and could be terminated by the participant at any time without consequence. Data was confidential and de-identified for reporting purposes.

Sampling Strategy

Individuals from the CRE network and associated organizations with detailed knowledge about the APHCRI CRE challenges were identified as potential key study informants. They were invited to participate in the study because they were viewed as “information rich cases” (Patton, 2002, p. 230), who could provide detailed qualitative information about the study phenomenon. Twenty potential key informants were identified. These were the nine multi-institutional CRE directors (one of each from each CRE), seven CRE managers (two CREs did not have a manager) and four “other” key informants representing the Primary Health Care Research Evaluation and Development (PHCRED) organisation and the APHCRI.

The Recruitment Process

Most of the potential study participants attended a CRE Network meeting in Canberra prior to recruitment commencement. The study plan was presented at this meeting and there were opportunities for questions and input. The information session was followed-up by email with a study invitation and a Participant Information Sheet and Consent Form. Non-responders were followed-up with a second email, and (if necessary) a telephone call.

Sample

Six CRE directors, four managers and three “other” invitees agreed to participate in the study. Consistent with the insider research stance, two of the managers and one of the “other” personnel were also the study researchers.

Data Collection Instrument

A semi-structured interview schedule generated discussion around the data summary table and constructs from the multi-institutional CRE model (Figure 2). The questions aimed to determine whether the data summary accurately reflected and encapsulated the problems specific to establishing and managing the APHCRI CREs and whether the proposed strategies for preventing or managing problems were feasible. Questions invited participants to describe any problems or lessons that had not been included in the data summary and to suggest modifications.

Data Collection

Interviews were conducted between February and June in 2015. Participants from the same CRE could elect to be interviewed together or singly.

Nine interviews were completed with 13 interviewees being involved. This occurred because two interviews were conducted concurrently with a CRE program manager and the director. The remaining interviews had one interviewee.

Interviewees were supplied with a copy of the research questions and the current data summary table to facilitate discussion. Most of the interviews were conducted by telephone; two were conducted face to face. All interviews were audio recorded. The interview duration ranged between 11 and 74 minutes. A professional transcriptionist transcribed the audio recordings.

Data Analysis

Qualitative data from 13 interviewees was analyzed using an inductive, iterative approach to identify the breadth of ideas and common themes in the transcriptions and to form a deep understanding of the data. Ideas and themes were explored and discussed by the research team with reference to the study goal and questions and theoretical propositions were generated (Grbich, 2012; Srivastava & Hopwood, 2009). The researchers discussed the transcript information as it became available and incorporated the feedback into the data summary table on an ongoing basis. The most recent version of the data summary table was used for each interview. This process was repeated until all interviews were completed. Researchers clarified information with the interviewer/s during the data review process, where necessary. After the transcription of all interviews, the researchers discussed the entire transcript dataset to form a cohesive, comprehensive understanding of the data and consensus on key themes was obtained. This information guided the development of a document called “Establishment and Management of a Multi-Institutional Center of Research Excellence - Tips for New Players”. The document content was checked and validated by participants (Bazeley, 2013, pp. 408-409; Patton, 2002, p. 560). Feedback was positive and generated no further changes.

An independent, external researcher, Rosslyn Eames-Brown, also coded and analyzed the transcripts (analyst triangulation) to cross check the themes and ideas identified by the three investigators (Patton, 2002). No discrepancies between the researchers’ and the independent researcher’s findings were identified.

Findings

Study findings indicated that the two areas with the greatest challenges were administrative and interpersonal processes. Administrative problems related to the CRE budget (e.g. a failure to include the correct on-costs from each partner institution for staff), contracts (e.g. difficulties in negotiating partner contracts), and recruitment (the lack of any procedure for recruiting positions that could be located within any of the partner institutions). A key challenge for the multi-institution CREs in the interpersonal domain was investigator engagement with the CRE.

Few problems were unique to a multi-institution CRE. Some version of the problem was generally faced in single-institution research centers or collaborative research projects. However, multi-institution CREs experienced these problems to a greater extent due to their administrative complexity and a confluence of barriers to investigator engagement with the CRE. These two themes are discussed below.

