

Research Capacity Building In The Rural Health Workplace

David Schmidt

School of Public Health, Faculty of Medicine and Health

The University of Sydney

A thesis submitted to fulfil requirements for the degree of Doctor of Philosophy

Supervisors: Professor David Lyle, Dr Emma Webster

Statement of originality

This is to certify that to the best of my knowledge, the content of this thesis is my own work. This thesis has not been submitted for any degree or other purposes.

I certify that the intellectual content of this thesis is the product of my own work and that all the assistance received in preparing this thesis and sources have been acknowledged.

David Schmidt 04/06/2023

Student Name, Signature, Date:

Authorship attribution statement

Chapter 1 of this thesis contains a paper published as Schmidt, DD 2016, 'What a great idea! Someone should evaluate that', Australian Health Review, vol. 40, no. 3, pp. 270-272.

I designed and wrote the narrative that comprises the manuscript.

Chapter 4 of this thesis contains a paper published as Schmidt, D, Reyment, J, Kirby, S, Webster, EL & Lyle, D 2020, 'The place of research in the rural health workplace structure: a content analysis of a rural health organisation's strategic and operational documents', Rural and remote health, vol. 20, no. 2, pp. 5493.

I designed the study with input from the co-authors, extracted the data, conducted primary and secondary analysis with input from co-authors and was primary author of the manuscript.

Chapter 4 of this thesis contains a paper published as Schmidt, D, Reyment, J, Webster, E, Kirby, S & Lyle, D 2020, 'Workplace-based health research training: a qualitative study of perceived needs in a rural setting', Health Research Policy and Systems, vol. 18, no. 1, pp. 67.

I designed the study with input from the co-authors, collected the data, conducted primary and secondary analysis with input from co-authors and was primary author of the manuscript.

Chapter 5 of this thesis contains a paper published as Schmidt, DD & Kirby, S 2016, 'A modular approach to rural and remote research education: a project report', Rural Remote Health, vol. 16, no. 1, pp. 3609.

I collected the data, conducted primary and secondary analysis with input from the co-author and was primary author of the manuscript.

*Chapter 5 of this thesis contains a paper published as Schmidt D, Duncanson K, Webster E, et al. Critical realist exploration of long-term outcomes, impacts and skill development from an Australian Rural Research Capacity Building Programme: a qualitative study. BMJ Open 2022;**12**:e065972. doi: 10.1136/bmjopen-2022-065972*

I designed the study with input from the co-authors, conducted primary and secondary analysis with input from co-authors and was primary author of the manuscript.

I am the corresponding author of all the listed published items. Formatted versions of the papers are included within the respective chapters.

David Schmidt 04/06/2023

Student Name, Signature, Date

As supervisor for the candidature upon which this thesis is based, I can confirm that the authorship attribution statements above are correct.

David Lyle

Emma Webster

Supervisor Name, Signature, Date

Contents

Research Capacity Building In The Rural Health Workplace	1
Statement of originality.....	2
Authorship attribution statement	2
Contents	4
Figures and tables	5
Acknowledgments and thankyous	6
Research Capacity Building In The Rural Health Workplace	7
Abstract.....	7
Methodological note.....	8
Introduction.....	10
Chapter 1.....	13
Understanding what it is like for a rural clinician wanting to undertake research.....	13
Chapter 2: Background	19
The need for workplace-based research training in rural areas.....	19
Setting of this thesis.....	31
Aims of this thesis.....	32
Chapter 3: Methods.....	33
Methodological lens.....	33
Key concepts of critical realism in this thesis:.....	34
The use of critical realism to explore complexity within this thesis.....	37
About the researcher	41
Chapter 4: Results	43
4.1 The structural context in which rural health research training occurs	43
4.2 The learning context in which rural health research training occurs	55
Chapter 5: Outcomes of rural research training programs	64
5.1 Short-term outcomes of a rural research training program	64
5.2 Long-term outcomes of a research training program	75
Chapter 6: Analysis	87
Understanding the context of research capacity building within New South Wales rural health services.....	87
The individual context	87
The team context	88
The organisational context.....	89
Understanding outcomes of research capacity building within New South Wales rural health services.....	90
Individual outcomes	90
Outcomes for teams.....	90
Organisational outcomes	91
Synthesis and new generative mechanisms	91
Testing research capacity building theory	94
Chapter 7: Discussion	96

Approaches and models used to train, educate and increase capacity in research in rural health workers	96
Underlying educational philosophies underpinning approaches used to train, educate and increase capacity in research in rural health workers.....	97
Educational content taught in rural research training	98
Who has been targeted for rural research training, and where they are targeted	98
Within the setting for this thesis	98
Recommendations.....	101
Recommendations for research capacity building in rural areas.....	101
Recommendations for further research	102
Strengths and limitations of this thesis	102
Chapter 8: Conclusion.....	104
References	106
Appendices	116
Appendix 1.....	116

Figures and tables

Table 1: Educational underpinnings of rural research capacity building programs	27
Table 2: Published content of introductory teaching in Australian research capacity building programs.....	29
Table 3: Generative mechanisms of research capacity building in rural health workplaces expressed as Context, Mechanisms Outcome (CMO) chains	92
Table 4: Emerging mechanisms from this thesis contrasted with mechanisms of research capacity development proposed by Cooke et al (2018)	95
Figure 1: Distilling ideas via cartoonography	8
Figure 2: PhD Map displaying components of this thesis and development of generative mechanisms	11
Figure 3: Possible structures influencing research activity for rural individuals and the non-linear use of agency to navigate these structures.....	17
Figure 4: Professional groups, processes and measured outcomes of research training	31
Figure 5: Key takeaway messages of Critical Realism (with fries)	37
Figure 6: Using critical realism to understand and explain complexity	38
Figure 7: Content analysis methods used in Paper 2.....	39
Figure 8: Process of deriving generative mechanisms from multiple studies	40
Figure 9: The researcher, self-portrait with self-portrait.....	41
Figure 10: Research at the strategic, operational and individual levels.	54
Figure 11: The influence of individual agency on research activity across health professions	54
Figure 12: The tension inherent in choosing targets for rural research training.....	63
Figure 13: The social and geographical isolation of rural and remote research trainees	74
Figure 14: Long-term individual, team and organisational outcomes as a result of rural health workers participating in a rural research capacity building program	85
Figure 15: The logical flow of context, mechanism and outcome	92
Figure 16: Looking forward, having looked back	105

Acknowledgments and thankyous



Professor David Lyle, University Department of Rural Health, Broken Hill, for your persistent encouragement (“So what are you going to do your PhD on?”), willingness to embrace the unknown of critical realism and cartoonography and not least your vast wisdom and pragmatism.



Dr Emma Webster, School of Rural Health, Dubbo, for always bringing me back to what is important, your ability to negotiate the worlds of health and university, navigating the ever-changing working relationship, endless patience and for being there in one way or another from the very start.



Dr Sue Kirby, University Department of Rural Health, Broken Hill, for being so kind and knowledgeable, just the perfect blend for a researcher at the start of a PhD.



Dr Kerith Duncanson, University of Newcastle, for being a wonderful work buddy, fabulous friend, absolute inspiration and super sounding board.



Ms Jill Reyment, Murrumbidgee Local Health District, for assistance in navigating the various systems and relationships in NSW Health whilst taking a step out of your own comfort zone.



Dr Emily Saurman, University Department of Rural Health, Broken Hill, for willingness to jump into projects, tour guiding in Broken Hill and role modelling just how being a rural researcher can be.



My lovely family (who may or may have not looked like this at some point in the journey) for being my inspiration, sounding board, distraction and source of unquestioning love and support. Especially to Dr Sharon James who started her PhD after me, finished well before and of whom I could not be more proud.

Lastly, to supporters who have been alongside me on this journey, in particular Pauline and Rowena, my work colleagues, those who supported my endeavours both academic and creative, and all my friends across the world – thank you.

Research Capacity Building In The Rural Health Workplace

Abstract

Introduction: Workplace-based research capacity building can assist the development of research capability and capacity in rural areas where access to university expertise is limited. Rural health complexities and the diverse approaches previously used to build research capacity have led to a lack of clarity about how to build research capacity within rural health services.

Goals and Methods: Using a critical realist foundation, this thesis explored workplace-based rural research training and synthesises five studies centred in rural New South Wales, Australia: a case study, content analysis of strategic documents, survey-based research and two qualitative studies. Critical realism allowed the exploration of the structural supports and barriers for workplace-based research training activities and the ability of individuals to pursue research activities within rural health workplaces.

Results: The component studies showed that rural research training programs improve individual research capability by developing research skill, increasing research experience and facilitating research networks across sectors. Rural research activities are characterised by individual agency and partnering or relationships to access support and expertise. Structural barriers such as a lack of operational planning for research and limited ongoing research opportunities limit the translation of capability into research capacity.

Conclusions: Individual workplace-based research training is effective, but not sufficient to build and maintain research capacity. Structural supports such as organisational commitment and careful training design, combined with awareness of the learning context for the individual, can maximise cooperative partnerships with education partners. Addressing both structural and individual factors is needed to build rural health research capacity and create the environment required to generate real-world health research which drives meaningful improvements in rural health.

Methodological note

A novel feature of this thesis is the use of cartoonography as a method of qualitative data analysis. The use of cartooning in research and science is becoming more commonplace (Tribull, 2017). Cartoonography, a form of cartooning specifically aimed at charting and capturing ideas, was used by me (the researcher) originally to organise my thoughts and capture key moments in the same way that some researchers use diaries or memos (McGrath, 2021). As the research process continued this method continued to evolve, from capturing my observations and thoughts to informing the data analysis process, alongside more text-based methods mentioned in the individual papers. The process of cartoonography is one where ideas are refined and key concepts are highlighted in a single image or series of static images. Figure 1 provides an example of a cartoonography representation of the process of distilling ideas to the key points. Humour is often contained in these images, however the use of humour is never flippant: in contrast the humorous elements serve as memory triggers to assist recall and consolidate learning (Badli & Dzulkifli, 2013; Sambrani et al., 2014).

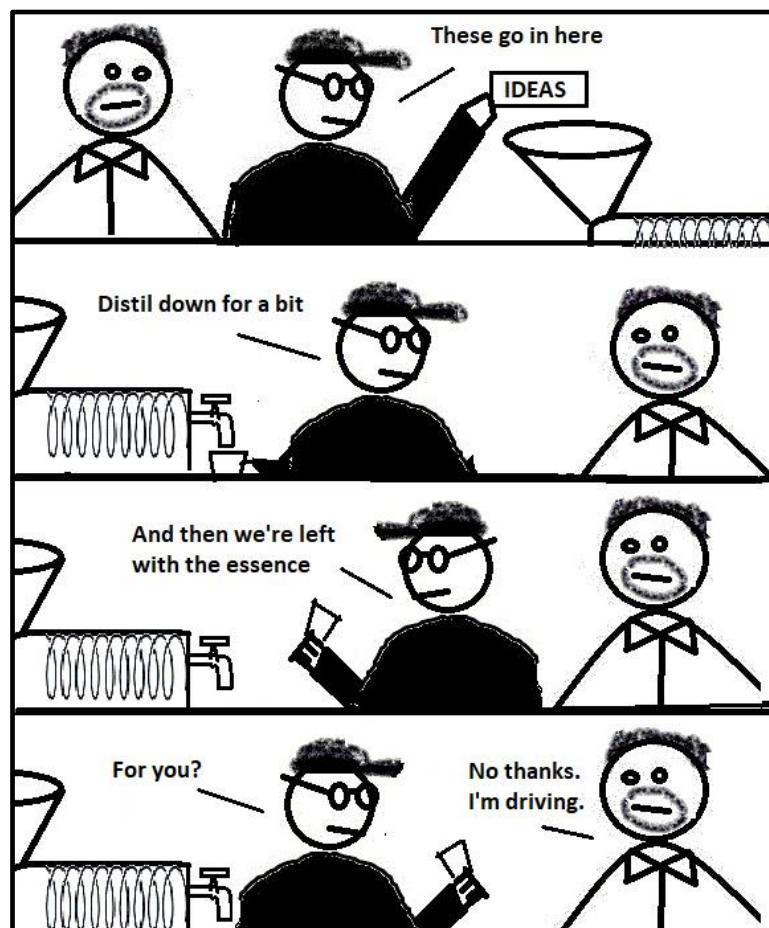


Figure 1: Distilling ideas via cartoonography

The use of visual approaches in qualitative research is longstanding, often in data collection (Cheung, Saini & Smith, 2016; Kearney & Hyle, 2004) and visual approaches are commonly used to summarise and represent data (Ecob, 2012; Walny, Huron & Carpendale, 2015). While capturing and representing data using drawing is becoming increasingly used, visual approaches are also used for data analysis with concept mapping being a familiar example (Cañas et al., 2005; Wilson, Mandich & Magalhães, 2016). Specifically in a research context, visual analysis is a tool used in qualitative research (van

Leeuwen & Jewitt, 2004). Cartoonography, while an example of visual analysis, has not been previously described in the literature for use in qualitative research. However, cartooning has been used as a means of reconceptualising experience and creating a new understanding as a form of art therapy in several settings (Axe, 2011; Mulholland, 2004), in addition to its role in science communication (Tribull, 2017).

The reader will find cartoonography used throughout this thesis to highlight and summarise key points. Cartoonography is further described and demonstrated in Appendix 1.

Introduction

This thesis including publications is focused on research capacity building in the rural health workplace. Including five individual papers from four studies, the thesis is brought together using a critical realist approach to examine the issue of research capacity building in the public health system within rural and remote Australia, particularly the state of New South Wales.

Critical realism was chosen to allow exploration of factors that underpin the context and outcomes of training rural health workers in research. As rural health service delivery and the organisations that provide it are complex, critical realism also allowed an exploration of this complexity.

Figure 2 outlines the major components of the thesis and how they link together. This figure acts as a map to guide the reader through the flow of the thesis. The overall structure of the thesis is designed to be consistent with critical realism, where an examination of context and exploration of known outcomes allows the development of proposed generative mechanisms.

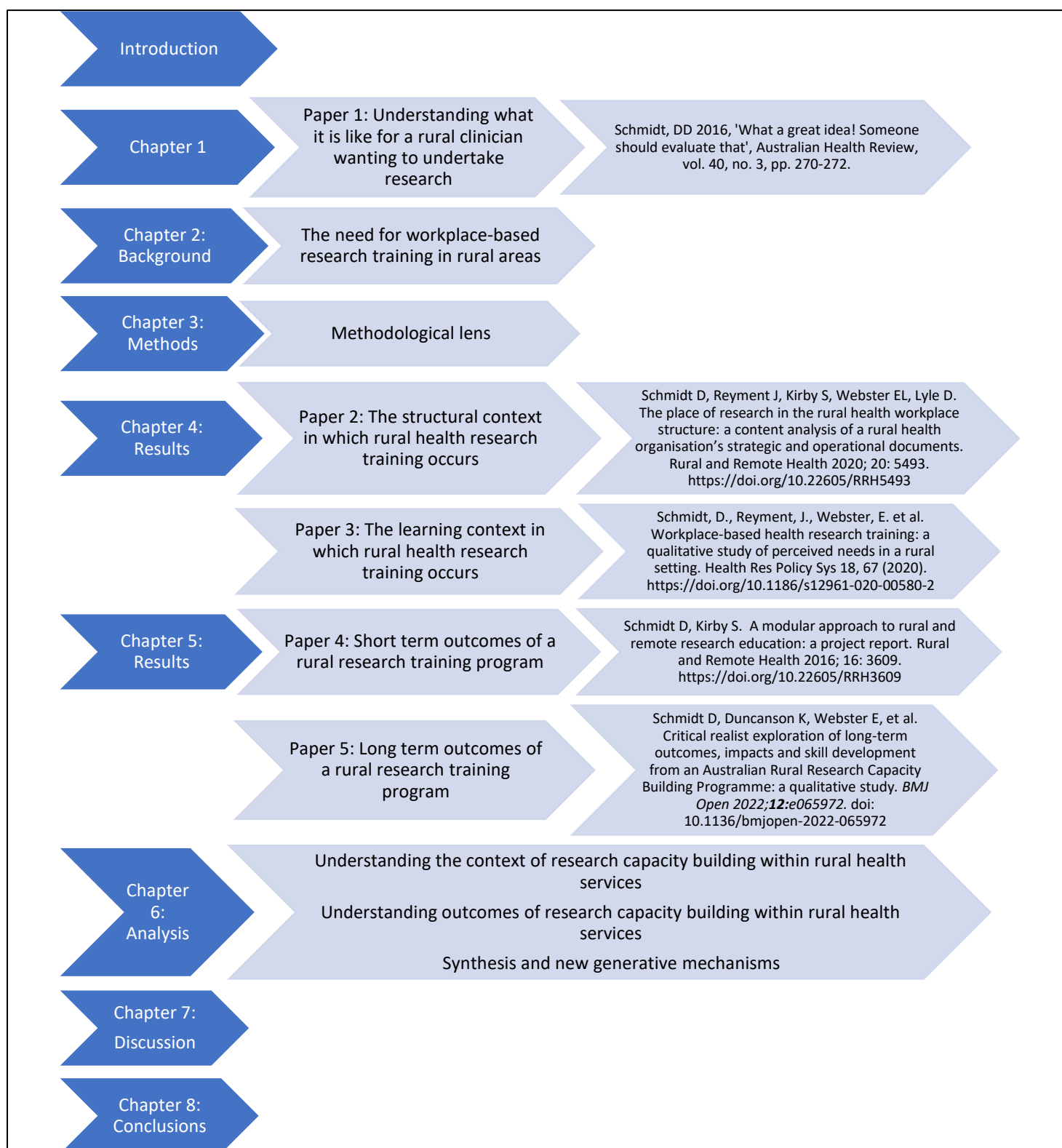


Figure 2: PhD Map displaying components of this thesis and development of generative mechanisms

The first two chapters contextualise the thesis. The first chapter gives an understanding of what life as a novice rural researcher is like. Chapter 2 provides an overview of the literature underpinning the field of rural research training.

Chapter 3 provides a description of the methods used in this thesis, an overview of critical realism and an explanation of its use as the methodological underpinning for this thesis.

The structure of the results section is consistent with the development of explanatory theory in critical realist research. This process begins with an exploration of context in Chapter 4. This chapter includes two publications examining the context of research training; the first looks at the operational and strategic context in which rural research *activity* is occurring, while the second considers the learning context for rural clinicians looking to undertake *training* in research. Once context is explored, outcomes of research capacity building programs are examined in Chapter 5; this chapter is comprised of two publications which explore short and long-term outcomes respectively.

The process of developing theory is continued in Chapter 6, the analysis section where context and mechanism are combined to create explanatory mechanisms for why things are as they are in research capacity building in rural and remote Australia. The discussion section, Chapter 7, discusses these mechanisms in relation to existing research and provides practical recommendations based on the thesis findings. The suite of recommendations provide guidance to those looking to build research experience and research skills for rural health workers.

Chapter 8 concludes the thesis, summarising the key findings and providing clear next steps for research educators.

Following the reference list, the Appendix contains an exploration of cartoonography.

Chapter 1

Understanding what it is like for a rural clinician wanting to undertake research

To provide context for the thesis and by means of an introduction, the following single case study (Paper 1) (Schmidt, 2016) explores what it is like as a clinician working in rural health who sees something that might be a valuable research project and decides to pursue this. This case study highlights important structural barriers and demonstrates the essential role of individual agency in undertaking research as a rural clinician and links to the concept of the clinician-researcher, where a clinician with relevant skills is able to independently conduct research relevant to their workplace and situation (Yanos & Ziedonis, 2006).