Administrative Complexity

The research findings indicated that administrative tasks that were simple to execute in single institutions were more difficult and time-consuming in multi-institution CREs. This is because, in contrast to working in a single institution, a multi-institution CRE comprises multiple investigators from multiple institutions, each with their own legal department, grants management office, human resources policies and procedures, scholarship programs, etc. Two examples of administrative complexity, establishing partnerships contracts and cross-CRE recruitment, are provided.

Partner Contracts

Legal contracts were required between the administering institution and the partner institutions to ensure each partner institution agreed to commit to the implementation of the multi-institution CRE as per the head agreement. These partner contracts included agreements regarding 'in-kind' contributions provided by the partners, intellectual property, and the distribution of the grant to the partner institutions. The process of establishing partnership contracts and distributing funds to partners was complex and time consuming.

A significant source of the problem was reluctance of the legal offices of some partner institutions to sign their partner agreement until certain conditions of the head agreement (the agreement between APHCRI and the administering institution) were changed. As they had not reviewed the head agreement until after it had been executed, changes were not possible.

A second contract problem arose for CREs that opted for funds to be held by the administering institution and to be distributed to partner institutions over the life of the CRE. In this situation the CRE Executive Committee would decide the allocation of funds over time. This arrangement provided for flexibility in the distribution of funds. However, some of the legal departments of partner universities were reluctant to sign agreements that did not stipulate a specific amount of funds for their institution. It also meant that a series of contract variations were required each and every time that a partner institution was allocated funds.

A third problem involved lack of clarity on 'in-kind' contributions from each investigator and each institution. This was not always clear from the grant application and some of the legal departments of partner universities were reluctant to sign agreements until this was clarified.

The number of partner contracts to be established, and the short time-frame for the multi-institution CRE to achieve all their outcomes (four years), meant these delays threatened the achievement of outcomes. For example, it was a requirement that all of the multi-institution

CREs provide doctoral scholarships as part of their capacity-building program. The duration of a doctoral program is a minimum of three years. Many students require more than three years to complete, and the scholarships could not be established, advertised or appointed until the partner contracts were complete.

Similarly, no staff could be recruited at partner institutions for research projects until the partner contracts were executed. Consequently, delays in establishing the partner contracts, recruitment of post-doctoral candidates, and other human resource requirements threatened the achievement of outcomes.

The study findings suggest that partner contract problems might have been reduced or preventable if certain steps were taken prior to submission of the grant application. That is, for the administering institution to consult with each institution's legal office to ensure those offices are satisfied with the head agreement and they are satisfied with draft partner agreements, including the specification of 'in-kind' contributions. Each institutions grants management office might assist in identifying 'in-kind' contributions.

Recruitment Across the CREs

The multi-institution CREs had funding to employ research staff and to provide student scholarships. Some CREs allowed these positions to be located in any of the partner institutions, depending upon the location and preferences of suitable candidates. For example, funding might be available for three postdoctoral fellows and these could be located in any of the CRE's institutions. However, there was no agreed process for recruiting across the institutions. Each institution had its own recruitment process that needed to be followed if the position was to be with them. This included creating a position description that adhered to that institution's policy, advertising the position from that university and culling, interviewing and selecting a candidate. If the CRE undertook a recruitment process and the successful candidate chose Institution X, then Institution X would need to implement their own recruitment processes. Hence, the 'successful' candidate would need to go through two processes of selection. Such a process would have delayed appointments and been unfair to the applicant.

APHCRI CREs faced with this problem generally negotiated specific arrangements with the institutions that were to host the successful applicant. This process was time-consuming and delayed the appointment of positions. It is likely that this problem is unique to multi-institution CREs, or rarely encountered elsewhere. Investigators planning to establish multi-institution CREs are advised to consult the Human Resource departments of partner institutions during the grant preparation period, or as soon as the grant is awarded, to develop a streamlined recruitment process that does not delay appointments.

Investigator Engagement

A second highly demanding challenge experienced by the APHCRI CREs related to the level and nature of investigator engagement with the CRE. Indicators of participation included, for example, attendance at project or CRE meetings, responses to requests to comment on

documents, to provide information for reporting, to promote the CRE and to contribute to the CRE-wide knowledge translation and exchange activities.

Indicators of promoting the CRE included: adding the affiliation to the CRE in email signatures and conference and other presentations; and adding the CRE website link to institution websites. The level of investigator engagement in CRE activities varied. As a result of variable investigator engagement, the completion of some planned CRE activities was delayed or prevented, and the workload fell disproportionately on those more deeply engaged with the CRE. This situation was not conducive to the fostering of positive work relationships or a sense of team and furthermore, the full benefit of including all investigators in planning and decision-making was unobtainable.

Study findings suggest several factors might have contributed to a lack of investigator engagement. Investigators, for example, had varied ideas of what involvement with the CRE meant. Some appeared to see it as only being involved in CRE research. The funding body, in contrast, expected investigators to support the CRE as an institution that would produce outcomes beyond their specific academic research. This included contributing to knowledge translation and exchange in relation to crosscutting CRE topic areas, not just in relation to specific CRE research projects. Investigator involvement could encompass engaging in media debates, preparing submissions to government, and advising and supporting primary health care (PHC) organizations. The funding body also expected investigators to raise the profile of the CRE, so that its value was more than the sum of its individual partners. A third expectation was that investigators produce far-reaching outcomes, like new or continued collaboration with other local and international partners, even when the CRE program had finished.

The qualitative research conducted indicated that even if investigators had fully understood the expectations of the funding body, other barriers to engagement remained. These related to investigator capacity for engagement and career priorities which was influenced by funding. Specifically, the APHCRI CRE grant did not include investigator remuneration. Investigators were remunerated by their own institution, and would continue to be paid by their institution after the multi-institution CRE funding had ceased. Investigators' careers relied upon the production of academic outputs and the development of their profile in affiliation with their institutions, rather than with the CRE. Further, the APHCRI CRE was a short-term project, one among many that investigators were leading. Thus, the investigators had many competing priorities for their time.

Fostering positive work relationships was impeded by investigators being located in geographically different locations. This factor limited opportunities for face-to-face interaction that could have assisted with communication and relationship building. Video or telephone conferencing methods were used for focused discussion. However, these were insufficient for building relationships.

Study findings identified several strategies that might improve the level of investigator engagement and teamwork:

1. Choose partners wisely—investigators reported that they benefited from pre-existing relationships.
2. Ensure the leader is skilled in collaborative leadership.

3. Obtain investigator consensus on the goals for the CRE.
4. Obtain consensus during the grant writing process on the roles of investigators. As investigators' ideas about this might change over time, for legitimate reasons, a review of these roles should occur after the first and second years of the CRE's operation.
5. Ensure that the plans for 'in-kind' contributions of investigators are clear, realistic and flexible.
6. Organize face-to-face meetings or team-building activities to coincide with team attendance at events such as conferences.
7. Allocate a budget to support building relationships.
8. Use the telephone for one-to-one conversations when possible. An email might be quicker, but a verbal conversation is more personal and helps to develop a relationship.

Discussion

This paper described a qualitative study that explored the challenges of establishing and managing a primary health care multi-institutional CRE in Australia. The research findings identified several highly demanding and unusual challenges in the areas of administrative and interpersonal processes.

Study participants reported a range of challenges, largely in administrative and interpersonal areas with complexity as a common theme. The multiple geographic locations and different institutional policies and procedures meant that administrative processes, such as establishing partnership agreements and recruitment, were resource-intensive and lengthy exercises that delayed the commencement of research activities. The multiple geographic locations, partner-institution demands on investigators, and the time-limited life of the multi-institution CRE, meant that developing a sense of team around a research center (rather than just a research project) was very difficult. The complexity found here is consistent with that reported by the ERCs in the USA, (Engineering Research Centers, 2012) and in the literature relating to virtual teams (Ale Ebrahim et al., 2009).