This publication not only sets the scene for the rest of the thesis, but also explores and highlights the individual context for rural clinicians undertaking research in the workplace. This paper demonstrates an early exploration of “why things are as they are” for rural researchers, which then led to the search for a framework to further explore this area. This search led to critical realism as an exploratory and explanatory framework which then underpinned the remaining body of this thesis.

This paper was published as:

Schmidt, DD 2016, 'What a great idea! Someone should evaluate that', Australian Health Review, vol. 40, no. 3, pp. 270-272.

What a great idea! Someone should evaluate that. . .

David D. Schmidt MPhy, GradDip(HlthServMgt), Grad Cert(ClinEd), BAppSc(Phty), PhD Candidate

School of Public Health, Faculty of Medicine, Edward Ford Building (A27), The University of Sydney, NSW, 2006, Australia. Email: dsch5166@uni.sydney.edu.au

Abstract. How often, as clinicians, do we see a really clever idea implemented in the workplace? In rural health in particular, creative work-around solutions are relatively commonplace. However, the evaluation and promotion of these ideas is less so, and this leads to lost opportunities for perpetuating these clever ideas. This paper explores one rural clinician's experience of what can happen if, instead of appreciating and complementing a great idea, that step of evaluating the great idea is taken. A reflective narrative was created, beginning with a corridor conversation ('What a great idea! Someone should evaluate that. . .'), continuing through a formal research project and ending with the impact of that project and the way its findings were communicated and implemented. The narrative outlines the effect of evaluating one great idea at the individual, workplace, organisational, state and national levels. Clinicians are well placed to identify great ideas in practice. Making the decision to evaluate these ideas can lead to personal growth, professional discovery and organisational benefits. With motivation and organisational support, who knows where evaluation may lead?

Received 6 November 2014, accepted 15 May 2015, published online 22 June 2015

Introduction

It started, as many things do in health, with a corridor conversation.¹ I was speaking with one of my employers at the private practice where I worked as a physiotherapist and I asked how the practice's recently appointed new graduates were going. I knew the practice had employed the graduates in a partnership arrangement with the local hospital. It had been a bit of a gamble, but apparently it was going well and everyone was pleased with it. I hadn't heard of a similar arrangement before, and my employer said he'd looked in the literature and nobody else was doing anything similar. 'What a great idea,' I said '...someone should evaluate that.' It took about 3 weeks before I realised that 'someone' should be me.

Background

It really was a great idea. The region where we worked on the far south coast of New South Wales was, like many rural areas, an area that traditionally found it hard to recruit physiotherapists.² New graduates seemed to prefer larger centres for their first year out of university, believing they would receive a greater range of experiences.^{2,3} So, to attract new graduate physiotherapists, the region had to offer something different. A partnership where the graduates would split their time between public and private, with a comprehensive education program, appeared very attractive and the large number of applicants confirmed that to be the case.

The graduates had been working for a month or two when that corridor conversation took place. The idea of evaluating the partnership gradually took hold. Previously I had been involved in another evaluation that used the COM-B System as a model for understanding behaviour, where Behaviour is a factor of Capability, Opportunity and Motivation.⁴ As I contemplated evaluating the partnership, I reflected on this model:

Was I 'capable'? I had some prior research experience and access to a network of research supports through my second job in a public sector training and education role. As a former manager in the public system and a current employee of the private sector, I was well placed. I had a knowledge of the partnership but no managerial involvement that could compromise the willingness of people to participate.

Was there 'opportunity'? The lack of published literature on similar models pointed to an unexplored area that warranted investigation. There was a real enthusiasm around the model and I felt people would be interested in sharing their experiences.

Was I 'motivated'? I had been looking for some time to undertake a small qualitative study as a lead researcher. As someone familiar with the concept of 'impostership',⁵ I felt I needed to undertake qualitative research to improve my credibility with my peers within the public sector. Oh, yes. . . I was motivated!

It was clear that the combination of capability, opportunity and motivation pointed to the behaviour: I would lead an evaluation of the model. Committed to the idea, I approached the managers in the public and private sector and they were supportive. I asked a colleague in the private practice to join the project as a co-researcher. A methodology was agreed upon, the search for grant funding began and the evaluation was underway. The question was: what would that evaluation produce?

Methods

The initial enthusiasm for the project saw the research protocol and associated documentation written within a few weeks. However, the funding grants I had targeted did not eventuate: as non-clinical research the project didn't fit with any available grants. My co-researcher, due to competing commitments, wasn't able to

offer as much time to the project as either of us would have liked. The general busyness of life encroached and progress of the project was at risk of stalling.

Seeking a solution, I negotiated with the private practice to work on the evaluation at work between patients. At the same time I discussed the project with my manager in the public sector, who encouraged me to dedicate time to the project as part of my personal professional development. A new momentum developed, with ethics and governance submissions approved within weeks.

The enthusiasm that had surrounded the partnership was reflected in the recruitment of participants. Within a month of ethics approval, all potential participants were contacted, three focus groups were arranged and conducted, and transcribing of audio recordings was underway. It wasn't long before the evaluation was complete, the final report submitted to the ethics committee and the process of disseminating the results had begun. The report made its way to the chief executive of the local health district, a conference presentation was offered and accepted and writing for publication commenced. After some months had passed, the impact of undertaking the evaluation started to emerge.

Results

It soon became apparent that undertaking this evaluation led to outcomes on several levels. On an individual level, there was a sense of achievement and personal growth. Although I hadn't suddenly become a qualitative research expert, I had grown my skills in this area. There were some uncomfortable moments as I became the public face of the model, not just the evaluation, and I attempted to ensure that credit for the partnership model was appropriately directed to those responsible.

Within the organisations involved in the partnership, the process of exploring the model prompted discussions, improvements to processes and a revitalisation of the working relationship. The partnership model and its evaluation were recognised with a local health district quality award, providing affirmation of the value of the partnership model.

At an organisational level, the evaluation and subsequent promotion of the findings raised the profile of physiotherapy and, by association, allied health services more broadly within the local health district. The project created an awareness that research can be completed locally and that clinicians need not rely on universities, large-scale studies or even external grants to complete a worthwhile project.

During the course of the dissemination phase the evaluation was distributed to physiotherapy representatives across the state. Three conference presentations on various aspects of the study captured an audience of physiotherapists and other rural health workers across the state and country.

At a national level, the Australian Physiotherapy Association became aware of the partnership model and profiled the partnership model and its evaluation as the lead story for the national physiotherapy private practice magazine *Business in Practice*. Publication of the evaluation occurred,⁶ broadening the audience to a national and even international level.

Discussion

This evaluation commenced with a great idea, a conversation and a realisation. While retelling the story of the evaluation shows

a simple project with widespread outcomes, the conversation and the outcomes could have been quite different. What would have happened if instead of 'Someone should evaluate that' the response was 'Well done, keep up the good work'? Would the model remain a great idea, of which only a handful of people were aware? Would the news of this great idea leak out in another way?

We can never know the answers to those questions. Instead, I would like to explore the answer to another question: what can be learned from this experience that would benefit other clinicians, managers or policy makers? How can this experience facilitate discussion about issues of policy, practice or workforce capacity in driving clinician-initiated research? Because the COM-B model⁴ assisted my own decision to undertake an evaluation, it may be useful for others to consider this model. Let's commence with 'opportunity'.

The partnership model offered a tremendous evaluation opportunity. It was an innovative solution that people were excited about. That excitement led to engagement in the research and the strength of the idea found a ready audience for research reports and presentations.

Often in health we see innovative solutions. In rural health, in particular, there is a propensity towards innovation due to sheer need.^{7,8} How often, though, are these innovations, these great ideas, complimented but not evaluated? Clinicians, in particular, are able to see the need for innovation and to see great ideas implemented in practice. Are there opportunities being missed to evaluate and share these great ideas?

The issue may not lie with a lack of opportunity, but perhaps with 'capability'. Although many clinicians feel comfortable recognising a great idea, taking the next step to a formal evaluation or research project may be outside that comfort zone. Access to research expertise in rural areas is often limited.⁹ However, a rise in online research training options, some of them free and open access,¹⁰ is providing accessible options for increasing research capability.¹¹ For clinicians who do not know where to start, these may provide a basic grounding in research or evaluation.

Clinicians may be unaware of or unable to access funding to support research projects, and a lack of funding is seen as a barrier to research activity in health.¹² In this research journey there was no funding support. Instead, both workplaces could see the value in the project being part of my work. Could this be an option for clinicians and managers to consider? Some health professionals, such as clinical nurse consultants, have research as part of their position requirements and research activity could be enabled with management support for dedicated research time.¹² Dedicating time does come at a cost to the organisation, but as the present case study shows, that cost could equally be viewed as an investment.

In this project I had no formal mentor or supervisor and my co-researcher was new to research. Instead, it was an informal network of friends and colleagues who had experience in evaluation that guided me through the process. Perhaps with my previous research experience I was more capable than some to undertake an evaluation, but it was my personal desire to undertake qualitative research that made this evaluation a formal research project. This partnership model could have been evaluated as a quality improvement activity by someone without research experience, and many health services have individuals experienced in quality activities or tools available to assist

clinicians with this style of evaluation. If there is not that expertise within the organisation, is partnering outside the organisation a possibility? Certainly in rural areas partnering across sectors is seen as a solution to a limited access to research expertise.¹³

Which brings us to 'motivation'. We often see innovation because clinicians have seen an issue and devised a solution. The problem is addressed and the clinician can dedicate time to the remainder of their busy workload. What would evaluation add? In some clinician's eyes evaluation simply demonstrates what we already know to be working. Other motivations to evaluate may be altruistic ('Other people should know about this great idea') or people may have a more individually driven agenda ('This would look great for me if I did research on that great idea'). Whatever the motivation, it should be noted that the great innovators aren't always the best evaluators. There is a role for innovation and evaluation, but the same individual need not play both roles.

Creating a culture that rewards and acknowledges research and evaluation is seen as a critical step in establishing ongoing research activities.^{12,14} Acknowledgement, recognition and valuing of evaluation efforts may, in turn, motivate others to undertake such an activity. This, in turn, may see an increase in capability, with those who have undertaken evaluations able to act as resource people within the workplace.

As part of this process I discussed with an experienced researcher writing a paper explaining what I learned from undertaking this evaluation. She asked me who the audience for such a paper would be and what do I want them to understand. My answer is that there are several audiences. The first is public health clinicians, to whom I would say that if you see a great idea, evaluate it! It can be done and it can have a tremendous impact. The second is health managers, for whom the message is that the opportunities are there for evaluation and the value adding that comes with it. Can you enable it by creating capability: by assisting access to training and allowing time for evaluation? Can you motivate your staff by valuing and celebrating research and evaluation? Finally, to policy makers I suggest that research that may drive policy may require policy to drive research, with research activities being considered under education leave provisions an example of a potential policy solution.

It must be noted this is a single case, with the limitations of generalisability that come along with single case study designs. There is also a risk that retelling such a personal journey can be seen as self-serving. In my defence, use of the first person is intended to make the story as genuine as possible, for all its faults.

Conclusion

Great ideas are all around us and clinicians are well placed to recognise them. If evaluations of great ideas are to occur, the issue of motivation must be addressed. Health services must acknowledge and appreciate both innovation and evaluation. Support can be provided for capability; training in research skills, acknowledging research and evaluation as personal professional development activities and providing time to evaluate are options that are available now. The opportunities are there. Will you take, facilitate or encourage that step into evaluation? If you do, who knows where that might lead? If this experience is anything to go by, the benefits can be seen for the individual, workplace, organisation and beyond.

Competing interests

None declared.

Acknowledgements

This paper draws on the experiences of the author while evaluating a partnership involving Southern NSW Local Health District and Sapphire Coast Physiotherapy, which involved support from the Health Education and Training Institute. Although this paper acknowledges the role of all three organisations in support of that evaluation, none of these organisations provided funding for this manuscript and had no involvement in the decision to submit the final manuscript for publication. The author wishes to thank Adam Woolcott (Sapphire Coast Physiotherapy) and Dr Sue Kirby (School of Public Health, University of Sydney) for allowing personal conversations to form part of this manuscript.

References

- 1 Carthey J. Reinterpreting the hospital corridor: 'wasted space' or essential for quality multidisciplinary clinical care? *HERD* 2008; 2: 17–29. doi:10.1177/193758670800200103
- 2 Mitchell RA. Perceived inhibitors to rural practice among physiotherapy students. *Aust J Physiother* 1996; 42: 47–52. doi:10.1016/S0004-9514(14)60440-2
- 3 Keane S, Lincoln M, Smith T. Retention of allied health professionals in rural New South Wales: a thematic analysis of focus group discussions. *BMC Health Serv Res* 2012; 12: 175. doi:10.1186/1472-6963-12-175
- 4 Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci* 2011; 6: 42. doi:10.1186/1748-5908-6-42
- 5 Brookfield S. Becoming a critically reflective teacher. San Francisco: Jossey-Bass; 1995.
- 6 Schmidt D, Dmytryk N. Exploring a public-private partnership new graduate physiotherapy recruitment program: a qualitative study. *Aust J Rural Health* 2014; 22: 334–9. doi:10.1111/ajr.12136
- 7 Dunbar JA. Innovation in rural health: sound the trumpet. *Aust J Rural Health* 2011; 19: 109–10. doi:10.1111/j.1440-1584.2011.01206.x
- 8 Smith KB, Humphreys JS, Wilson MGA. Addressing the health disadvantage of rural populations: how does epidemiological evidence inform rural health policies and research? *Aust J Rural Health* 2008; 16: 56–66. doi:10.1111/j.1440-1584.2008.00953.x
- 9 Taylor J, Hughes C, Petkov J, Williams M. Unique issues in research and evaluation in rural and remote locations: is there a place for specific research training? *Rural Remote Health* 2005; 5: 351–62.
- 10 University of London. Understanding research methods. 2014 Available at: <http://www.coursera.org/course/researchmethods> [verified 13 March 2015].
- 11 Aggarwal R, Gupte N, Kass N, Taylor H, Ali J, Bhan A, Aggarwal A, Sisson SD, Kanchanaraks S, McKenzie-White J, McGready J, Miotti P, Bollinger RC. A comparison of online versus on-site training in health research methodology: a randomized study. *BMC Med Educ* 2011; 11: 37. doi:10.1186/1472-6920-11-37
- 12 Wilkes L, Cummings J, McKay N. Developing a culture to facilitate research capacity building for clinical nurse consultants in generalist paediatric practice. *Nurs Res Pract* 2013; 2013: Article ID 709025. doi:10.1155/2013/709025
- 13 Dunbar JA. Building capacity for rural and remote research. *Aust J Rural Health* 2010; 18: 133. doi:10.1111/j.1440-1584.2010.01146.x
- 14 Sarre G, Cooke J. Developing indicators for measuring research capacity development in primary care organizations: a consensus approach using a nominal group technique. *Health Soc Care Community* 2009; 17: 244–53. doi:10.1111/j.1365-2524.2008.00821.x

This narrative highlights the value of rurally situated individuals identifying ideas that are meaningful to the rural context and in need of being explored using research. Identifying these ideas is an important first step, creating the potential for a research or evaluation project. For those rurally-situated individuals to be capable of undertaking research in a rural area, there is a requirement for a base level of research skill, or research capability. To then turn that capability into capacity to undertake research there are structural barriers to overcome. These barriers included a lack of available resources, limited access to expertise, policy barriers and limited time. This narrative also demonstrated the ability of an individual to navigate within these structures. This ability is referred to as individual agency.

As this paper highlights, there are structural issues that individuals must navigate as their individual agency allows. Figure 3 represents an example of some of the possible influences or structural issues that might affect a rural health worker wanting to undertake research and the role of individual agency (depicted by a wandering path) in navigating through, around or in response to some of these structural issues. While this paper (Schmidt, 2016) illustrates these issues for those *undertaking* research, the issues are identical, if not greater for those wanting to *learn about* undertaking research. It is this focus on learning about how to do research and how to create capacity to undertake research that is the focus of this thesis.



Figure 3: Possible structures influencing research activity for rural individuals and the non-linear use of agency to navigate these structures

These terms, structure and agency, are key tenets of critical realism (Ackroyd & Karlsson, 2014; McEvoy & Richards, 2003; Pawson et al., 2005), the methodological lens used to explore the development of research capacity in this thesis. While this case study was not originally designed using critical realism, in hindsight it was consistent with a critical realist approach through its acknowledgment of the contextual influences that assist or inhibit research activity for rural clinicians, and the ability of those individuals to act within their context. The use of a case study design is also consistent with the realist approach, where case studies are seen as important tools for development of knowledge and testing hypotheses (Ackroyd & Karlsson, 2014; Løkke & Sørensen, 2014).

The narrative touches on the issue of context. Context is a particular concept in realist research and provides a foundation for theory development (Gatenby & Rees, 2014). This paper in particular outlines the context for an individual rural clinician wanting to understand and undertake research.

Capturing the individual perspective, as in this narrative, is important. This is my own experience, and having a means of understanding my own experience and its influence on the subsequent development of the remainder of the thesis therefore and its exploration of research capacity building is an important reflexive moment. Reflexivity is further discussed in the methods section, in Chapter 3.

There are many structural and contextual components involved in undertaking and learning about research in a rural area. These components, taken together, are complex. To understand the way these components interact, a way to study and understand this complexity is needed. Critical realism provides a way to explore this complexity and will be discussed further in the methods section in Chapter 3.

Chapter 2: Background

This chapter explores what is known about workplace-based research training and research capacity building in rural health workplaces. First, we discuss why there is a need for such training, and clarify what is meant by research capability, research capacity, research capacity building and clinician researchers.

To help understand the field of rural research capacity building, specific consideration is also given to:

- Approaches and models used to train, educate and increase capability in research in rural health workers
- Underlying educational philosophies underpinning approaches used to train, educate and increase capability in research in rural health workers
- Educational content taught in rural research training
- Who has been targeted for rural research training, and where they are targeted
- The issues of complexity and the aims of this thesis

Literature underpinning this thesis was informed by a search of peer-reviewed publications on workplace-based research building strategies within the field of health services or health delivery. Key search concepts were derived and defined, then broken further down into keywords to be used in literature searching. The search strategy was constructed, trialed on one database and revised before being employed across four health-focused platforms available via University of Sydney and NSW Health.

The following key concepts were explored:

Concept 1: Workplace-based health research development program. Literature was limited to workplace-based programs. University-based programs fall under different resourcing, academic and learning culture structures to workplace-based programs. For this thesis programs that have university support and funding but are delivered within a health workplace were considered workplace-based, while strategies conducted within a university were excluded.

Concept 2: Increased research capacity. For identifying the literature, the term research capacity building was used along with equivalent terms research capacity development, research skill building and research skill development.

Combining these searches led to the following Boolean search string:

“research capacity building” OR “research capacity development” OR “research skill building” OR “research skill development”

Literature was sourced from health-related databases on OVID, EBSCO, Embase and Scopus platforms with a snowballing strategy used to identify other resources within reference lists.

The need for workplace-based research training in rural areas

People living in rural and remote parts of Australia and other countries experience significant health disadvantage when compared to their urban counterparts (Australian Institute of Health and Welfare,

2019; Pong, DesMeules & Lagacé, 2009). There are meaningful differences in life expectancy and disease rates for both physical and mental health issues (Australian Institute of Health and Welfare, 2019).