Specific strategies for preventing or managing each challenge are identified in the "Establishment and Management of a Multi-institutional Center of Research Excellence - Tips for New Players" document that was developed as a result of this research (Lavey, Spooner, & Mukuka, 2015). The key strategies that cut across the challenges related to 1) early planning, 2) communication, and 3) management capacity, are discussed below.

Early Planning

Most of the multi-institution CREs' problems might have been prevented with early planning and stakeholder consultation—during the development of the grant application and immediately upon being advised of the grant's success. For example, presenting the head agreement to the legal departments of every partner institution before it was executed could have enabled a smoother roll out of partner agreements. Ensuring the investigators agree upon what involvement in the multi-institution CRE means before they consider joining the consortium would have prevented

misunderstandings during the life of the multi-institution CRE. Talking early with the HR departments of each institution to identify a satisfactory process for recruiting positions across the multi-institution CRE would have facilitated rapid recruitment of students and staff as soon as the funds were available. The recommendation to engage in early planning and troubleshooting with stakeholders is a common project management process (Project Management Institute, 2013).

While early planning is ideal, there are barriers to this approach. In particular, investigators have a very busy work schedule. Planning a multi-institution CRE, including its research projects, capacity-building program and KTE program, is a complex and time consuming process. Developing and agreeing upon high-level partnership principles is also a lengthy process. This is particularly the case when embarking on a project with investigators with whom one has not collaborated before. If the grant is unsuccessful, the work involved might be considered a waste of time.

Communication

Effective communication is essential for building relationships and achieving common goals in any collaborative partnership or virtual team (Bozeman & Boardman, 2003; Engineering Research Centers, 2012; Pauleen & Yoong, 2001). One aspect of communication is the means of communication. As discussed by Hertel et al. (2005), virtual teams necessarily rely upon electronic communication (telephone, email, and video-conference). The study participants reported a high use of emails to distribute or collect information and to request or invite investigators to perform a task. However, emails were sometimes misunderstood and requests often required numerous reminders, which were not conducive to positive relationships.

Study participants talked about the importance of face-to-face communication, including non-work-related interactions such as team dinners, for building team relationships. The value of face-to-face communication for building rapport and trust has been reported elsewhere in research on virtual teams (Hertel et al., 2005; Pauleen & Yoong, 2001). While video conferencing can provide an approximation to face-to-face communication, it cannot replace it, particularly as some investigators were unable or unwilling to broadcast their faces via the webcam. With a large team of investigators across considerable geographic distances, face-to-face meetings were expensive. However, the cost of not having communication structures in place to facilitate relationships and CRE commitment is disengagement and lack of a 'sense of team'. Some study participants noted that communication was easier when they had good pre-existing relationships with other investigators. Where these do not exist, there is a particular need to plan for face-to-face communication that contributes to building relationships.

Management Capacity

A manager, who can deal with the complexity of a multi-institution CRE and communicate effectively with the investigators, staff, students and back offices of all of the partner institutions, is essential. Bozeman & Boardman (2003) recommended a generalist manager with an MBA, but other backgrounds could also be effective. Given the amount of time required for dealing with the complexity, it is not just the level and background of the manager, but also the amount

of resources that is important. Some multi-institution CREs dedicated an insufficient budget for this role. For example, one CRE originally budgeted for a half-time position and soon realized the position needed to be full time. Failure to recruit the position immediately upon execution of the head agreement delayed the execution of partner contracts, disbursement of funds, appointment of positions and commencement of research work. The importance of this position in a multi-institution CRE cannot be underestimated.

The findings discussed in this paper reflect the experiences and perceptions of 13 study participants (from 20) who were involved in the establishment and management of nine multi-institutional CREs funded by APHCRI across Australia. The findings are empirically based so they might be applicable, appropriate or transferable to other situations if the contextual features are adequately similar and pertinent (Bazeley, 2013; Lincoln & Guba, 1985).

Conclusion

This study highlighted some of the highly demanding and unusual challenges that can be encountered during the establishment and management of a CRE.

Many of the challenges stemmed from the requirement to accommodate the needs of multiple investigators, in multiple institutions that were spread across multiple sites, and to build relationships and a 'sense of team' within a complex organizational structure. Early planning, appropriate communication methods, and effective management of resources are necessary for the successful operation of CREs in terms of efficiency, building commitment to the CRE, and getting true value from the investigators and institutions involved.

Further research could explore investigators perceptions and expectations of their role, approaches to increase investigator engagement in the CRE, and ways to structure investigator responsibilities that complement their career priorities.

Authors' Note

The research reported in this paper was a project of the Australian Primary Health Care Research Institute, which was supported by a grant from the Australian Government Department of Health. The information and opinions contained in this article do not necessarily reflect the views or policy of the Australian Primary Health Care Research Institute or the Australian Government Department of Health.

We are grateful to E.Y. Song who provided assistance with the literature review.

Catherine Spooner

Coordinator, Centre for Obesity Management & Prevention Research Excellence in
Primary Health Care
Centre for Primary Health Care and Equity, UNSW Australia
Sydney, NSW 2052
Tel: +61 2 9385 1505
Email: c.spooner@unsw.edu.au

Lisa Lavey

Research Administration Manager, Centre of Research Excellence in Rural and
Remote Primary Health Care
School of Rural Health, Monash University
PO Box 666, Bendigo Vic 3552
26 Mercy Street, Bendigo Vic 3552
Tel: + 61 3 5440 9082
Email: lisa.lavey@monash.edu

Chilandu Mukuka

Manager, Research Co-Ordination
The Royal Australian and New Zealand College of Radiologists
Level 9, 51 Druitt Street, Sydney 2000 NSW
Tel: +61 2 9268 9732
Email: Chilandu.Mukuka@ranzcr.edu.au

Rosslyn Eames-Brown

Research Assistant
Centre for Primary Health Care and Equity, UNSW Australia
Sydney, NSW 2052
Tel: +61 2 9385 1547
Email: cphce@unsw.edu.au

References

- Ale Ebrahim, N., Ahmed, S., & Taha, Z. (2009). Virtual teams: A literature review. *Australian Journal of Basic and Applied Sciences*, 3(3), 2653-2669. Retrieved from <https://ssrn.com/abstract=1501443>
- Australian Government Department of Health and Ageing. (2010). *Primary health care research, evaluation and development (PHCRED) strategy: Phase three: 2010-2014*. Canberra: Commonwealth of Australia.
- Bammer, G. (2008a). *Enhancing research collaborations*. Retrieved from www.anu.edu.au/iisn
- Bammer, G. (2008b). Enhancing research collaborations: Three key management challenges. *Research Policy*, 37(5), 875-887. doi:<http://dx.doi.org/10.1016/j.respol.2008.03.004>
- Bazeley, P. (2013). *Qualitative data analysis: Practical strategies*. Thousand Oaks, CA: Sage.
- Bindler, R. C., Richardson, B., Daratha, K., & Wordell, D. (2012). Interdisciplinary health science research collaboration: Strengths, challenges, and case example. *Applied Nursing Research*, 25(2), 95-100. doi:<http://dx.doi.org/10.1016/j.apnr.2010.06.004>
- Bozeman, B., & Boardman, C. (2003). *Managing the new multipurpose, multidiscipline university research center: Institutional innovation in the academic community*. Washington, DC: IBM Endowment for the Business of Government.
- Bryson, J. M., Crosby, B. C., & Middleton, S. M. (2006). The design and implication of cross-sector collaborations: Propositions from the literature. *Public Administration Review*, 66(1), 44-55. doi:10.1111/j.1540-6210.2006.00665.x
- Chung, K. C., Song, J. W., & Group, W. S. (2010). A guide to organizing a multicenter clinical trial. *Plastic and Reconstructive Surgery*, 126(2), 515-523. doi:10.1097/Prs.0b013e3181df64fa
- Coghlan, D., Shani, A. B., Roth, J., & Sloyan, R. M. (2014). Executive development through insider action research: Voices of insider action researchers. *Journal of Management Development*, 33(10), 991-1003. doi:10.1108/JMD-06-2012-0072
- Edelstein, H. (2015). Collaborative research partnerships for knowledge mobilisation. *Evidence & Policy*, 12(2), 199-216. doi:<http://dx.doi.org/10.1332/174426415X14399903490979>
- Engineering Research Centers. (2012). Best practices manual. Retrieved from http://erc-assoc.org/best_practices/best-practices-manual