These disadvantages are linked to disparities in access to health care (Pedigo & Odoi, 2010; Robin & Linda, 2013; Smith, Humphreys & Wilson, 2008). In New South Wales, Australia, for example, there are fewer specialist doctors and less allied health professionals per head of population in rural compared to urban areas (Australian Institute of Health and Welfare, 2022). Specialist services tend to be clustered in cities, creating barriers to access for rural people (Australian Institute of Health and Welfare, 2022). Other challenges to health service access include large geographical distance between centres and low population densities (Australian Institute of Health and Welfare, 2019). Social determinants of health are another cause of this disparity (Dixon & Welch, 2000; McDonald, Bailie & Michel, 2013).

Gaps in the health of rural people and rural health care highlight the unique challenges and circumstances associated with health care delivery. Often in rural health care delivery in Australia, models of care are developed in urban areas and then transferred into the rural areas. Predictably this 'one size fits all' approach does not necessarily translate into effective models of care in rural areas (Australian Government, 2020; Parliament of New South Wales, 2022). In rural areas, tailored rural solutions and specific models of care may be required. As an example, the case study in Chapter 1 is a model that was successful in a rural environment but is unlikely to have succeeded, or even been required, in a metropolitan setting.

There are some health conditions that are unique to a rural environment and health care is delivered in a context characterised by the resilience of rural people and the effect of this resilience on decision making (Greenhill et al., 2009; Maybery et al., 2009; Wells, 2009). Rural health delivery, outside the larger regional centres, is dependent on a mix of primary health services and services provided by generalist clinicians, decentralised services and outreach services from larger centres, particularly in rural Australia (Australian Institute of Health and Welfare, 2019; Australian Institute of Health and Welfare, 2022).

To address these particular circumstances and needs of rural healthcare delivery in Australia, there is a need for specific research into rural health issues and rural health service delivery (Alston et al., 2022; Taylor et al., 2005) including developing and implementing rural models of care (Allan, Ball & Alston, 2007) and translating relevant urban research into rural environments (Bell, 2008; Bell et al., 2011). In short, better rural health care is contingent upon a better understanding of the rural health care environment and rural health delivery. Being able to undertake your own research is an emancipatory action, something that can be empowering for rural health workers (MacLeod & Zimmer, 2005).

One of the difficulties in gaining an understanding of particular rural health issues is the limited number of rurally based researchers (Alston et al., 2022; Brown et al., 2021). Historically most researchers have been urban based and even if they conducted research in rural areas, this has not led to increased locally-driven research (Taylor et al., 2005). Research conducted with, within, and by, rural health services and rural clinicians has advantages in being more attuned to identifying the critical issues relevant to the rural context and understanding of rural people's mindset and characteristics (Alston et al., 2020; Alston et al., 2022; Wong Shee et al., 2022). The unique circumstances surrounding rural health service delivery have led for a call for specific rural training for researchers in Australia (Taylor et al., 2005).

One factor contributing to a lower level of rural research activity is funding inequity (Barclay, Phillips & Lyle, 2018). There is limited research grant funding directed to rural health research, 2.4% of health research grants, and the funding that is provided is disproportionate to population size and need of the 30% of Australians who live rurally (Barclay, Phillips & Lyle, 2018).

Developing local research capability via training rural health workers, along with other research capacity building endeavours, is a potential solution. The “train them where you need them” philosophy has been shown to be instrumental for building and retaining rural workforce in health services such as medicine, nursing and allied health (Laven & Wilkinson, 2003; Manahan, Hardy & MacLeod, 2009; McGrail, O’Sullivan & Russell, 2018; Playford, Wheatland & Larson, 2010). The underlying principle is that developing research experience and research capacity within rural health services will lead to rural-relevant research that will lead to improved health care for rural communities.

Research training and capacity building within health services has taken many forms over the past two decades. To understand the multiple forms of approaches taken, it will be helpful to explore how, what, where, why of the strategies used to build rural health research skill and capability. Before progressing, it is important to clarify what is meant by research capability, research capacity and research capacity building.

Clarification of nomenclature:

The terms research capability and research capacity are sometimes used interchangeably but there are important differences in these terms. Definitions used for the purposes of this thesis are:

Research capability

“Research capability is the ability to answer a problem following the scientific processes of planning, gathering data, and interpreting it with the appropriate statistical tool or qualitative analysis” (Caingcoy, 2020). Research skill, experience, knowledge and confidence contribute to research capability. While this definition lends itself to the individual level, research capability is a term that can also be applied to teams or to organisations.

Research capacity

Research capacity is defined as “the ability to engage in, perform or carry out quality research” (Matus, Walker & Mickan, 2018). Whilst having research capability is an important component of research capacity, having the ability to follow scientific processes does not automatically mean a researcher is in a position to ‘engage, perform or carry out’ the research intended. This is because researchers, particularly those working in roles in health services, function within a dynamic system with competing commitments, priorities and pressures. As with research capability, research capacity can be applied at the individual, team or organisational level.

Research capacity building

Research capacity building is defined as “a process of developing sustainable abilities and skills enabling individuals and organisations to perform high quality research” (Holden et al., 2012) and extends beyond the individual to incorporate organisational elements, such as developing organisational systems to support research. Research capacity development is used synonymously however again there are nuances, with capacity building often referring to a situation where there is no existing skillbase, whereas capacity development refers more to enhancing capacity that is present at the commencement of the development activity (Zamfir, 2017).

Application of these concepts has a bearing on the nature and conduct of research training programs. Training programs that focus on education may link to increasing individual skill, that is, individual capability. Training that incorporates an experiential learning component, where learning about research is in part achieved by undertaking research in a workplace, have the potential to create research capacity as well as capability. Developing research capability is an important part of developing research capacity, but it does not automatically follow that building research capability will result in building research capacity.

Considering actions and outcomes at different structural levels is consistent with research capacity literature; capacity can be built at the individual, team, organisational or supra-organisational levels (Cooke, 2005; Sarre & Cooke, 2009).

Clinician researcher

A clinician researcher “is an individual who conducts research and provides direct patient care” (Yanos & Ziedonis, 2006). It is important to note that these two roles need not occur at the same time or for the same organisation (Hay-Smith et al., 2016). Clinician researchers are not unique to the rural health environment but may play a vital role in rural research activity in the absence of other research expertise. Clinician researchers are also well-positioned to identify and explore relevant issues using research skills (Schmidt, 2016). In many ways a clinician researcher is the logical product of many research capacity building endeavours in rural environments.

Approaches and models used to train, educate and increase capability in research in rural health workers

A variety of approaches have been used to develop research capability and capacity in health service settings. These have included grant programs, partnerships, embedded researcher models and training programs.

Given the breadth of literature in this area, only a selection of examples for each of these approaches is described. As the Australian context is the setting for this thesis, Australian programs or strategies have been used as examples where available. Similarly, programs or strategies that were developed for rural or remote environments have been reported. International approaches or metropolitan models or examples have been presented where necessary to highlight aspects of training relevant to the Australian rural context.

Grant programs

Providing grant funding has been a long-established means of increasing research activity. One of the challenges of providing grant funding is that it may enable research *capacity* by providing opportunity to dedicate time and resources to a research project, but it is reliant on there being an existing level of research *skill* or *capability* to apply that funding in practice. These grant programs are usually competitive, oversubscribed and can only be used for specific purposes; in particular the allocation of grant funding to rural health research is uneven, with low success rates for rurally-based projects in grant funding applications (Barclay, Phillips & Lyle, 2018).

One Australian strategy that encompasses both urban and rural settings is the Translational Research Grant Scheme (TRGS) operated by the Office of Health and Medical Research, part of the New South Wales public health sector. This program targets grant funding to researchers working in the public

health who have successfully proposed a translational research project in conjunction with partners in another health district, university, or non-government sectors (Auld et al., 2018; Office of Health and Medical Research, 2017). In some ways the TRGS is both a grant and partnership model, and is an example of how capacity building strategies will use more than one approach concurrently. This program has increased research funding and research activity in rural areas, although the capacity building component appears to be more at an organisational level through the establishment of partnerships across sectors (Auld et al., 2018) than resulting from changes in individual research capability.

The provision of grants and bursaries in the Australian Primary Care setting through the Australian Government funded 'Primary Health Care Research Evaluation and Development' (PHCRED) Strategy was a program that targeted a mix of rural and urban health professionals from a range of professional backgrounds and targeted early career and novice researchers. This small grants program ran for approximately ten years from 2000 across both urban and rural areas. The PHCRED Strategy was reported to increase research activity and improve self-rated research experience (Ried, Farmer & Weston, 2007), although whether these changes were statistically significant was not stated.

Central Queensland University's Research Ready Grant Program (RRGP) is another Australian program aimed at creating research capacity in a range of rural and regional health workers through workplace-based training and experiential learning (Flenady et al., 2022b). This initiative is in the early stages, with a protocol published (Flenady et al., 2022b) detailing the design of the program and its evaluation. The program is designed to develop capacity of clinicians with an interest in research during the workshop training and one-year research phases, and has an additional goal of growing the skills of research facilitators (Flenady et al., 2022a; Flenady et al., 2022b).

Internationally, a novel example of the grant approach to research capacity building was conducted in India and involved a rapid-style education and development model referred to as a 'grantathon' (Hawk et al., 2017). This model saw 24 participants from across India receive education and proceed to receive grant funding to conduct mental health research over the course of a year. The participants rated significant improvements to their own research skill and confidence, described as ability to conduct research (Hawk et al., 2017). The small data set in this study means that these results should be generalised with caution.

Partnership models

Training and education partnerships between health organisations and educational institutions for health research have been trialled in rural areas.

Salmon et al., (2007) reported on a partnership between a rural Australian brain injury rehabilitation service and a regional university to form a research collaborative to develop research capacity. The partnership included coordination, research skills workshops and small grant funding. This partnership produced four peer-reviewed projects and the program coordinators reported plans to develop the partnership into a state-wide initiative. There is no published literature suggesting that such a state-wide approach was ever formalised.

A combined rural and urban partnership between multiple universities and public health services across Queensland, Australia, was described by Hulcombe et al., (2014). A combination of embedded researchers and grant funding was used to develop research capacity, with a specific approach of targeting a portion of grant funding to novice researchers. This ambitious partnership has sought to build not just research capacity but influence research culture in what is described as a "predominantly clinical workforce". The complexity of this partnership, being underpinned by an industrial agreement,

and the scale of the partnership, with more than 20 full-time equivalent staff employed across 17 health services, is unlike any other partnership model in Australia and demonstrates a level of investment not seen in other settings. Investment, partnerships and infrastructure development are key elements of research capacity building at the organisational level (Cooke, 2005; Sarre & Cooke, 2009), and with such an investment it would be expected that significant evaluation has occurred. Studies at regional health facilities have demonstrated some improvements in research experience in Allied Health professionals (Pain, Petersen & Fernando, 2018; Wenke et al., 2018; Wenke et al., 2017). Broader evaluations are not found in the published literature.

Internationally models like the Rural 360 and 6for6 programs (Asghari et al., 2021; Asghari et al., 2019) demonstrate formal partnerships between university staff and rural physicians via a research training program in rural Canada. This partnership model not only provides education but also grant funding, access to university resources and mentoring to increase research activity and use this activity to create potential for further grant funding. Like the TRGS program, the Rural 360 and 6for6 programs demonstrate a multi-pronged approach to research capacity building. Unlike the TRGS program, which uses the prospect of grant funding to encourage the formation of research partnerships, the Rural 360 and 6for6 programs are examples of partnerships that have been developed to deliver education and support of which grant funding is one component.

A larger consortium model was described by Bevilacqua, Morris & Pumariega (1996), where a rural public mental health service partnered with multiple universities. The consortium led to embedded research positions within public mental health services in the United States, along with a series of educational workshops. This model shows the scale of collaboration that can be achieved in the rural health workplace although, like the model described by Hulcombe et al., (2014), demonstrates a level of funding commitment not available in all rural health workplaces.

A challenge for partnership models is the potential for conflicting goals of the educational institution and the health organisations. Education institutions may value outcomes like publications, grants and completion of higher degree research (Thomas, et al., 2006) while the focus of the capacity building for a health institution may operate at a more fundamental level of building research capability for many staff, rather than identifying the early high achievers. Research endpoints may also differ, with health institutions favouring research which drives improvements in patient care.

Embedded health researchers

Moran et al (2019) has advocated for the embedding of health researchers into health services for the purposes of building both research activity and research capacity (Moran et al., 2019). An embedded researcher model describes an arrangement where a researcher from an academic institution is physically located and working within a non-academic organisation (Ward et al., 2021). Embedded researchers may also have a conjoint appointment which encompasses a research, clinical and educational role (Mickan & Coates, 2022).

A systematic review examining embedded researchers in Allied Health reported positive changes in individual research activity, research outputs and research culture at the team and individual levels (Wenke & Mickan, 2016). It is important to note that this review was not centred upon rural and remote settings, with only one rurally focused paper included in the review. Further research explored allied health researchers embedded in urban and regional health services in Queensland, Australia (Wenke et al., 2017). Embedding 15 allied health researchers into nine health services led to impacts at the individual, team, and organisational levels. These impacts included improved research skill of

individuals, increased research activity, a shift in research culture and improved research collaborations (Wenke et al., 2017). The positions also had a link to boosting the profile and reputation of allied health professions. That paper went on to identify mechanisms by which these changes occurred, including the personal factors associated with the researcher, the support from the organisation and the means by which the research positions were implemented (Wenke et al., 2017).

A long-term partnership between a regional health service and a university has also been used to embed researchers in rural New South Wales, Australia. This partnership model saw embedded researchers from the university partner leading both research and capacity development activities (Wolfenden et al., 2017). Capacity building occurred as a result of embedding experienced researchers, however it is noted that this model relied on the provision of opportunities for PhD candidates and postdoctoral researchers for this capacity, in particular targeting senior managers of the service (Wolfenden et al., 2017). While successful, this model does rely on ongoing resourcing from health service and university partners, along with grant funding, thus demonstrating the need for ongoing organisational support required for model sustainability.

It is notable that all the above are quite recent initiatives, indicating that this is an evolving area of interest in rural health services. As such, issues of sustainability and scalability with the competing priorities on rural health staff and limited health funding have not been fully explored.

Research training and capacity building programs

The New South Wales Rural Research Capacity Building Program (RRCBP) offers participants a two-year experiential learning program with centrally delivered education supporting a workplace-based investigator led research project. Aimed at rural health workers who are novice researchers, the program has been shown to increase some elements of research capacity (Webster et al., 2011), improve research experience (Schmidt, Webster & Duncanson, 2019) and contribute to the rural evidence base through increasing publication rates (Duncanson, Webster & Schmidt, 2018). The author of this thesis was both a candidate of this program in 2008 and has been responsible for managing it since 2011.

Challenges for the RRCBP are that it is state-based, only open to government employees and like many of these programs does not lead to a formal qualification. The RRCBP relies on volunteer mentors to supplement support provided by program coordinators and has a non-completion rate comparable to, or better than, other distance education research education programs (Schmidt, Robinson & Webster, 2014). One of the strengths of the program is experiential learning foundation, an educational approach which allows for real-world learning (Doel & Shardlow, 2009). Programs like the RRCBP combine a grant component, education and experiential learning. It is this addition of grant funding and the experiential component that extends programs of this type beyond capability building into capacity building through the act of undertaking research as part of the learning process. Long-term outcomes of this program are described in Chapter 5 of this thesis.

Another Australian program modelled on the RRCBP was designed and delivered by Centre for Research Excellence for Rural and Remote Research and based out of Broken Hill in remote New South Wales, Bendigo in rural Victoria and Alice Springs in remote Northern Territory. This one-year research capacity building program involving primary healthcare workers produced similar short-term outcomes to the RRCBP and is explored in depth in Chapter 5 of this thesis.

The Supporting Translation of Research in Rural and Regional areas (STaRR) program, conducted by a rural health academic alliance in rural Victoria, Australia, is a new program aimed at building both

health researcher and mentor capability in rural health services. This short workshop-based program is conducted by the Western Alliance, a formal partnership of two universities and multiple rural health care service providers with a shared focus on regional health outcomes. The STaRR program combines an education program, mentoring and potential grant funding aimed at a broad range of rural health professionals with an interest in developing research skill (Western Alliance, 2022). The program coordinators have recently called for submissions to its second intake, and evaluation of the model is underway.

Canada's *6for6* program also incorporates an education program and experiential learning through close-to-practice research (McCarthy et al., 2016a; McCarthy et al., 2016b; Walsh et al., 2021). Targeted at rural doctors, this program has a formal needs-based curriculum and delivers six educational sessions over the course of a year (McCarthy et al., 2016a; McCarthy et al., 2016b). While a predetermined evaluation plan has been published (Asghari et al., 2021), outcomes of the program have not been presented. Nevertheless, these structural components provide useful guidance for others looking to enter the research training domain. The developers of the *6for6* and the accompanying Rural360 program refer to the programs as an 'anchored' model, with the educational institution providing a central point of coordination and outreach (Walsh et al., 2021). This contrasts to the model described in Chapter 5 of this thesis (Schmidt & Kirby, 2016), where a decentralised model with discrete but connected hubs provided a structural response to challenges of distance and remoteness (Bethune et al., 2019; Schmidt & Kirby, 2016).

Programs specifically designated as research capacity building programs tend to demonstrate organisational, and occasionally system-wide, commitment and investment. These programs often allow for local health services to engage in research capacity building without major investment and to engage or disengage according to local circumstances. These features tend to generate consistent quality and notable reach which are hallmarks of sustainability.

The examples above show that multiple approaches and models have been used to build research capacity in health services. Each program was conducted within their own specific context, be that rural, regional, or urban, and have different targets for education or support. Other approaches such as participatory action research as a capacity building strategy for physiotherapists (Janssen et al., 2013) or offering fellowships to medical practitioners (Ried, Farmer & Weston, 2007) have been trialled in New Zealand and Australian contexts respectively. Scaffolding the development of organisational research capacity via a framework approach (Brown et al., 2015) or underpinned by program theory (Murphy et al., 2015) are organisational level approaches that are described in the rural Australian context.

The success of these initiatives is measured using different metrics, including self-rated research experience (Pain, Petersen & Fernando, 2018; Schmidt & Kirby, 2016; Schmidt, Webster & Duncanson, 2019), completion rates (Schmidt, Robinson & Webster, 2014), research activity (Auld et al., 2018; Ried et al., 2008; Salmon et al., 2007) and the ability to secure grant funding (Asghari et al., 2021; Asghari et al., 2019). Other metrics of interest may include publications or presentations (Kuzhabekova & Lee, 2018; Ramkalawan & Dieppe, 2008), workforce development (Ewen, Ryan & Platania-Phung, 2019; Webster et al., 2011), influence on policy and practice (Auld et al., 2018; Hulcombe et al., 2014) or research confidence (Finch et al., 2013). The attainment of formal qualifications or articulation with research higher degrees was an important feature of some programs (Wolfenden et al., 2017), but many programs led to no formal qualification.

The range of approaches, contexts and metrics add complexity to understanding the relative merits of each approach. This highlights the need for studies such as this thesis, where critical realism is used to create clarity from this complexity.

Underlying educational philosophies underpinning the approaches used to train, educate and increase capability in research in rural health workers

There has been little examination of the underlying educational philosophies or the underlying mechanisms by which changes in research capacity is enhanced. Solutions, particularly training solutions, appear to be educator-driven based on what educators “need to teach” rather than what learners might “need to know”.

Some programs specifically state their educational underpinning. Examples of programs with stated educational approaches are in Table 1. These examples have been selected to demonstrate the range of educational underpinnings used in research capacity building approaches in rural, remote and urban areas within Australia. Other programs, such as the StaRR (Western Alliance, 2022) or 6for6 (Asghari et al., 2021) programs, may have been based on specific educational foundations but have not clearly articulated these in describing their programs.