- Grbich, C. (2012). *Qualitative data analysis* (2nd Ed.). London: Sage.
- Grudinschi, D., Kaljunen, L., Hokkanen, T., Hallikas, J., Sintonen, S., & Puustinen, A. (2013). Management challenges in cross-sector collaboration: Elderly care case study. *The Innovation Journal*, 18(2), 1-22. Retrieved from http://www.innovation.cc/scholarly-style/7-418grudinschi-elder-care_v18i2a7.pdf
- Hertel, G., Geister, S., & Konradt, U. (2005). Managing virtual teams: A review of current empirical research. *Human Resource Management Review*, 15(1), 69-95. doi:<http://dx.doi.org/10.1016/j.hrmr.2005.01.002>
- Hunsaker, P. L., & Hunsaker, J. S. (2008). Virtual teams: a leader's guide. *Team Performance Management: An International Journal*, 14(1/2), 86-101. doi:10.1108/13527590810860221
- Jones, B. F., Wuchty, S., & Uzzi, B. (2008). Multi-university research teams: Shifting impact, geography, and stratification in science. *Science*, 322(5905), 1259-1262. doi:10.1126/science.1158357
- Landry, R., & Amara, N. (1998). The impact of transaction costs on the institutional structuration of collaborative academic research. *Research Policy*, 27(9), 901-913. doi:[http://dx.doi.org/10.1016/S0048-7333\(98\)00098-5](http://dx.doi.org/10.1016/S0048-7333(98)00098-5)
- Lavey, L., Spooner, C., & Mukuka, C. (2015). *Establishment and management of a multi-institutional centre of research excellence. Tips for new players*. Retrieved from <http://aphcri.anu.edu.au/files/tips%20for%20New%20Players%20Revised.pdf>
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.
- NHMRC. (2015). *National Health and Medical Research Council Annual Report 2014-2015*. Canberra: National Health and Medical Research Council. Retrieved from https://www.nhmrc.gov.au/_files_nhmrc/file/publications/nh169_nhmrc_annual_report_2014_15_web.pdf
- Patton, M. Q. (2002). *Qualitative research & evaluation methods* (3rd Ed.). London: Sage.
- Pauleen, D. J., & Yoong, P. (2001). Facilitating virtual team relationships via internet and conventional communication channels. *Internet Research*, 11(3), 190-202. doi:10.1108/10662240110396450
- Project Management Institute. (2013). *A guide to the project management body of knowledge (PMBOK guide)* (5th ed.). Newtown Square, Pennsylvania: Project Management Institute, Inc.

- Srivastava, P., & Hopwood, N. (2009). A practical iterative framework for qualitative data analysis. *International Journal of Qualitative Methods*, 8(1), 76-84. doi:10.1177/160940690900800107
- van Rijnsoever, F. J., & Hessels, L. K. (2011). Factors associated with disciplinary and interdisciplinary research collaboration. *Research Policy*, 40(3), 463-472. doi:http://dx.doi.org/10.1016/j.respol.2010.11.001
- Wagner, C. S., Roessner, J. D., Bobb, K., Klein, J. T., Boyack, K. W., Keyton, J., Rafols, I., & Börner, K. (2011). Approaches to understanding and measuring interdisciplinary scientific research (IDR): A review of the literature. *Journal of Informetrics*, 5(1), 14-26. doi:http://dx.doi.org/10.1016/j.joi.2010.06.004
- Wuchty, S., Jones, B. F., & Uzzi, B. (2007). The increasing dominance of teams in production of knowledge. *Science*, 316(5827), 1036-1039. doi:10.1126/science.1136099