Table 1: Educational underpinnings of rural research capacity building programs

	Author	Year	Model name	Country	Educational underpinning
1	Brown et al (Brown et al., 2015)	2015	Rural academic general practices	Australia	Framework approach Pathway model (organisational)
2	Murphy et al (Murphy et al., 2015)	2015	Not stated	Australia	Program theory
3	Schmidt & Kirby (Schmidt & Kirby, 2016)	2016	CRE RCBP	Australia	RCB Framework Learn by doing Partnership Cultural constructivism
4	Schmidt, Webster & Duncanson (Schmidt, Webster & Duncanson, 2019)	2019	RRCBP	Australia	RCB Framework Learn by doing Cultural constructivism

The last two programs listed in Table 1 show a high degree of overlap as the CRE RCBP program (Schmidt & Kirby, 2016) is based on the RRCBP (Schmidt, Webster & Duncanson, 2019). These programs share a common foundation having been underpinned by capacity building principles. Both programs have been included as they are presented in full and discussed in Chapter 5 of this thesis.

A range of educational philosophies have been used within approaches to health research capacity building in Australia. This variety of philosophies may reflect careful consideration of the fit between program philosophy and desired educational outcomes, or decisions may have been more pragmatic. The majority of educational programs do not state a specific educational approach or underpinning,

which may reflect the pragmatic approach of educators, who are more focused on the delivery and outcomes of education programs than explicitly describing the how and why.

Recent literature has started to address the gap of underlying educational theory (Cooke, Gardois & Booth, 2018) in the form of a realist synthesis. While that synthesis brings together many of the underlying principles of capacity building, none of the programs examined are rural, and as such do not examine the unique challenges of rural health. This synthesis however does provide a blueprint in terms of establishing an overarching theory. One of the important steps in critical realism is testing theory (Kempster & Parry, 2014) and mechanisms derived in the course of this thesis will be compared and contrasted to the mechanisms presented in Cooke et al's (2018) synthesis. The mechanisms of research capacity development presented by Cooke et al (2018) were:

- 'Exceeding the sum of the parts', where individuals or organisations achieve more than they are likely to achieve in isolation
- 'Learning by doing', where individuals or organisations learn by undertaking activities and reflecting upon the outcomes of these activities
- 'Liberating the talents', where individuals or organisations maximise the use of existing skills and experience
- 'Releasing resources', where resources are provided to overcome individual or organisational barriers and enable research activity
- 'Coproducting knowledge', where individuals or organisations use networks and partnerships for knowledge development and the sharing of ideas
- 'Feeling that you are making a difference', where individuals or organisations see that research makes an impact on health policy or practice
- 'Modelling positive behaviours', where individuals see research occurring in their organising and the positive impact of involvement in research
- 'Signalling importance and making research core business', where individuals see that engaging in research is a valued part of the organisation's business

These proposed mechanisms have been highlighted here as they will be compared to mechanisms derived in this thesis in Chapter 6, the analysis.

Educational content taught in rural research training

Many of the educational programs and workshops report delivering an introduction to research methods. While the exact nature of what content is considered 'introductory' is not routinely published, examples of teaching content that has been published for some of these programs is in Table 2. Note that not all the programs that report their educational underpinning (as seen in Table 1) report their educational content (see Table 2) and vice versa. For example, an allied health training scheme based in an urban setting (Harding et al., 2010) may include description of program content without explaining educational approach utilised. Similarly, a rurally based program that uses a framework approach and organisational pathway model might not reveal the educational content (Murphy et al., 2015). This also applies to programs such as the Rural Research Capacity Building Program which do not explicitly describe their content while having a clear capacity building underpinning (Schmidt, Webster & Duncanson, 2019; Webster et al., 2011). This lack of explicit explanation of both educational philosophy and content adds to the complexity of understanding which educational approaches produce which outcomes.

Table 2: Published content of introductory teaching in Australian research capacity building programs

	RRGP ¹	RCBP ²	AHRTS ³
Formulating a research question	✓	✓	✓
Searching and reviewing literature	✓	✓	✓
Conceptualizing the research design	✓	✓	
Ethical approval	✓		
Introduction to qualitative methods	✓	✓	
Introduction to quantitative methods	✓	✓	
Population and participants	✓		
Sample size and power	✓		
Data collection techniques	✓	✓	✓
Data analysis approaches	✓	✓	✓
Writing skills			✓
Presentation skills	✓		

¹ Research Ready Grant Program (Flenady et al., 2022b)

² Research Capacity Building Program (Schmidt & Kirby, 2016)

³ Allied Health Research Training Scheme (Harding et al., 2010)

The Research Ready Grant Program (Flenady et al., 2022b) and the Research Capacity Building Program (Schmidt & Kirby, 2016) are Australian rural programs that offer an overview of the research process as a whole in their teaching content.

The program documented by Harding and associates (Table 2) targeted metropolitan Allied Health staff to learn the skills associated with research through a 12-week systematic review training course (Harding et al., 2010). The content for that program only covered what was relevant for a systematic review, however the review of the program demonstrated that not only is a measurable change in confidence and some changes in research experience achievable over a short period, but it is also feasible to do so without the commitment of additional resources. The authors indicated that training did not increase the interest in research, but it did provide a mechanism for research activity and subsequent publication (Harding et al., 2010). While this program was not conducted in a rural area, it does provide an example of the generative nature of these programs.

In Australia a range of health disciplines have been targeted for research capacity building, including Aboriginal health workers (Bailey et al., 2006; Ewen, Ryan & Platania-Phung, 2019; Giles, Malin & Harvey, 2006; Stajic et al., 2019), allied health staff (Golenko, Pager & Holden, 2012; Grimmer et al., 2014; Harvey et al., 2016; Matus et al., 2019; McCurtin & O'Connor, 2020; Nightingale et al., 2020; Wenke et al., 2018; Wenke et al., 2017; Wright et al., 2020), medical staff (Brett, Sherrard & Bower, 2006; Ried et al., 2008) and primary health care workers (Hulcombe et al., 2014; McIntyre, Brun & Cameron, 2011; Meurer et al., 2020; Offredy, 2007; Ried, Farmer & Weston, 2006a; Ried, Farmer & Weston, 2006b; Ried, Farmer & Weston, 2007; Ried & Fuller, 2005; Schmidt & Kirby, 2016).

Research training schemes and models have been described in rural and remote public health services in Australia (Flenady et al., 2022b; Matus et al., 2019; Pain, Petersen & Fernando, 2018; Schmidt & Kirby, 2016; Webster et al., 2011), Canada (Asghari et al., 2021; Asghari et al., 2019; McCarthy et al., 2016a; McCarthy et al., 2016b; Walsh et al., 2021), New Zealand (Crozier, Moore & Kite, 2012) and the United States (Harden & Watman, 2015; Snowden et al., 2018; Vogel, Whippy & Robinett, 2010).

The private sector workforce is less represented in the literature, outside of general practitioners and other medical staff working in primary care settings (Brett, Sherrard & Bower, 2006; Ried, Farmer & Weston, 2007; Ried et al., 2008). A recent scoping review examining the priorities for rural allied health in Australia did call for more research infrastructure and discussed the role of the allied health private sector, however did not explicitly link research activity to the private sector (O'Sullivan & Worley, 2020). It should be noted that in rural allied health there is a proportion of staff that work across sectors (Keane et al., 2013), and this can mean research capability can translate across from one sector to another. The experience of rural nurses in the private sector was not identified in the research capacity building literature.

The setting for the studies comprising this thesis is rural, regional and remote Australia, and the studies themselves were predominately conducted within New South Wales, although some study participants were from outside the state. This rural perspective informs and underpins the thesis as a whole.

While rural health inequality persists, and research into health issues affecting rural residents remains limited, there is a need to build research capacity into rural health services so that rural health workers are capable and have capacity to investigate and find solutions to areas of rural concern. However, with the complexity of different approaches, different training professional groups targeted and different outcomes measured for rural research capacity building endeavours (see Figure 4), it is difficult for those with an interest in research training in rural areas to understand exactly what works for whom in what circumstance. That question is the issue this thesis sets out to explore. For rural health research training, what works for who, where?

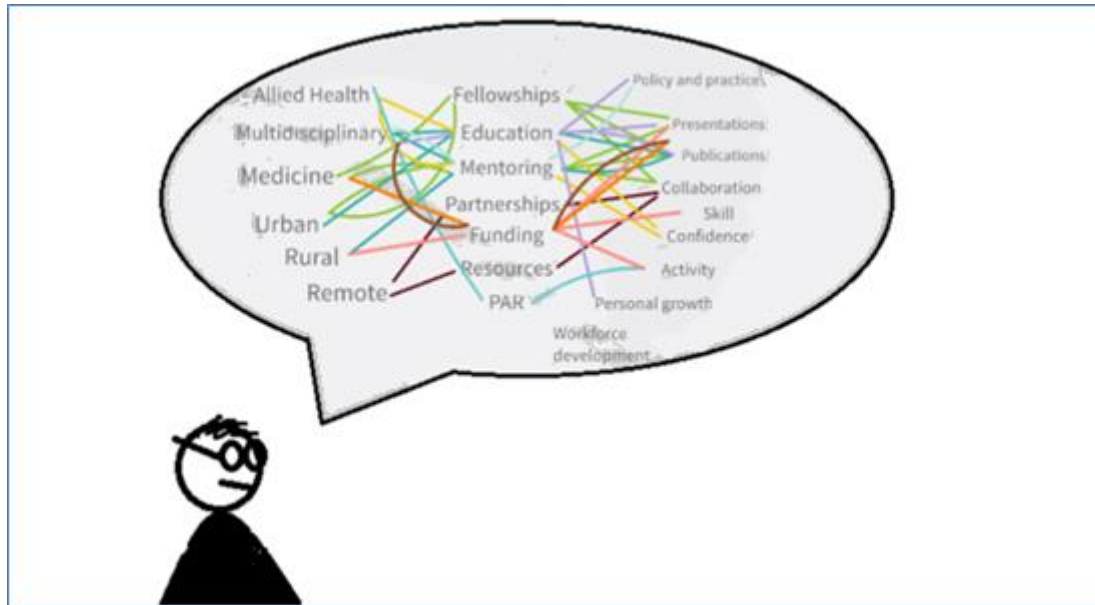


Figure 4: Professional groups, processes and measured outcomes of research training

Each of the individual studies within this thesis provides an important insight into an aspect of rural research capacity building. Collectively, the studies and a critical realism perspective allow development and testing of generative mechanisms that explain “why things are as they are” in research capacity building in rural health services.

Setting of this thesis

While the literature above explores research capacity building from a national or international perspective and encompasses rural, remote and urban environs, this thesis was conducted from a unique perspective and within a particular setting.

The setting for this thesis is within the public health system of Australia, and in particular the state of New South Wales. The New South Wales public system is structured with a centralised governance and policy body overseeing 15 local health districts and multiple specialty networks responsible for delivering clinical services (New South Wales Government, 2023). In rural areas, these local health districts function as independent organisations servicing populations from 30,000 people (Far West Local Health District, 2023) to over 900,000 people (Hunter New England Local Health District, 2023). Local health districts have independent board governance and an executive that are responsible for their organisation providing health services, the nature of which is determined via a service agreement (New South Wales Government, 2022)

Within these rural local health districts, there has been an effort to build research capacity through the delivery of the Rural Research Capacity Building Program (Schmidt, Robinson & Webster, 2014; Schmidt, Webster & Duncanson, 2019; Webster et al., 2011). This program was instituted in recognition of a lack of limited research expertise in the rural health services and within rural health workers (Webster et al., 2011). The stated aims of the program are to build research knowledge and skill while contributing to the rural research evidence base (Schmidt, Webster & Duncanson, 2019). This aligns very closely to the clinician-researcher model, producing rural clinicians with research capability and experience, whilst building research capacity.

As the Rural Research Capacity Building Program is conducted both by and for the public health service in New South Wales, there is an ability for those involved with the program to understand and influence the structural constraints inherent in the rural health system in a way that a university-based education program might not.

The thesis was undertaken to understand these constraints and to understand what rural research capacity building can achieve within this context. As a result, the studies comprising this thesis have largely been conducted within New South Wales and within the public health system, in particular Papers 1, 2, 3 and 5. However the individual studies on their own, while of value, do not provide a view of the whole of the setting or allow for a big-picture view of the underlying issues. This thesis combines these aforementioned papers, along with Paper 4 which was conducted in New South Wales and other rural and remote parts of Australia, to create a larger overarching exploration. This larger exploration is to use the experience of research capacity building in rural New South Wales as an exemplar and draw out the key underlying explanations of why things are as they are. These underlying explanations may have an applicability and relatability to other rural contexts outside New South Wales and outside Australia.

To summarise, the rural health environment is complex. There have been multiple approaches to research capacity building in rural areas, and this diversity in approach and outcome has added to the complexity. In New South Wales there has been a concerted effort to develop clinician-researchers via the Rural Research Capacity Building Program. Using the New South Wales public health system as a context, this thesis uses multiple studies to explore aspects of this complex area and by combining these component studies a greater understanding is sought than could be achieved using the information contained in the individual studies.

Aims of this thesis

The aims of this thesis are as follows:

1. To describe and understand the contexts in which rural health research training occurs.
2. To understand both the short- and long-term outcomes of research capacity building endeavours in the rural health workplace.
3. To use these short- and long-term outcomes in context to understand the mechanisms at play in the education of research for the rural workforce which have led to the kinds of outcomes we see.
4. To develop general principles to guide the development of rural research training programs.

Chapter 3: Methods

Rural research capacity building is complex due to the number of approaches used, the range of professions targeted for training, the varying content and educational underpinnings of training programs and the various metrics used to measure success of these approaches. The challenges of the rural health workplace, such as geographical isolation, diversity of rural communities and organisations and limited access to research expertise add to this complexity. This complexity led to important decisions about the structure, methodology and methods used in this thesis.

Methodological lens

To adequately explore this complex situation, it was necessary to undertake a series of smaller studies examining different aspects of rural research capacity building rather than a single large study. Each of these individual studies was conducted using a method appropriate to their research question, meaning multiple research approaches were used. This variety led to the choice of a methodological lens that could accommodate both an understanding of complexity and the use of these multiple methods.

The methodological lens chosen to underpin this thesis was critical realism. Critical realism was selected for its established use in complex health research (Clark, Lissel & Davis, 2008; Sword et al., 2012) and its ability to incorporate multiple methods under a single perspective (Wiltshire, 2018).

Critical realism was developed and described by Roy Bhaskar, originally in his work *A Realist Theory of Science* (Bhaskar, 1975). Bhaskar developed his theories in response to a perceived lack of ontology in the prevailing philosophical approaches, or as he described it “the epistemic fallacy, or the conflation of ontology and epistemology” p37 (Bhaskar & Hartwig, 2010). Bhaskar felt a need to account for “the presence of structure in the world, as well as in our knowledge of the world” (Bhaskar & Hartwig, 2010).

Critical realism emerged as a framework that brings together a realist ontological position with an epistemological perspective that knowledge is “a social product, which is not independent of those who produce it” (Bhaskar, 2008b). Thus critical realism draws from both a positivist and constructivist perspective (Fletcher, 2017) and has become known as an “internally consistent and philosophically developed framework” (Gorski, 2013).

Critics of critical realism state that it is defined by its ontological stance and operates at that level (Cruickshank, 2004), rather than providing a research methodology per se. Adherents of critical realism see that as an overarching philosophical perspective it allows coherence of viewpoint while allowing for use of multiple methods (Wiltshire, 2018).

As a research framework, critical realism has been used in philosophy and educational areas since its emergence in the 1970s. The use of critical realism in health research is relatively new (McEvoy & Richards, 2003). Although it does not have the rich history of use in health research of other qualitative methodologies, it is not completely unknown. Critical realism has been recommended and used to explore areas in health research where complexity requires a research methodology capable of exploring multi-layered and complex situations (Clark, Lissel & Davis, 2008; Harwood & Clark, 2012; Oladele et al., 2013; Sword et al., 2012).

While critical realism may have emerged from a philosophical viewpoint, it also provides a range of practical strategies that could be applied for understanding phenomena (Jessop, 2005). In this thesis critical realism has been applied in this way, as an underlying philosophical foundation and as a series of applied concepts that are useful for exploring and understanding the topic at hand.

Some of the key concepts of critical realism in this thesis are described below.

Key concepts of critical realism in this thesis:

1. *Stratified reality*

One of the key concepts in critical realism is the notion of stratified reality (Bhaskar, 2008b; Scott & Bhaskar, 2015). Critical realism asserts that reality occurs on a number of levels; the real, the actual and the empirical (Bhaskar, 2008b; Marks & O'Mahoney, 2014; Vincent & O'Mahoney, 2014). These are defined within this thesis, based on the work of (Bhaskar, 2008b) as:

The empirical: that which can be experienced first-hand through the senses.

The actual: things that are known to be true even if they are not witnessed first-hand.

The real: that which exerts an influence.

A study by Collett et al (2022) gave an example, related to the health workplace, that demonstrated this stratified reality in medical education where:

“The subjective experience of the student and whether they interpret what is occurring as a good or poor learning experience”, is *the empirical*.

“A consultant supervising a student examination of a patient and a student attending a ward round asking a consultant to explain a patient's ECG”, is *the actual*.

Medical students learning on ward rounds being influenced by “time pressures, patient load, consultant and other staff members attitudes to teaching or even the physical dimensions of the hospital”, is *the real* (Collett et al., 2022).

In this example, patient load and staff attitudes may have a real influence on the learning experiences of a medical students, even though the medical students may not experience those loads or attitudes directly. These layers of reality are not mutually exclusive and can co-exist. This concurrent and co-existing understanding of reality is one element that allows critical realism to explore and acknowledge complexity. This stratified reality also allows exploration and acknowledgement of the influence of that which has an influence, even if it cannot be experienced empirically.

2. *Structure and agency*

That which is *real*, that is those things that exert an influence, are known as structures (Bhaskar, 2008b). Structures can include those things that can be experienced empirically (Bhaskar, 2008b). In a health service workplace, the geographical distance to the nearest research unit may be considered a visible structure that exerts an influence on the ability of health staff to engage with research at work. Similarly, an organisational policy on research activity may be considered a visible structure, in that it can be seen and it exerts an influence on those same health staff.

Critical realism acknowledges those structures that cannot be seen empirically, as in experienced with the senses, but nevertheless that can exert an influence (Bhaskar, 2008b). In a hospital, the culture of a ward can exert an influence over workplace behaviours in a way that is very real, even if the culture itself cannot be experienced empirically. The attitudes of the manager towards research, worker personal experience and individual confidence in research methods are all able to exert influence on a health worker's ability to engage with research at work. Acknowledging the existence and influence of these hidden structures is an important strength of critical realism.

Structures tend to be inhibiting or enabling (McEvoy & Richards, 2003). A policy that allows dedicated research time for health staff could function in an enabling way. Limited access to library services would act as inhibitory structure.

Sitting alongside the concept of structure is one of agency (Marks & O'Mahoney, 2014; McEvoy & Richards, 2003). Agency refers to the ability of the individual to function and progress within, with the assistance of or in spite of the influence of structure (Marks & O'Mahoney, 2014), or in other words, to shape the world around them (Carter & New, 2004). Agency can be defined as the degree of control an individual has over their choices and the ability to act on those choices; what people can achieve (Stutchbury, 2022).

The interplay of structure and agency is dynamic (Marks & O'Mahoney, 2014; McEvoy & Richards, 2003). The influence of structure can vary in response to the level of agency of the individual. Where a structure might be an enabling one for an individual with high levels of agency, the same structure may not act in an enabling way for an individual with lower degrees of agency. Access to research grant funding, for example, could be an enabling structure for an individual with the ability to dictate their own caseload and work priorities, but would not function in the same way for a staff member with a fixed caseload and lower levels of ability to decide how time at work is spent.

3. *Understanding of context and the search for generative mechanisms*

Central to the use of critical realism is the search for mechanisms that explain why things are as they are. These mechanisms are referred to as generative or causal mechanisms (Bhaskar, 2008b; Scott & Bhaskar, 2015) and are sought once an understanding of context is known. Generative mechanisms are the critical factors that are hypothesised to lead to a particular outcome within a specified context (Vincent & O'Mahoney, 2014). While structures provide the context for the journey of the individual, mechanisms are the key elements that explain why things are as they are (Stutchbury, 2022).

The context in this instance encompasses both empirical (measurable or observable) and actual (observable and non-observable) structures. Context in the example of a health service, therefore, may involve a policy context, an organisational context, a financial context, a cultural context, a geographical context and a relational context.

This context is put together with observable outcomes; together these provide the necessary information for generative mechanisms to be explored and proposed (Ackroyd & Karlsson, 2014). Being able to understand context and outcomes, and use these to generate proposed mechanisms is one aspect of critical realism that makes it a useful approach for studying complexity (Sturgiss & Clark, 2020; Sword et al., 2012; Walsh & Evans, 2014)

Classically generative mechanisms occur at the level of the *real*, whereas the observed outcome and activities leading to these outcomes occur at the *empirical* or *actual* levels (Bhaskar, 2008b). Thus, mechanisms are the influencing factors *underpinning* what is seen. For example, a staff worker

choosing not to apply for research funding may not be because of a lack of interest, but an underlying recognition that workload and available time may mean that undertaking a project is not feasible.

4. *Retroductive reasoning and development of explanatory theories*

The process by which observations on context and outcome are used to look for mechanisms is referred to as retroductive reasoning, or retroduction (Vincent & O'Mahoney, 2014). By starting with known outcomes, it is possible to look back to understand what factors have led to things being as they are (Bhaskar, 2008b; Scott & Bhaskar, 2015). Bhaskar coined the term retroductive reasoning to emphasise the temporal component where looking *back* is the emphasis, recognising the influence of temporality (Marks & O'Mahoney, 2014) in that learning and theory generation are influenced by the time and space in which these activities occur (Bhaskar, 2008b).

Bhaskar describes the process of retroduction leading to theory development thus:

You imagine a structure or mechanism, which if it were real would account for the phenomenon in question. And then activating the role of the creative imagination, you could posit a large number of mechanisms or structures, and an infinite number could be imagined. So you eliminate them on the grounds of coherence... Then you come to this wonderful moment, when you can identify a new structure. Once you have identified a new structure... [it allows] you to correct the large number of your results, [and when] you get to this level, this new level of structure, you start all over again. p22.(Bhaskar, 2008b)

Theory development occurs when generative mechanisms are proposed that explain the observed outcomes in context. It is important to note that these mechanisms are proposed theories, not empirical proofs (Marks & O'Mahoney, 2014) and as explained above are selected from a number of possible explanations on the grounds of coherence (Bhaskar, 2008b).

In critical realism it is common to express the observed context and outcome with the hypothesised generative mechanisms together in a what is known as a CMO chain or CMO statement (Ackroyd & Karlsson, 2014), thus contextualising the generative Mechanism within the Context and Outcome.

While CMO chains are how the interaction of these factors is expressed, it is important to note that this is not the order in which these understandings are derived. By observing outcomes and contexts, mechanisms can be found. Reflecting this emergent order and in line with the concept of temporality (Marks & O'Mahoney, 2014) the structure of this thesis is to present papers covering *context* and *outcomes*, then the derived *mechanisms* are explored in the analysis section.

5. *Process of testing theory*

An important step within the critical realist process is that of testing theory (Kempster & Parry, 2014). Generating explanatory hypotheses based on observation requires additional rigour and this is achieved by testing theory, which may be achieved in several ways. Explanatory hypotheses may be explored and discussed with peer researchers to ensure coherence (Kempster & Parry, 2014). The process of peer review, publication and public comment ensures hypotheses are tested and justified (Kempster & Parry, 2014). Assessing whether the derived theory is useful for explaining similar issues or in different environments (Johnston & Smith, 2010), such as placing generated theory against other realist-derived theories, is a third way of testing theory.

Other core tenets of critical realism include emergence, embodiment and materiality (Marks & O'Mahoney, 2014), which are integrated throughout as part of reflexive practice, methodological application and theory generation. For the purposes of clear communication of realist principles, a subset of the foundational principles of critical realism were emphasised as 'takeaway points' (see Figure 5).

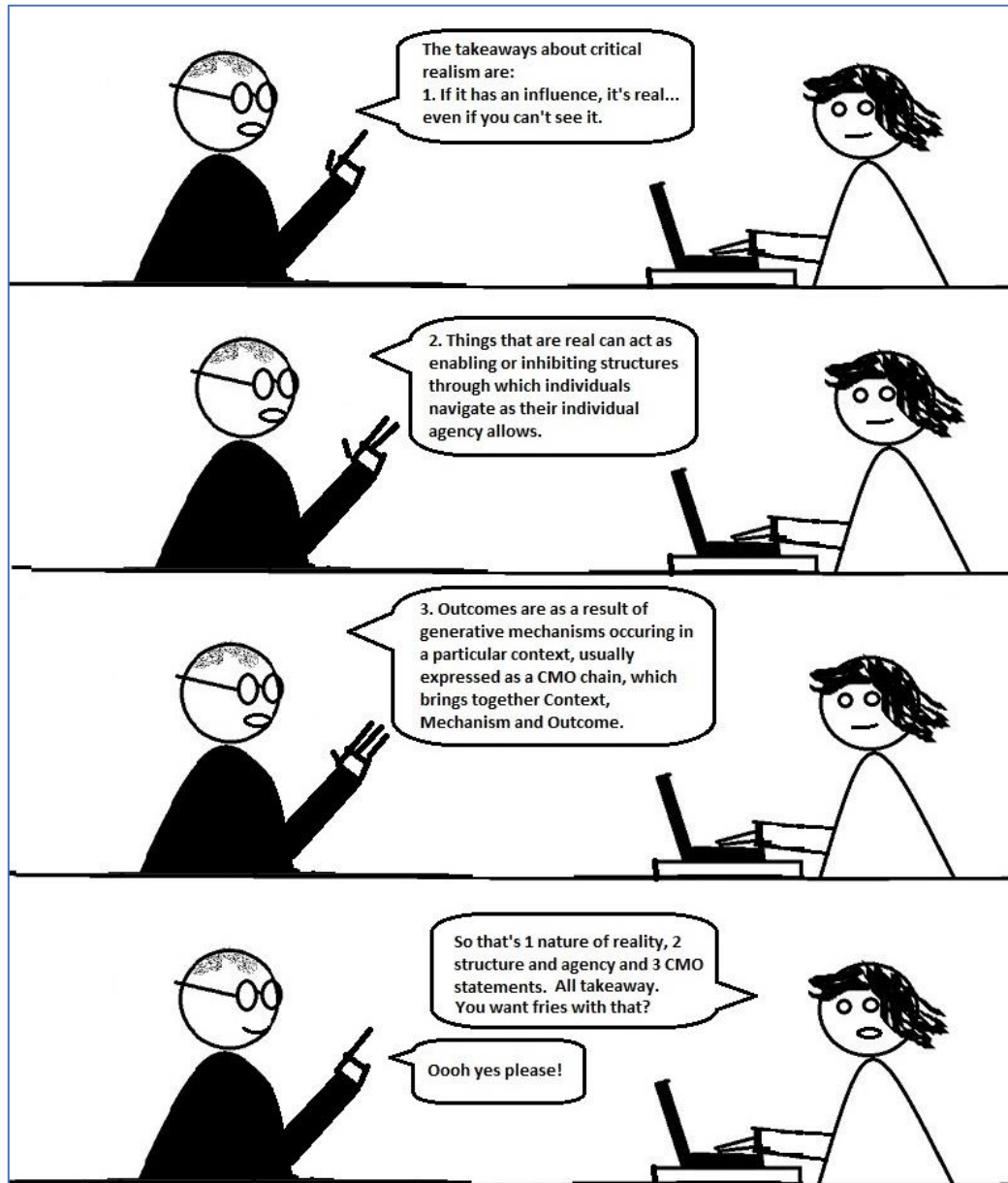


Figure 5: Key takeaway messages of Critical Realism (with fries)

The use of critical realism to explore complexity within this thesis

The existing research on research capability and capacity building in the rural health workplace has displayed an array of approaches, targets and outcome measures which indicate a complex situation. Research capacity building occurs in multiple ways and at multiple structural levels and to date there has been no simple way to easily summarise the key elements that lead to success.

Studying complexity is in itself complex. Complexity is not easy to describe, and it is not easy to put boundaries around. The use of critical realism allows for a framework within which complexity can be understood and explained (Figure 6) (Ackroyd & Karlsson, 2014). This framework allows explanations for processes that are not linear or straightforward, and provides guidance to others navigating the process of understanding complexity in their own context.



Figure 6: Using critical realism to understand and explain complexity

Critical realism is suited to research in complex policy areas (McEvoy & Richards, 2003; Pawson et al., 2005). This is in part due to that ability to express context, mechanism, and outcome together and describe the interplay of these factors in understanding complexity (Ackroyd & Karlsson, 2014).

The ability for critical realism to accommodate both quantitative and qualitative approaches and allow a large scope of methods (Ackroyd & Karlsson, 2014) is also important, as examination of outcomes and context in this study have required different approaches. This ability to match method to the purpose of the study is one of the strengths of critical realism (Hurrell, 2014).

Methods used in component studies within this thesis

The methods used in the individual studies that comprise this thesis reflect the flexibility available within critical realism to apply multiple research methods. These multiple methods are dictated by the complexity of the area under study: rural health service delivery and the development of research capacity in rural health workers is complex. As such, a single research study conducted within a single organisation would provide a very limited perspective on this issue. Instead, multiple studies conducted in and across multiple organisations were undertaken, with an aim of achieving a broader understanding of the underlying mechanisms within this complex situation. The organisations in which these studies were conducted were public sector organisations based in rural or remote Australia.

Each of these component studies required careful consideration of methods to answer the research question for that study. The approaches used in the component studies are outlined below, with the use of a critical realist lens adding a unifying perspective. Each of the component studies explored a unique aspect of rural research activity or rural research capacity building, highlighted in bold and italicised in the descriptions below.

Paper 1 (Schmidt, 2016) used a single case study design and narrative analysis to explore the ***individual context*** and experience of an individual clinician undertaking rural research.

Paper 2 (Schmidt et al., 2020a) used content analysis underpinned by critical realism to explore ***policy and operational context*** of rural health research in a public health organisation. Policy documents and

other organisational documents of a large public rural health organisation were explored using content analysis to identify where research and evaluation were included. Content analysis located the words research or evaluation in these documents and explored the context of their use (see Figure 7). This novel study is important because it helps to consider an aspect to training that has not been described previously, the policy and operational context in which research occurs.

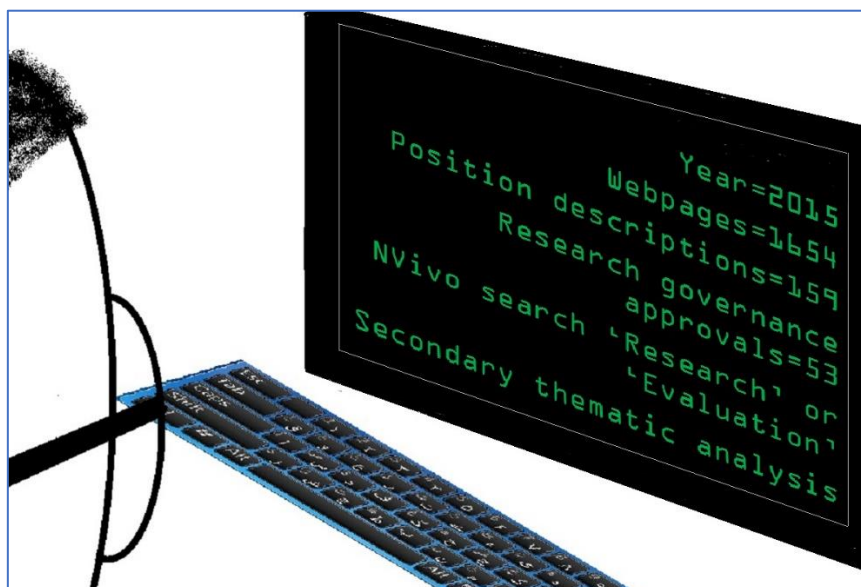


Figure 7: Content analysis methods used in Paper 2

Paper 3 (Schmidt et al., 2020b) used interviews and focus groups, underpinned by critical realism, to explore the **learning context** of research training in a public health organisation. Individual interviews with purposively selected leaders in a rural health organisation were undertaken to understand the perceived value of research and research training in a rural health organisation. Accompanying focus groups with a convenience sample of research-interested health workers facilitated stimulation of thought, robust discussion and interplay of ideas around the issue of research training. One focus group was conducted via telephone to provide remotely located individuals an opportunity to participate, given the large geographical area covered by the organisation under study.

Paper 4 (Schmidt & Kirby, 2016) used a survey and repeat cross-sectional measures to gauge **short-term outcomes** of a research training program in rural and remote areas. The use of the Research Spider as a tool for measuring self-assessed research experience is a widely-used and recognised means of gauging change in research experience (Smith et al., 2002). As the participants of this study were situated in rural and remote areas of Australia, a survey approach was a practical method of reaching such a widespread sample (MacDonald et al., 2009).

Paper 5 (Schmidt et al., 2022) used interviews and focus groups to explore **long-term outcomes** of a research training program in rural and remote areas. This method allowed graduates from different cohort of the same research training program to reflect on their experiences of research training, including what it has meant for them professionally and personally. Focus groups were conducted online via videoconferencing which allowed coverage of a widespread group across rural and remote areas of NSW, Australia. Individual interviews allowed interaction with those who preferred not to participate in a focus group.

Detailed method descriptions for each of the individual studies are found in Chapter 1 for Paper 1, Chapter 4 for Papers 2 and 3, and Chapter 5 for Papers 4 and 5 (see Figure 2). Overall, the component

studies build together to create an understanding of the individual context, policy and operational context, learning context, short-term and long-term outcomes of rural research capacity building. In critical realist terms, context and outcome are used to derive explanatory mechanisms (Bhaskar, 2008b). Some mechanisms are proposed within the individual chapters, however mechanisms for the overall thesis are derived in the analysis (Chapter 6). The process through which these mechanisms are derived from the component studies is described below.

Analysis: synthesis and development of new generative mechanisms

The process of synthesising the findings from the individual studies into new generative mechanisms follow a process outlined in Figure 8, where Context, Mechanism and Outcome of each of the preceding studies are separated, considered separately and in light of existing literature, particularly through the structural levels of capacity building; individual, team, organisational and supra-organisational (Cooke, 2005; Sarre & Cooke, 2009). These elements are then combined via a process of retrodution and hypothesis building to form new CMO chains. These CMO chains are then tested and consolidated into practical understandings of what works where and for whom which can then be transferred into practical recommendations for health system, health service and education purposes.

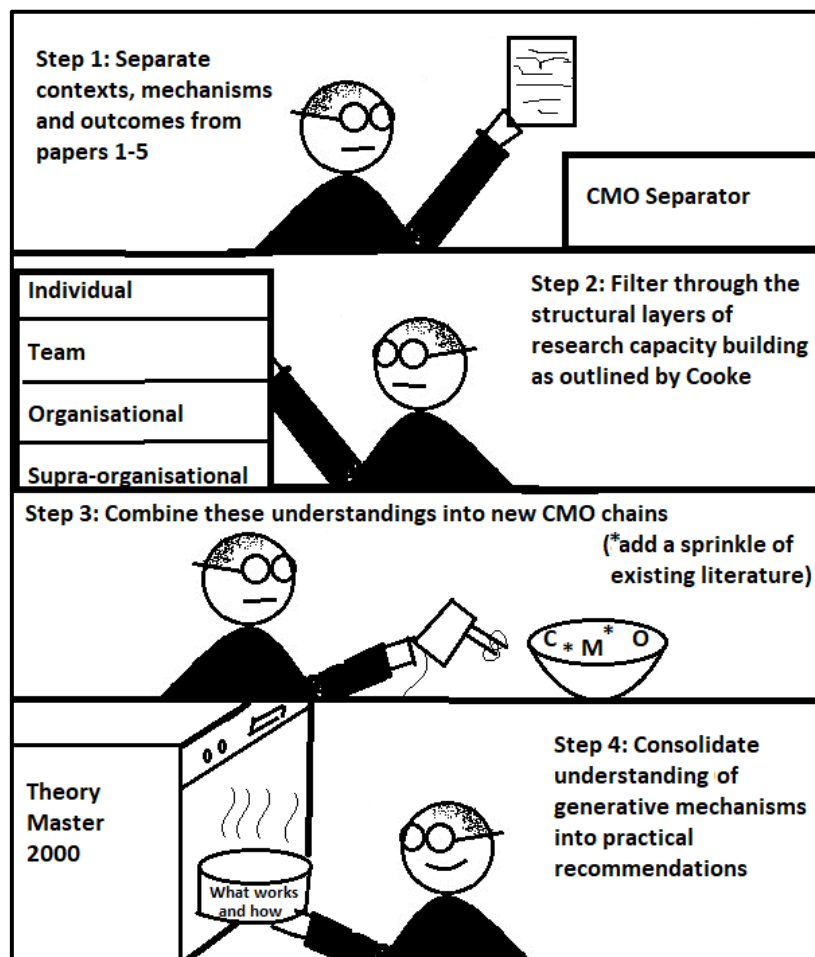


Figure 8: Process of deriving generative mechanisms from multiple studies

The process of synthesising together context and outcomes from individual studies and then using retrodution to derive mechanisms was an iterative and intuitive process, using the “creative imagination” described by Bhaskar (2008b). Mechanisms were hypothesised then explored for logic

and coherence. This exploration led to proposed mechanisms being refined, adopted or abandoned. Central to this process was the knowledge inherent in being an embedded insider with a deep understanding of the rural health context, the New South Wales public health system and the process of research capacity building. This insider perspective provided a credible foundation from which the creative imagination could be employed. This process was repeated throughout the analysis stage of the thesis multiple times until a suite of proposed mechanisms were compiled.

These mechanisms were tested in two ways. The first was through discussion with experienced health research educators to check for coherence (Kempster & Parry, 2014). Copies of the proposed mechanisms were provided and the educators were asked if the mechanisms outlined were consistent with their knowledge and experience of rural research capacity building. Feedback from these educators was used to refine the mechanisms and the way they were expressed in CMO chains. The second method of testing mechanisms was by comparison to the mechanisms highlighted by Cooke et al (Cooke, Gardois & Booth, 2018) in their realist synthesis, a work that applies realist principles to the area of research capacity building. This comparison is found in the analysis section of this thesis (Chapter 6).

About the researcher



Figure 9: The researcher, self-portrait with self-portrait

I, the researcher (see Figure 9), am a middle-aged health research educator and cartoonist who comes from a physiotherapy background. I work as a coordinator of the Rural Research Capacity Building Program for NSW Health and am a graduate of the program. As such I have been a clinician, a clinician-researcher and one who trains clinicians about research. All this time I have been based in a rural area, as I have my whole professional career. I grew up in rural New South Wales and connect strongly with the rural community.

This insider perspective is crucial, because it means I have seen firsthand the disconnect between research and clinical practice (Figure 10).

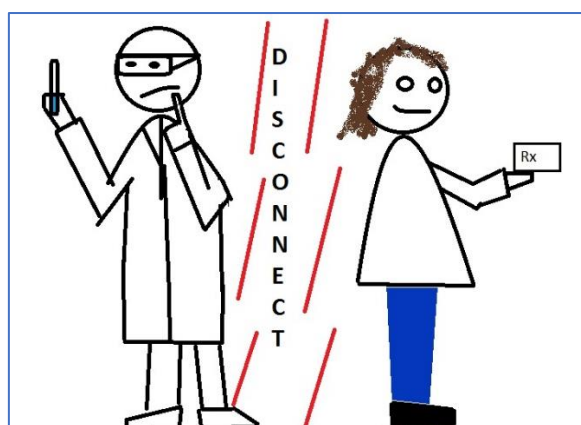


Figure 10: The disconnect between research and clinical practice

My first experience of the disconnect between clinical practice and research was at university as an undergraduate, where the invitation to undertake an honours project was reserved for the academic high achievers – the ‘special’ few. It seemed to me that those special few learned to speak a special language and undertook a special process via ethical review. Once graduated, I very rarely if ever saw research happening in the workplace. Research happened in universities and research units; special

places. Sometimes there was special money in the form of research grants. Research was not something we clinicians did: it was the special people in their special place with their special money and special language.

At least that's how things felt for me as a clinician in my early years as a health professional and I'm sure that experience was not unique. Fortunately, things are changing with a recognition that "developing the capacity of clinicians to engage in health research is a recognised strategy to respond to the research practice gap" (Flenady et al., 2022b). While more engagement with research is occurring at undergraduate levels, much of the public health workforce has had limited exposure to the experience of undertaking research.

Reflexivity

Reflexivity is vital for qualitative rigour (McGrath, 2021; Rettke et al., 2018). Reflexive practices built into this study have included reflexive conversations with supervisors to ensure congruence between derived conclusions and the presented data within each individual study. No structured questions or formal guides were used, however ensured the findings of each study were directly linked to the research question of that particular study. The process of peer review and publication added another layer of critique, ensuring that study findings were rigorous.

Taking an insider perspective presents specific challenges for reflexive practices (Finefter-Rosenbluh, 2017; Hellawell, 2006), and the process of checking assumptions was ongoing and iterative. Supervisory meetings during the thesis frequently challenged assumptions and thought processes, including the role of the insider and existing preconceptions.

One of the processes used was bracketing (Fischer, 2009). Bracketing refers to the identification of the researcher's biases and preconceptions which may influence what the researcher is observing, and attempts to set aside of 'bracket' these preconceptions whilst undertaking the study (Fischer, 2009). Bracketing can be used in conjunction with an insider perspective to embrace the intuitive understandings available to the insider, whilst maintaining qualitative rigour (Dörfler & Stierand, 2020). Bracketing can take many forms and it is incumbent upon the researcher to use an appropriate method, or multiple methods (Tufford & Newman, 2012). Memoing and reflexive journaling are accepted methods of bracketing (Tufford & Newman, 2012) and in this thesis both were used, with reflexive journaling undertaken using cartoonography. Memos were used to reflect on the initial impressions at the time of data collection during the studies, and this in turn assisted with interpretation of data. Cartoonography allowed an expression of the conflicting thought processes of researcher and research educator, along with the challenges of undertaking the thesis (Figure 11).



Figure 11: Using cartoonography as a method of reflexive journaling

Chapter 4: Results

"Skills development in the absence of organisational development and change is a high-risk strategy, given that informants identified major institutional and cultural barriers to research implementation at the practice level. Education cannot therefore be isolated from its organisational and community context" (Grundy & Johnston, 2003)

The above quote highlights that understanding context is critical for research education to be successful. This chapter focuses on the context for rural health research and research capacity building within rural health services.

This chapter contains two studies. The first (Schmidt et al., 2020a)(Paper 2) explored the strategic and operational context in which rural research activity occurs. This study used content analysis to examine where research and evaluation was situated in a rural public health organisation's strategic and operational documents.

The second study (Schmidt et al., 2020b)(Paper 3) explored the learning context in which rural research education occurs. Conducted within the same organisation, this was a qualitative study involving interviews with key informants within the organisation and with a convenience sample of health workers with an interest in research.

Whilst the two studies were conducted in the same organisation, the studies required different research methods and data sources to answer the research questions, so were conducted as separate studies.

4.1 The structural context in which rural health research training occurs

Skill development occurs within a specific and definable context, at a particular time (Bhaskar, 2008b). Exploration of generative mechanisms, the hypotheses of 'why things are as they are' is possible by retroduction – looking back from observable outcomes that have occurred within a particular context (Bhaskar, 2008b; Scott & Bhaskar, 2015; Stutchbury, 2022). This context extends beyond geography to encompass the physical structures, organisational contexts and policy contexts in which research training occurs.

The following study on the strategic and operational context for rural research activity was published as:

Schmidt, D, Reyment, J, Kirby, S, Webster, EL & Lyle, D 2020, 'The place of research in the rural health workplace structure: a content analysis of a rural health organisation's strategic and operational documents', *Rural and Remote Health*, vol. 20, no. 2, pp. 5493



ORIGINAL RESEARCH

The place of research in the rural health workplace structure: a content analysis of a rural health organisation's strategic and operational documents

AUTHORS



David Schmidt¹ MPhysiotherapy, PhD Candidate *, dsch5166@uni.sydney.edu.au

Jill Reymont² GradCert(NursEd), Director



Sue Kirby³ PhD, Senior Research Fellow, s.kirby@unswalumni.com

Emma L Webster⁴ DrPH, Senior Lecturer



David Lyle⁵ PhD, Head of Department

CORRESPONDENCE

*Mr David Schmidt dsch5166@uni.sydney.edu.au

AFFILIATIONS

¹ The University of Sydney, Sydney School of Public Health, Faculty of Medicine and Health, Sydney, NSW, 2006, Australia

² Clinical Governance, Murrumbidgee Local Health District, Wagga Wagga, NSW 2650, Australia

³ Centre for Remote Health Research, Department of Rural Health, Broken Hill University, Broken Hill, NSW 2880, Australia

⁴ School of Rural Health, Sydney Medical School, The University Of Sydney, Dubbo, NSW 2830, Australia

⁵ University Department of Rural Health (Broken Hill), Sydney Medical School, Faculty of Medicine and Health, The University of Sydney, Broken Hill, NSW 2880, Australia

PUBLISHED

17 April 2020 Volume 20 Issue 2

HISTORY

RECEIVED: 24 May 2019

REVISED: 27 March 2020

ACCEPTED: 27 March 2020

CITATION

Schmidt D, Reymont J, Kirby S, Webster EL, Lyle D. The place of research in the rural health workplace structure: a content analysis of a rural health organisation's strategic and operational documents. Rural and Remote Health 2020; 20: 5493. <https://doi.org/10.22605/RRH5493>

This work is licensed under a [Creative Commons Attribution 4.0 International Licence](https://creativecommons.org/licenses/by/4.0/)

ABSTRACT:

Introduction: Research training is conducted within rural health organisations without a clear understanding of the role of research within the structure of the organisation itself, potentially limiting the effectiveness of that training. This study sought to identify the role of research within the organisational structure of a large rural health organisation in Australia. Specifically, the study sought the answer to the following questions: Is research identified within the strategic documents of the organisation? If so at what level of the organisation is responsibility for research attributed? Is research identified within the position descriptions of staff? If so, at what level of the organisation are staff expected to conduct research? Is there evidence of research activity elsewhere within the organisational structure?

Methods: This qualitative study used a critical realist approach and content analysis to identify and contextualise the terms 'research' and 'evaluation' within publicly available and internal documents from a large rural health organisation in New South Wales, Australia. Secondary thematic analysis identified organisational factors influencing research activity. Data were sourced from strategic, operational and other documents from the

2015 calendar year, with key documents extracted from 1654 external and internal websites, 159 position descriptions and approvals for research projects active in 2015 ($n=53$).

Results: Only a third of research conducted in the organisation was locally instigated or involved local staff as researchers. Matching between positional responsibility for research and research activity was limited. Research was a strategic goal for the organisation; however, this was not well represented in operational documents. A lack of research in operational documents devolves responsibility for research to individuals. Individuals with greater levels of individual agency were more likely to be engaged in research. A low critical mass of local researchers means that collaboration, both internal and external, is essential to strengthen research capacity.

Conclusion: Health services can create conditions for local health research in a rural environment by addressing structural barriers such as a lack of operational planning for research. Identifying research-active individuals as champions to build internal research collaboration is an important strategy, as is partnering with external organisations for necessary expertise.

Keywords:

Australia, research capacity development, rural research, strategic planning.

FULL ARTICLE:

Introduction

Research capacity building has been reported as a desired goal of rural health organisations¹ as it has the potential to create locally driven research evidence that is relevant to the development of policy or able to influence client care. Research in rural areas presents its own set of challenges, and a need for specific rural training has been identified². Several programs have been undertaken within the Australian rural health context to improve research capacity³⁻¹⁰.

While these programs broadly consider the context in which research activities occur, there is no research available within the published literature that explores or demonstrates the role of research within the structure of a rural health organisation. Understanding the place of research within an organisational structure is important in the support and growth of research activity, because a lack of structural organisational support for research is likely to be reflected in the culture of the organisation. Structural support for research may be seen in ways such as the inclusion of research in the position descriptions of staff, business plans or other documents where there is a clear indicator of research capacity building, which can be measured and performance can be reviewed annually^{11,12}. Clearly positioning research within a job description is attaching individual responsibility for research. Organisational ownership of research may be evidenced in other ways, through celebration of research in newsletters or inclusion of research in annual reports¹².

Health services are state funded within Australia and, at a state level across New South Wales (NSW), there has been an emphasis

on research in rural areas¹³, with a need for 'structures and processes ... to maximize communication, productive collaboration and knowledge transfer across all aspects of health and medical research'¹⁴. These structures may be physical structures such as research units or specialist teams¹⁴. However, a critical realist perspective acknowledges that structures may be less tangible and may include societal constructs such as organisational norms or workplace cultures¹⁵. In many ways a research culture is harder to evidence; however, an active research culture within an organisation may be seen in the way an organisation acknowledges and celebrates research¹².

This article outlines the findings of a research study conducted in 2016 in rural NSW, Australia, which explored the place of research within an Australian rural health organisation or local health district (LHD), as defined by references to research within the organisation's strategic, operational and other documents. The LHD in which this study was conducted is a single coordinated public health organisation that services a rural and outer regional portion of the state and is responsible for the provision of publicly funded health services. The LHD contains a mix of small health facilities, known as multi-purpose services, and small hospitals, with few large hospitals. The LHD provides clinical services and is able to determine its own service priorities in association with the NSW Government, with which the LHD has a service agreement.

The region has links to up to six universities, although these relationships were primarily viewed as a mechanism for teaching and training in a reciprocal arrangement with universities and the organisation collaborating for clinical education placements. While

the organisation can set its own priorities in regard to research, the LHD was aware that it was not particularly active in research.

Study goals and objectives

This study sought to answer the following research questions:

- Is research identified within the strategic documents of the organisation? If so, at what level of the organisation is responsibility for research attributed?
- Is research identified within the position descriptions of staff? If so, at what level of the organisation are staff expected to conduct research? At what level is research activity occurring?
- Is there evidence of research activity elsewhere within the organisation structure?

Methods

Study design and methodology

This qualitative mapping study was conducted using a critical realist underpinning. Critical realism allows an examination of organisational and societal constructs and has been used to examine complex policy areas within health systems^{15,16}. The use of critical realism was intended to provide an understanding of the organisational structures in place, empirical and non-empirical, which may include policy structures, cultural norms, power imbalances and legislative frameworks¹⁷. The authors also sought to generate an understanding of the likely agency of the individual to be able to undertake research at all levels of the organisation, bearing in mind the influence of the structures identified.

The study drew from the following data sources:

1. publicly available documents from the organisation's public internet pages
2. internal documents available from the organisation's intranet
3. position descriptions from the publicly available NSW Health electronic recruitment (eRecruit) system
4. records of research governance approvals, where research has been approved to be conducted within the organisation, to identify staff currently involved in research.

Documents retrieved included:

- strategic plans for facilities, work units or clinical specialties
- operational plans at the facility, work unit or clinical specialty level
- staff newsletters and internal communiques
- annual reports including financial reports
- external (internet) and internal (intranet) webpages
- departmental reports
- meeting minutes
- organisational charts.

Documents released during the 2015 calendar year, or strategic planning documents with a stipulated date range spanning 2015 (eg plans covering 2014–2018), were included. Internet and intranet pages were included as available at the time of study.

Research governance approvals were considered for all studies approved or active within the LHD during 2015.

All internet and intranet pages were manually searched by the lead researcher (DS). Pages and documents that contained relevant information were downloaded for further analysis.

All position descriptions for positions advertised within the LHD between November 2015 and February 2016 were downloaded as PDFs from the NSW Health eRecruit website. Any additional documentation accompanying the position descriptions was also captured.

Research governance records were examined by one co-researcher (JR). Data were extracted into an Excel spreadsheet and sent to the lead researcher for further analysis.

For the purposes of this study, specialist physicians, referred to as visiting medical officers (VMOs), and students conducting research whilst on placement within the LHD, were considered as if they were LHD employees. This is because the LHD had traditionally employed the majority of its medical workforce under a visiting contractor arrangement, thus these physicians are in essence the medical workforce of the organisation. Students on placement are bound by the same policies and codes of conduct as staff and work under direct supervision of staff within the organisation.

Data management and analysis

Data from web pages and positions descriptions were imported into NVivo qualitative data analysis software v10 (QSR International; <http://www.qsrinternational.com>) for management and analysis. Content analysis was used to identify the terms 'research' or 'evaluation' within the documents and the context of its use. The term 'evaluation' was included to reflect that 'evaluation' and 'research' are used interchangeably; however, each instance was examined to ensure the document referred to service or program evaluations rather than the evaluation of clinical outcomes in the course of routine care. Research was defined as any project that would or potentially could require submission to a human research ethics committee for approval. All documents that were included because they referred to research or evaluation that could be considered equivalent to research were subsequently included. No further distinctions between research and evaluation were made within the analysis.

The lead researcher developed linkages between references to research, where research was mentioned or described within the organisation's documents, to assess congruence between organisational responsibility for research, documented research activity and positional expectation of research. This was completed by the use of secondary thematic analysis via a thematic map, where the context of references to research were initially coded, then like codes were grouped to form themes¹⁸.

Rigour

All initial coding of the data was completed via NVivo software and undertaken by the lead researcher (DS), with the resultant codes and thematic map reviewed by two other researchers (SK, EW). The

other researchers (JR, DL) reviewed the completed analysis to ensure veracity of the information and interpretation with respect to the organisational structure.

In terms of reflexivity, the lead researcher reflected on his role in research training within the public health system in NSW. In designing the study, collecting the data and undertaking the analysis, the lead researcher bracketed his beliefs about research capacity building to minimise the impact on the interpretation¹⁹. This was assisted by a process of reflective memos and discussions with co-researchers throughout the iterative data analysis process.

Ethics approval

Ethics approval for this project was granted by the Greater Western Human Research Ethics Committee (reference LNR/15/GWAHS /126), with governance approval from the hosting LHD and informed consent to access the LHDs documents provided by the LHD's chief executive.

Results

A total of 1654 internet (public domain) or intranet (non-public domain) pages were searched. From these, 151 strategic,

operational and other documents were downloaded for further examination. In total, 159 position descriptions were retrieved during the data collection period. Research governance approvals showed 53 projects active in 2015, with 19 projects approved that year, and 34 projects approved prior to 2015 but still active.

Research activity in the local health district

The majority of research approved to be conducted within the LHD was externally initiated and led by an external principal investigator (Table 1). Approximately one-third of all projects were initiated within the LHD and a similar number engaged LHD staff as members of the research team.

Within the LHD, medical practitioners were most active in research, notably VMOs and medical students under VMO supervision. As these projects were conducted through the LHD they came under the auspices of the organisation. Any projects initiated and approved within the university sector, as might happen with a conjoint appointment, were deemed external projects. Registered midwives and health promotion staff were also active, while allied health services and pharmacy were only involved in one research project respectively.

Table 1: Research activity as determined by research governance approvals

Details of research activity	Approved in 2015 n (%)	Active in 2015, approved prior to 2015 n (%)	Total n (%)
Where project initiated			
Internal	5 (26)	10 (29)	15 (28)
External	14 (74)	24 (71)	38 (72)
Principal investigator			
Internal	6 (32)	13 (38)	19 (36)
External	13 (68)	21 (62)	34 (64)
LHD researcher [†]			
Executive	1		1
Medical practitioner			
VMO	5	10	15
Medical student	4	1	5
Nurse/midwife			
Nurse manager		1	1
Clinical nurse consultant	2	3	5
Registered nurse	1	4	5
Registered midwife		6	6
Allied health	1		1
Pharmacy	1		1
Health promotion	1	3	4
Administration		2	2

[†] Percentages not calculated because not all projects had an LHD staff researcher and others had up to three LHD researchers.
LHD, local health district; VMO, visiting medical officer.

Positional responsibility for research

Examination of position descriptions (n=159) can be seen in Table 2. The majority of medical, allied health and administrative roles did not contain positional responsibility for research or service evaluation activities. Registered nursing and midwifery roles indicate an expectation of participation in or contribution to research; however, this is not noted in enrolled nurse or assistant-in-nursing roles. While only a small number of executive and management roles were advertised, the majority of these

contained some level or responsibility for conducting research, participating in quality activities or managing those who do undertake research. No health promotion positions were advertised during the data collection period.

It should be noted that some, but not all, position descriptions were accompanied by a schedule of other organisational responsibilities, which indicated that all staff were expected to 'participate in, and where applicable lead ... quality improvement activities'.

Table 2: References to research or evaluation within position description, by profession

Profession	No responsibility	Participate in quality activities or service evaluations	Contribute to or participate in research	Conduct or coordinate research	Manage those undertaking research	Have research/ evaluation responsibility (%) [†]
Executive (n=2)				1	1	100
Management (n=2)	1	1				50
Medical (n=16)						38
Director		1	1	1	1	
VMO	8	1				
Staff specialist	2					
Career medical officer		2				
Resident medical officer		2				
Nursing/ midwifery (n=94)						63
Nurse manager	1					
Clinical nurse consultant	1					
Clinical nurse educator	7	5				
Clinical midwife educator	2					
Clinical nurse specialist		2				
Registered nurse		46	46			
Registered midwife	9	6	6			
Enrolled nurse	13					
Assistant in nursing	2					
Mental health/drug & alcohol (n=11)						36
Team leader		1	1		1	
Case worker	5	1	1			
Counsellor			2			
Trainee	2					
Allied health (n=14)						7
Dietitian	1	1				
Occupational therapist	2					
Physical therapist	6					
Radiographer	1					
Social worker	1					
Speech pathologist	2					
Pharmacy (n=2)	2					0
Dental services (n=1)			1			100
Administration (n=22)	21		1			5
Support services (n=5)	5					0

[†] Some position descriptions attributed responsibility at several levels. VMO, visiting medical officer.

Research within strategic, planning and operational documents

LHD board minutes

Exploration of the organisation's strategic and operational documents revealed a number of themes relating to the conduct of research activities within the organisation:

- challenges, resources and needs
- collaboration
- strategic direction.

These themes are explored below, with reference to the key documents within which the relevant information was located.

Challenges, resources and needs: A number of challenges were identified within planning and operation documents. These include a perceived lack of strategic support and coordination, as described by the organisation's board:

A challenge in [the organisation] is a lack of strategic [organisational] support in relation to research. There are a number of research projects being undertaken within [the organisation] however these projects are not being managed or led by [the organisation's] staff.

This lack of strategic support is associated with another challenge, as reflected in the organisation's service agreement with the NSW Government, which identified a lack major research facilities and organisations based within the LHD, either as LHD-controlled entities or independent medical research institutes within the LHD.

One concern for the establishment and continuance of research endeavours was a perceived lack of dedicated resources, as reflected in the organisation's rehabilitation clinical services plan:

Delivery of best practice, innovations and research are limited by a lack of resources to drive these initiatives.

LHD rehabilitation clinical services plan

Resourcing for research activities was addressed in the organisation's service agreement, which outlined the need to ensure 'business, human resources, information technology and financial service processes support research activities'. This extended to appropriate support staffing for research administration, which included research ethics and governance functions. Under the current structure, research activities fell under the oversight of the organisation's clinical governance unit.

Funding for teaching, training and research was outlined in the organisation's service agreement, and in the 2015–16 financial year attracted 0.5% of the organisation's annual budget. It is not clear from the strategic and operational documents what activities or resources were within the scope of that budget, or what proportion of that budget was available for research activities.

Along with these challenges, established needs related to research were identified, including a need to:

- 'Provide training for clinician researchers and facilitate access to research support' (service agreement)
- 'Expand innovative use of information technology to manage information and make it appropriately accessible for research' (internal communicate)
- 'Explore teaching and research opportunities, including joint academic and clinical appointments, to enhance the knowledge and skills of the workforce and drive the research agenda' (mental health clinical services plan).

Collaboration: The organisation's documents demonstrated an interest and effort in engaging partners for ongoing research. Identified research collaborators included six universities with a presence in the LHD, either via a facility within the LHD's geographical region or by teaching and training links. Other collaborators included state government health education bodies, local governments, technical colleges and federally funded primary healthcare organisations.

Collaboration was viewed within the documents as means of moving towards best practice. This was exemplified within the LHD's palliative care plan, which referred to the practical ways in which research collaboration could be realised into the future.

Over the medium term [the LHD] should seek to identify possible research partners and conduct research on practical, practice related issues focused on palliative care in a rural setting. Utilizing and promoting the rural research capacity building program through the [NSW Health] Education and Training Institute or establishing links with tertiary institutions to conduct two research projects per annum on palliative care in a rural setting. ... Over the longer term [the LHD] should investigate the feasibility of establishing a Centre for Rural Community Nursing (including palliative care) in conjunction with a suitable tertiary institution.

LHD palliative care plan

It is important to note that the language around collaboration was future-focused, reflecting a desire to collaborate rather than an existing collaborative relationship with the identified partners.

Strategic direction: Under the terms of the organisation's service agreement, the LHD had a number of clearly defined roles in regard to research. The organisation was required to undertake research 'relevant to the provision of health services'. This extended to:

- fostering a dynamic and supportive research culture through strategic leadership and governance
- attracting and retaining high quality clinician researchers
- providing training for clinician researchers and facilitating access to research support
- ensuring business, human resources, information technology and financial service processes support research activities
- attracting clinical trials by removing the barriers to undertaking clinical trials in LHDs.

The organisation's strategic plan outlined the importance of research activities, particularly in the development and implementation of new models of care, with a focus on accessibility, sustainability and relevance to rural communities. The plan outlined the markers for evidence of achievement of this goal, with a focus on implementation of models of care that minimised patient travel and length of stay along with improved Aboriginal health indicators.

The appointment of a board-level research and innovation committee is a clear indication of the intent to develop a strategic approach to research. This committee had responsibility to:

- *predict and strategically plan for change and draw on partnerships to research, develop and implement new and/or innovative models of care which will be sustainable and relevant to rural communities within the organization's geographical region*
- *identify potential projects and make recommendations with regard to seed funding of projects, and the monitoring and evaluation of outcomes of projects*
- *ensure projects have a solid base in evidence, theory, experience or example and are implemented within a research framework*
- *ensure development and implementation of projects are done with active community and clinician engagement and input to ensure openness, transparency and accountability.*

LHD board research and innovation committee terms of reference

While the research and innovation committee had strategic responsibilities, the executive and board of the organisation as a whole had monitoring and reporting responsibilities for research activity, research collaborations, applications for ethical review and research governance.

Below board level strategic documents indicated a planned approach to research for certain professional groups or clinical areas. The LHD's nursing and midwifery clinical educators framework indicated a need for clinical nurse and midwifery educators to collaborate internally with key staff, including clinical nurse consultants, to identify research opportunities. Similarly, the organisation's falls prevention plan (2013–15) discussed the need to 'support the conduct and dissemination of research to advance falls prevention policy and practice'. The organisation's aged care clinical services plan discussed the need to continue to support aged care research to assist the development of evidence based practice. The organisation's rehabilitation clinical services plan specifically indicated a need for research into the development of

telehealth as an outreach model of care and as a method of home based therapy. The organisation's surgical services plan indicated that pathology services are able to assist with 'education, training, research and advice', but there were no further references to research within that plan.

Of the facility and health services operational plans, only one facility's health service plan specifically addressed research, with a vision that both theoretical and translational research is 'imbedded and supported'. The importance of translational research activities was particularly outlined within the plan, with repeated references to the ability of this form of research to inform practice.

Proactively promote the development of more translation research activity to inform the continual improvement of clinical practice.

LHD facility health service plan

Discussion

This research examined the place of research within a large rural health organisation's structure. It is important to understand the structural context within which research may be conducted, as this structure may facilitate or inhibit the activity of research and the development of clinicians as researchers.

It is clear that the LHD as a whole had both an obligation and a willingness to conduct and support research. Strategic leadership across the organisation is an important component of rural research capacity building²⁰ and in this study the organisation acknowledged a lack of strategic leadership and coordination of research activities. While there was evidence of strategic level planning to address this need, operational-level documents did not contain evidence of how this strategic direction would be enacted. In effect, the lack of operational priority created a situation where research activity was driven largely by the agency of individuals.

It is unsurprising, then, that research activity within the organisation was most evident in a group with a greater amount of individual agency. Medical practitioners, in this instance VMOs and students under VMO supervision, were the largest contributors to research activity within the organisation, despite research not being specifically listed as a positional responsibility within VMO position descriptions. The mechanisms by which this activity occurred can be observed at several levels. As VMOs are essentially private contractors to the health service, they have a high degree of autonomy in regard to their workload, roles and responsibilities. This autonomy is also a function of the positional power associated with the medical profession within health services. However, professional autonomy or individual agency is not the sole enabler of research activity. The activity seen may reflect a culture of research within the medical profession. Academic publication is seen as a means of career advancement within parts of the medical profession^{21,22}, and this may also be a driver of research activity.

Nursing staff, in contrast, were seen to have the greatest positional

responsibility for research, but undertook very little research activity. Compared to the high levels of positional and professional autonomy afforded their medical colleagues, many nursing staff had little autonomy in determining their workload and time priorities. Protected research time is a known enabler of nursing research²³. In the absence of a supportive structure such as a research-focused business plan, there was limited agency for the nurse with an interest in or responsibility for research to turn that interest into research activity. The nursing culture towards research has been described as 'indifferent', due in part to research that has not led to practical change²⁴, so the organisation's focus on translational research – that is, research that explores the process and outcomes of implementing research findings into a clinical setting – and new models of care may be a productive way of engaging nurses as researchers.

There was limited research activity for allied health professions. Allied health services have been described as 'research emergent', lacking a history and culture of research²⁵, and this may be evidenced by a lack of responsibility for research within the position descriptions of the majority of allied health professionals. While a need for research training for allied health staff was identified, training alone will not be sufficient to increase allied health research, with a broader organisational support involving leadership, supportive policies, coordination and recognition of research activities required²⁶.

Having research outlined within a position description is one feature of health research capacity building¹¹, although within most position descriptions reference to research was staff 'practicing in a research-informed manner'. This descriptor was particularly prevalent in nursing roles and absent in those for professions such as allied health. Reference to active involvement in research within position descriptions was occasionally ambiguous, with references to 'contributing to research' or 'participating in research', with the latter able to be interpreted as being a research subject rather than a researcher.

The presence of research in strategic plans and position descriptions may seem like an enabler for research, but this is countered by the lack of research focus in facility and work unit operational or business plans, which presents a significant structural barrier to research activity. Successful research capacity building contains activities and structural supports at the individual, team, organisation and supra-organisational levels¹¹, and in rural health it is organisational supports rather than individual factors that have been demonstrated to be critical in non-completion of research endeavours²⁷. Operational plans that enable and support the individual to pursue research activities will not only allow the individual to meet the obligations outlined in their position descriptions, but also assist the organisation to meet its strategic goals and obligations for research.

While the organisation's service agreement referred to research that is relevant to health services, the organisation's strategic plan indicated a single strategic focus on research into new models of care. There is a long history in health services that 'what gets measured gets done'^{28,29}, and a focus on research that only

develops new models of care may limit the scope of research into other areas of potential benefit to the health service and health consumers.

The sole facility service plan containing references to research provided an example of the value and importance of research being emphasised at the facility level. A similar emphasis may have been excluded from the service plans of smaller facilities to reduce the expectations on a small generalist workforce. Such a decision may inhibit the ability of staff within these smaller facilities to actively engage in research activities, to the detriment of the LHD's strategic focus; in rural health, need is a driver of innovation^{30,31}, and smaller facilities are often sites where new models of care are developed. The focus on translational research within the facility service plan indicated a desire for the majority of research occurring within that space to have immediate practical application³².

Resourcing for research was identified as a challenge for implementing research within the LHD. Research activities are block funded along with teaching and training. As there is no clear delineation for the proportion of this funding dedicated to research activities, there may be competition for this limited funding. With the state potentially changing to activity-based funding for teaching, training and research³³, organisations will need to consider the role of research and the ability to conduct, host or collaborate on research activity at a level that will attract and maintain funding, and the approaching timeframe adds a level of urgency to this necessary discussion.

One of the challenges within rural health organisations is research that is conducted within, but not for or by, the organisation. Limited engagement of local staff within these research projects leads to few opportunities for research capacity building within the organisation. The present study did not explore the designs or content of research being conducted by external agencies, such as universities or non-government organisations, within the LHD. The organisation's service agreement emphasised attracting clinical trials, and across the strategic planning documents there are references to a need to balance locally relevant research endeavours and allowing larger scale endeavours with little immediate local relevance. A move to activity-based funding for research may lead rural health organisations to critically examine the cost-benefit of engaging in clinical trials given the relative lack of direct benefit to the organisation.

As an organisation without a large research unit, the LHD relied on collaboration in many of the research endeavours identified. This type of collaboration has been described as a means for health researchers to access needed expertise^{1,26}. The fact that known collaborators are identified within the documents indicates the LHD has existing collaborative relationships in place; however, it is not clear if these collaborations are strategically driven or have developed on an ad hoc basis. A collaborative model of research is more consistent with successful research capacity building^{11,12,20} and the ability of LHD staff to interact with experienced researchers is more likely to assist in the development of research skill in rural clinicians. In addition to external collaboration, there

exists an opportunity for increased internal collaboration. Those already active in research, such as VMOs, could collaborate with others in the LHD, in effect becoming research 'champions' (eg involving a junior medical officer in a project that a student and VMO had instigated). Extending beyond a single profession, encouraging collaboration between allied health and existing researchers within the LHD in a multidisciplinary cooperative would be an appropriate means of building allied health research capacity²⁶. These collaborative strategies can provide expertise and support, in some respects offsetting the lack of a critical mass of researchers needed to build allied health research capacity²⁶.

One strategy within the organisation was to train and attract clinician researchers, and there was a small pool of researchers responsible for approximately one-third of the LHD's research activity. Training for these individuals is desired, but few options for training were identified beyond formal supported research training programs such as NSW Health's Rural Research Capacity Building Program^{9,27}. Identifying training needs via a research training needs assessment is a key element of research capacity building¹¹. The role of the clinician-researcher can be a challenging one^{34,35}, and organisational support not only for training but for the conduct of research is required for successful research completion^{10,23,27,36}.

Limitations

This study was limited to documents relevant to the year 2015. Although attempts were made to capture planning documents that were released prior to that year, it is possible that not all relevant documents were found. This study relied entirely on documents available on the public internet or internal intranet of the LHD and therefore documents held on individual network drives were not accessed or included.

This study included documents that referred to both research and evaluation. Other synonymous terms may have fitted the definitions of research or evaluation used in this study, and as a result these documents may have been included.

Conclusion

This study has found that, in a rural health organisation in NSW, Australia, a lack of operational planning for research leads to a reliance on individuals to drive research activity. There appeared to be a mismatch between positional responsibility for research and research activity conducted, with personal agency a key factor in activity.

In this study, the majority of the rural research conducted did not engage local staff as researchers. Rural health organisations face challenges including a limited numbers of skilled researchers, limited resourcing and an acknowledged lack of organisational support and coordination. In such a setting, collaborative links become increasingly important.

Rural health organisations have an opportunity to create a positive research culture by ensuring the potential to engage in research is reflected in the operational plans for all facilities and work units.

Engaging existing researchers as 'champions' and enabling internal collaboration will strengthen research activity and build research capacity.

REFERENCES:

- 1 Dunbar JA. Building capacity for rural and remote research. *Australian Journal of Rural Health* 2010; **18**(4): 133. <https://doi.org/10.1111/j.1440-1584.2010.01146.x> PMID:20690906
- 2 Taylor J, Hughes C, Petkov J, Williams M. Unique issues in research and evaluation in rural and remote locations: Is there a place for specific research training? *Rural and Remote Health* 2005; **5**(2): 351. Available: <http://www.rrh.org.au/journal/article/351> (Accessed 31 March 2020).
- 3 Bailey J, Veitch C, Crossland L, Preston R. Developing research capacity building for Aboriginal & Torres Strait Islander health workers in health service settings. *Rural and Remote Health* 2006; **6**(4): 556. Available: <http://www.rrh.org.au/journal/article/556> (Accessed 31 March 2020).
- 4 Birden HH. The researcher development program: how to extend the involvement of Australian general practitioners in research? *Rural and Remote Health* 2007; **7**(3): 776. Available: <http://www.rrh.org.au/journal/article/776> (Accessed 31 March 2020).
- 5 Fraser JD, Hawkins A, Alexander C, Robertson C, Fragar L. The impact of the Research Methods Support Structure on research capacity in rural New South Wales. *Australian Health Review* 2006; **30**(4): 427-434. <https://doi.org/10.1071/AH060427> PMID:17073536
- 6 Gausia KMP, Thompson SCFP, Lindeman MABAP, Brown LJB, Perkins DBAP. Contribution of university departments of rural health to rural health research: an analysis of outputs. *Australian Journal of Rural Health* 2015; **23**(2): 101-106. <https://doi.org/10.1111/ajr.12142> PMID:25692850
- 7 Grundy J, Johnston F. Building research capacity in primary health care settings in the Northern Territory. *Australian Journal of Primary Health* 2003; **9**(1): 9-17. <https://doi.org/10.1071/PY03002>
- 8 McIntyre E, Saltman D, Traynor V, Sims J, Richards J, Dollard J. Building research capacity in Australian departments of general practice and rural health: a document review of annual reports. *Primary Health Care Research & Development* 2007; **8**(1): 3-11. <https://doi.org/10.1017/S1463423607000023>
- 9 Webster E, Thomas M, Ong N, Cutler L. Rural research capacity building program: capacity building outcomes. *Australian Journal of Primary Health* 2011; **17**(1): 107-113. <https://doi.org/10.1071/PY10060> PMID:21616034
- 10 Schmidt DD, Kirby S. A modular approach to rural and remote research education: a project report. *Rural and Remote Health* 2016; **16**(1): 3609. Available: <http://www.rrh.org.au/journal/article/3609> (Accessed 31 March 2020).
- 11 Cooke J. A framework to evaluate research capacity building in health care. *BMC Family Practice* 2005; **6**: 44. <https://doi.org/10.1186/1471-2296-6-44> PMID:16253133
- 12 Sarre G, Cooke J. Developing indicators for measuring Research Capacity Development in primary care organizations: a consensus approach using a nominal group technique. *Health & Social Care in the Community* 2009; **17**(3): 244. <https://doi.org/10.1111/j.1365-2524.2008.00821.x> PMID:19040697
- 13 NSW Ministry of Health. *NSW Rural Health Plan: Towards 2021*. Sydney: NSW Ministry of Health, 2014.
- 14 NSW Ministry of Health. *NSW Health and Medical Research Hub Strategy 2014-2019*. North Sydney: NSW Ministry of Health, 2014.
- 15 Pawson R, Greenhalgh T, Gill H, Walshe K. Realist review – a new method of systematic review designed for complex policy interventions. *Journal of Health Services Research & Policy* 2005; **10**: 21-34. <https://doi.org/10.1258/1355819054308530> PMID:16053581
- 16 McEvoy P, Richards D. Critical realism: a way forward for evaluation research in nursing? *Journal of Advanced Nursing* 2003; **43**(4): 411-420. <https://doi.org/10.1046/j.1365-2648.2003.02730.x> PMID:12887360
- 17 Ackroyd S, Karlsson J. Critical realism, research techniques and research designs. In: P Edwards, J O'Mahoney, S Vincent (Eds). *Studying organizations using critical realism*. Oxford: Oxford University Press, 2014.
- 18 Liampittong P. Qualitative data analysis: conceptual and practical considerations. *Health Promotion Journal of Australia* 2009; **20**(2): 133-139. <https://doi.org/10.1071/HE09133> PMID:19642962
- 19 Fischer CT. Bracketing in qualitative research: conceptual and practical matters. *Psychotherapy Research* 2009; **19**(4-5): 583-590. <https://doi.org/10.1080/10503300902798375> PMID:20183407
- 20 Murphy K, Stockton D, Kolbe A, Hulme-Chambers A, Smythe G. Building research capacity in a regional Australian health service: a management strategy analysis. *Asia Pacific Journal of Health Management* 2015; **10**(1): 14-22.
- 21 Buddeberg-Fischer B, Stamm M, Buddeberg C. Academic career in medicine – requirements and conditions for successful advancement in Switzerland. *BMC Health Services Research* 2009; **9**(1): 1-14. <https://doi.org/10.1186/1472-6963-9-70> PMID:19402885
- 22 Crockett SD. A 25-year analysis of the American College of Gastroenterology research grant program: factors associated with publication and advancement in academics. *American Journal of Gastroenterology* 2009; **104**(5): 1097-1105. <https://doi.org/10.1038/ajg.2009.35> PMID:19319125
- 23 Wilkes L, Cummings J, McKay N. Developing a culture to facilitate research capacity building for clinical nurse consultants in generalist paediatric practice. *Nursing Research and Practice* 2013; **2013**: 709025. <https://doi.org/10.1155/2013/709025> PMID:23956854
- 24 Cleary M, Hunt GE, Robertson M. Editorial: Improving research cultures in nursing. *Journal of Clinical Nursing* 2011; **20**(9-10):

1213-1214. <https://doi.org/10.1111/j.1365-2702.2010.03247.x> PMID:21492270

25 Pager S, Holden L, Golenko X. Motivators, enablers, and barriers to building allied health research capacity. *Journal of Multidisciplinary Healthcare* 2012; **5(53)**: e9. <https://doi.org/10.2147/JMDH.S27638> PMID:22396626

26 Golenko X, Pager S, Holden L. A thematic analysis of the role of the organisation in building allied health research capacity: a senior managers' perspective. *BMC Health Services Research* 2012; **12**: 276. <https://doi.org/10.1186/1472-6963-12-276> PMID:22920443

27 Schmidt D, Robinson K, Webster E. Factors influencing attrition from a researcher training program. *International Journal for Researcher Development* 2014; **5(1)**: 56-67. <https://doi.org/10.1108/IJRD-08-2013-0013>

28 Ijaz K, Kasowski E, Arthur RR, Angulo FJ, Dowell SF. International health regulations – what gets measured gets done. *Emerging Infectious Diseases* 2012; **18(7)**: 1054-1057. <https://doi.org/10.3201/eid1807.120487> PMID:22709593

29 Knopf DK, Park MJ, Brindis CD, Mulye TP, Irwin Jr CE. What gets measured gets done: assessing data availability for adolescent populations. *Maternal and Child Health Journal* 2007; **11(4)**: 335-345. <https://doi.org/10.1007/s10995-007-0179-2> PMID:17308967

30 Smith KB, Humphreys JS, Wilson MGA. Addressing the health disadvantage of rural populations: how does epidemiological

evidence inform rural health policies and research? *Australian Journal of Rural Health* 2008; **16**: 56-66. <https://doi.org/10.1111/j.1440-1584.2008.00953.x> PMID:18318846

31 Dunbar JA. Innovation in rural health: sound the trumpet. *Australian Journal of Rural Health* 2011; **19**: 3. (109-110) <https://doi.org/10.1111/j.1440-1584.2011.01206.x> PMID:21605222

32 Drolet BC, Lorenzi NM. Translational research: understanding the continuum from bench to bedside. *Translational Research* 2011; **157(1)**: 1-5. <https://doi.org/10.1016/j.trsl.2010.10.002> PMID:21146144

33 Council of Australian Governments. *National Health Reform Agreement 2011*. Available: http://www.federalfinancialrelations.gov.au/content/npa/health_reform/national-agreement.pdf (Accessed 14 November 2016).

34 Yanos PT, Ziedonis DM. The patient-oriented clinician-researcher: advantages and challenges of being a double agent. *Psychiatric Services* 2006; **57(2)**: 249-253. <https://doi.org/10.1176/appi.ps.57.2.249> PMID:16452704

35 Woodward V, Webb C, Prowse M. The perceptions and experiences of nurses undertaking research in the clinical setting. *Journal of Research in Nursing* 2007; **12(3)**: 227-244. <https://doi.org/10.1177/1744987107077398>

36 Schmidt DD. What a great idea! Someone should evaluate that. *Australian Health Review* 2016; **40(3)**: 270-272. <https://doi.org/10.1071/AH14215> PMID:26093999

The preceding paper highlights several important issues about the rural context for research activity, and by extension, research capacity and capability development.

Firstly, from a critical realist viewpoint, policy and operational planning are critical structural factors that determine and influence research activity. It is not unusual in organisations for a gap to occur between strategic and operational levels of planning (Kujala et al., 2013), and in this study what should be an enabling structure, the presence of research in the strategic plan and position descriptions, is offset by the inhibitory absence of operational planning for research (see Figure 10). By applying retrodution, it can be hypothesised that this lack of operational planning is a likely mechanism leading to low levels of research activity in certain professions.



Figure 10: Research at the strategic, operational and individual levels.

It is important to note that this low level of research activity aligns more strongly with the individual's profession than with the presence or absence of positional responsibility for research. Retroductively it can be theorised that positional responsibility is not a strong mechanism for research activity. Instead, individual agency associated with certain professions appears to play a greater role in determining research activity (Figure 11).

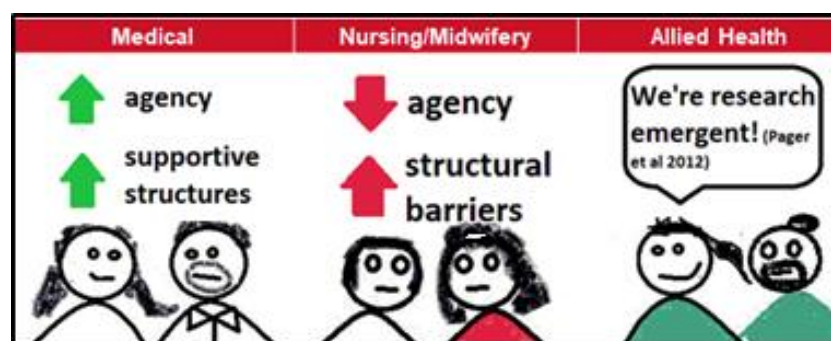


Figure 11: The influence of individual agency on research activity across health professions

Where professions are “research emergent” (Pager, Holden & Golenko, 2012), as Allied Health professions have been described, there is a limited capability for research and limited research activity. Such limitations require greater levels of individual agency if research activity is to occur.

4.2 The learning context in which rural health research training occurs

The previous paper sheds light on the operational and strategic context in which research *activity* is occurring. These new insights are helpful for understanding where research is prioritised and where organisations are reliant on individual agency to drive research activity, or where individual agencies drive research activity despite a lack of organisational support.

For those interested in research capacity building, it is also important to consider the learning context for research *training*. Learning context in this instance refers to an understanding of the need for research training, the preferred structure of research training in a rural health organisation and who should receive such training. Therefore, the second part of this chapter focuses on research training, with this paper:

Schmidt, D, Reymont, J, Webster, E, Kirby, S & Lyle, D 2020b, 'Workplace-based health research training: a qualitative study of perceived needs in a rural setting', *Health Research Policy and Systems*, vol. 18, no. 1, pp. 67.

RESEARCH

Open Access



Workplace-based health research training: a qualitative study of perceived needs in a rural setting

David Schmidt^{1*} , Jill Reymont², Emma Webster³, Sue Kirby⁴ and David Lyle⁵

Abstract

Background: The calls for increased numbers of researchers in rural health are growing. To meet this demand, training is needed. If training is to be effective, the value placed on research, the organisational need for research training and key targets for research skill development within a rural health organisation must be understood.

Methods: This qualitative study was underpinned by a critical realist perspective that allowed exploration of the organisational, cultural and structural contexts of research training and of the ability of individuals to act within these contexts. Individual interviews with purposively selected key informants from the organisation's board, executive and facility management ($n = 7$) and two focus groups with a convenience sample of frontline health workers with interests in research (total $n = 11$) were held. Data were analysed using NVivo software and thematic analysis.

Results: The themes emerging from this study were the fragmentation of research activity, a need for systems that support research and collaboration for expertise.

Conclusions: This study has identified an overreliance on individual activity leading to a fragmented approach to research. There is a need for supportive structures, coordination and workplace leadership to overcome a longstanding culture that views research as out of the rural scope of practice. Identifying research training targets, partnering for educational expertise and planning for long-term sustainability are necessary steps toward increasing research activity in the longer term.

Keywords: Rural research, research training, organisational support, research capacity

Introduction

Rural health decision-makers and clinicians need relevant, good quality research to make improvements and enhancements to rural health services. Research capacity-building is an avenue for these organisations to have the capability to produce research that leads to better understanding of locally relevant issues and consider improvements and enhancements [1]. Research in rural areas presents its own set of challenges and the solutions proposed have included

specific rural training [2] and embedded health service researchers [3]. The challenges of providing training on research skills in rural areas include a limited pool of experts in rural research, a similarly limited pool of research experts based in rural areas, structural barriers requiring thoughtful educational design [4] and maintaining support to sometimes isolated learners [5].

Several programmes have been undertaken within the rural health workspace to improve research capacity [6–13]. Some of these programmes [4, 5, 12, 13] have endeavoured to align trainee selection and research activities with the organisational priorities of the hosting organisation. However,

* Correspondence: dsch5166@uni.sydney.edu.au

¹The University of Sydney, Sydney School of Public Health, Faculty of Medicine and Health, Sydney, NSW 2006, Australia

Full list of author information is available at the end of the article



© The Author(s). 2020 **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

information on the research training needs of rural health organisations on the whole is not known.

This study, conducted within a rural and outer regional portion of New South Wales, Australia, in 2016–2017, explored the perceived benefits of and perceived need for research and research training within a large rural public health organisation responsible for the management of over 40 hospitals and other health facilities over a very large geographic area. The organisation's 3500 staff service a combination of large and small towns with significant diversity in terms of socioeconomic status and ethnicity. The region has an Aboriginal population of approximately 5%, with 9% of residents born overseas and approximately 1% non-English speaking. Health services try to work in concert with primary care providers and privately run services. Along with previous research identifying research within a rural health organisation's strategic and operational documents [14], the results of this study will assist rural organisations in identifying the structural deficits and structural enablers that impact on the training of research skills and the conduct of research in rural areas.

This study sought to explore the perspectives of key stakeholders on the role that research plays within a rural health service, the perceived needs of the organisation in terms of research training, the perspectives on methods of training to benefit staff within the organisation as a whole and what that training should encompass, and the perspectives on which individuals within the organisation should be targeted for training in research.

For the purposes of this study, research is defined as activities that could or should be submitted to a human research ethics committee [14].

Methods

This qualitative study was conducted using a critical realist underpinning. Realist approaches are directly applicable to organisation and management studies [15] and the use of critical realism was intended to allow an understanding of the organisation, the work culture and other 'structures' likely to contribute to or inhibit the ability or 'agency' of the individual to undertaking learning in this field [16]. These structures include not only the physical spaces of the hospitals and community-based facilities but also the cultural norms of the organisation, the policy and procedural frameworks within which research training may occur, and the financial or organisational constraints affecting research training and activity. Critical realism was the lens that was used to reveal these structures and draw inferences about the ability of these structures as inhibitors or enablers of individual agency of rural health workers wishing to undertake further training in research.

The study also explored how individuals access education and training in research or, if this is not possible, the perceived barriers to access.

Participants included the following key informants or groups: (1) members of the organisation's board or executive with a strategic or organisational responsibility for research; (2) managers of facilities in which research is active; and (3) other staff with an interest in research.

Purposive sampling was used to identify and recruit potential board, executive and management participants. Individuals were invited by email contact from the lead researcher (DS).

Clinicians and other health staff were recruited by convenience sampling via an email flyer distributed across the organisation, inviting participation in a focus group.

Interviews were conducted either face-to-face in a location chosen by the interviewee or via telephone. One focus group was held in a meeting room at a large regional hospital whilst the other was held via teleconference. All participants provided written consent prior to interview or focus group participation.

A semi-structured approach was used for interviews and focus groups, with a pre-determined schedule of questions providing the outline and prompt questions used for further exploration of ideas and concepts. Questions were derived by the lead researcher (DS), informed by existing research capacity-building literature and refined by the other members of the research team, aimed at improving clarity and flow. No pilot testing of the questions occurred. All interviews and focus groups were digitally recorded and transcribed professionally.

Interviews lasted between 18 and 48 minutes, while focus groups lasted between 53 and 72 minutes. The lead researcher (DS) convened all focus groups and conducted interviews, at the conclusion of which field notes and reflections on the information discussed were made to inform analysis.

Data collection was concluded after all available interviews and focus groups were conducted. No attempt was made to ensure thematic saturation or redundancy as a result. Participation in the research was voluntary and individual interview participation was only known to the lead researcher and the participant. Involvement in focus groups was known to the other participants in the focus group. Participants were given the opportunity to request a copy of the final transcript; however, no participants made this request.

Thematic analysis was used with initial codes manually derived by the lead researcher by an inductive process of multiple readings of the transcripts. NVivo software (QSR International Pty Ltd. Version 10, <http://www.qsrinternational.com/>) was used for initial management of the data, with manual coding and theme derivation completed using the cut and paste method [17]. Memos and field notes assisted with theme development [18].

The veracity of themes was confirmed by co-researchers (JR, SK and EW) who independently read three de-identified transcripts and reviewed the derived themes. Co-researchers were able to posit new themes from the data; however, only minor discrepancies between the derived themes and the co-researchers' interpretation of the transcripts were identified, which were resolved by negotiation and further refinement of the themes.

The lead researcher (DS) is studying research skill-building in the rural health workplace as a PhD student and works in a rural researcher training programme. The lead researcher attempted to bracket his own pre-conceptions [19], with memos and reflective discussion with supervisors used to ensure methodological and procedural rigour.

Ethical approval was granted by the Greater Western Human Research Ethics Committee (ref LNR/16/GWAHS/72), with governance approval from the hosting organisation.

Results

A total of 18 individuals participated (14 female, 4 male) in the study, with seven individual interviews held with board members ($n = 2$), members of the organisation's executive ($n = 4$) and operational management ($n = 1$). Eleven health staff, comprising a mix of clinical ($n = 8$) and non-clinical staff ($n = 3$), participated through focus groups ($n = 8$ face-to-face and $n = 3$ in the virtual focus group). Interviewing organisational leaders rather than including staff of various levels in focus groups was intended to allow free and open discussion of issues without perceived power imbalances. To preserve anonymity, the responses have been simply assigned an interview or focus group number.

From the analysis of the interviews and focus groups, three themes emerged, namely fragmentation of research activity, a need for systems which support research, and collaboration for expertise. These themes are explored in greater depth below.

1. Fragmentation of research activity

Currently, research is viewed as an individual activity rather than as part of a staff member's work role or contribution to the organisation overall. This reliance on individual agency to drive research leads to research activity that is fragmented and has little connection to the organisation's strategic direction.

"Because people were coming and saying I want to do this and I want to do that and it's like that's got no relevance to where our strategic build is going and our workforce build and whatever." Focus Group 1

There is a need for supportive structures that would allow staff to align their preferred research activities to the organisation's greater goals; this could include clear strategic direction for research and leadership for research within the organisation's priorities.

The current perception within the organisation is that there appears to be little research activity, with low visibility of existing research.

"It would be really good to know in the last five years or even more who has actually conducted research within [the organisation] ... But it's hidden. We don't see it." Focus Group 1

This lack of visibility acts as an inhibiting structure. As a result, local research is not seen as leading clinical care or service priorities.

"It should play a large role and it should drive a lot of clinical practice. However, I don't believe that that's the case. I don't believe we have much capacity for research ... it just is one of those things that are good in theory and we like to talk about it. But we don't actually put the infrastructure or the resources into doing it." Focus Group 1

One of the perceptions about the organisation is that, as a rural health service, they are poorly placed to undertake research and poorly resourced for research activity.

"[Our organisation] has always thought that we are too rural and too poor to do research. And I think this is the thinking in most rural organisations or rural and regional organisations. But recently, say in the last 1 or 2 years, the thinking has been gradually shifting and changing." Interview 7

This perception has a real effect in that staff within the organisation have traditionally not pursued research activities, instead seeing research as something outside their capabilities as a rural organisation.

There is a tension within the organisation when considering appropriate targets for research training. One perception is that the way to build research activity and capacity is to start with those with an interest and desire for research, regardless of their position or status within the organisation. This egalitarian approach recognises that any individual or group within the organisation may have a viable and important research idea.

"I think it needs to be available to any employee that ... have a – a level of interest in it ... it could be someone in administration, it could be clinicians, research skills can be applied in lots of different settings." Focus Group 2

Balancing this egalitarian view is a more pragmatic approach – that the organisation has limited resources and these should be targeted to those best placed to maximise the organisational benefits of this training. These individual targets include those with an existing teaching and training role or those with existing responsibility for research.

"I guess the Utopia would tell you as many as possible [receive training]. In reality is that if that costs money you have to be selective about who does that, then I believe that the process of being selected can actually be quite discriminatory depending on where you sit in the organisation." Interview 4

The limited amount of funding acts as an inhibiting structure, leading to potential indecision for deciding who, if anybody, should receive opportunities in research and research education. This indecision, in conjunction with an overall fragmentation of activity and a lack of alignment with organisational strategy, makes developing a comprehensive and coordinated research training strategy more difficult.

2. A need for systems which support research

"If we start encouraging research then from our perspective we have to put systems in place so that people will know what is available, how to do it, what kind of support and what kind of funding is available." Interview 7

At present, there is a lack of systems and structures to support research within the organisation. Ideally, the organisation would have one or more employees with a diverse skillset who would be placed to help facilitate research and develop researchers.

"I think somewhere in the district you have to identify one or two people ... who has got good communication skills, good liaison skills, good problem solving skills, to work with these people that are actually doing that, to enable them to concentrate on their research." Interview 4

The level of knowledge about research is low within the organisation and people have been reluctant to engage with research due to a perception that research is complex, secretive and difficult, with systems that are obstructive and unhelpful.

"... it's a little bit too hard, it's almost a bit like secret research business ... I think there's a little bit of a perception it's secretive, it's complicated and it can

be, depending on what you're doing, but the main practice doesn't have to be." Interview 1

One structural support system that is required is the adequate resourcing of research activities. At present, there is little resourcing for time, funding or research equipment, which leads staff to pursue options outside of the organisation or to view research as unsupported.

"I think the challenges for us are get the institution right, the culture right for individuals, to get the training right. Both in terms of people who do research and people who facilitate research and then we've got to get the last part which is the money." Interview 5

Institutional or structural barriers to research and research training create a perception that the organisation is actively discouraging budding researchers from learning about or undertaking research.

"I think there are a number of barriers which probably I think characterise as institutional. So ... how does an institution encourage people to think innovatively, to be looking for questions and to encourage it without becoming weary of change or resistant to change or uncaring about change? Sometimes I think good ideas get through the health institution by good luck rather than good management." Interview 5

One structural barrier is the geographical spread of the organisation. This may inhibit activity at some of the outlying sites and create a tendency for all activity to be centred on the organisation's largest facility.

"The other thing that is probably a little bit of a barrier for those people is because some of those people are in isolated areas. And we can talk about technology and we can talk about networking and all that but sometimes that isolation inhibits them from moving forward." Interview 6

"Why are we only focusing on [the major centre], that's my thing? There is so much research opportunity out there. We've got [over 30] hospitals. And in typical [organisational] form we are very [major hospital] centric." Focus Group 1

It is essential that supportive structures, including formal governance structures and informal supports such as mentoring, acknowledge and attempt to address these known barriers.

3. Collaboration for expertise

There is a recognition that research is a specialist skillset that requires expert knowledge and expert input that does not currently exist within the organisation. In the absence of this expertise within the organisation, there is a need to build partnerships with universities and other health organisations to access this level of skill. Thus, we can see a structural solution in the form of a partnership used to address a structural deficit in terms of research skill.

"That's where a partnership with a university would be beneficial, if you have got someone that has a high level of training in the best way to conduct research... because it's not a focus [of a rural health organisation] ..." Focus Group 2

This collaboration with university partners was seen as a means of securing such expertise, provided that the organisation retains ownership of the strategic direction for research.

"That's about setting the agenda, and if you're not necessarily owning the research, being a part of the lead in the process of that research. Again, not being a passenger but actually being involved in driving where we are going." Interview 2

Any research training strategies implemented as part of a partnership with a university should acknowledge existing workplace cultures and the influence of competing priorities for the education and healthcare sectors.

The need for access to education and training saw participants recognise a place for online training but felt that face-to-face training may be more effective in terms of acceptance.

"I think face-to-face, project-based and over a period of time rather than a one-off. Project-based is ... a lot more engaging and they can actually practice the skills as they go, plus they get encouraged to identify a project and then the training is about supporting them to work through that and they get the practical skills rather than just - when they learn about it in a classroom environment." Interview 3

This approach can build on existing quality improvement and project skills already in the workforce.

"We're very good at project work. ... But I think research is just that next stage on ... It's just taking it that step - the project one step forward isn't it?" Focus Group 1

Discussion

This study has examined the viewpoints of rural health decision-makers and clinicians within the organisation

regarding research and research training. The use of a critical realist framework allows particular examination of supportive structures and the agency of individuals to work within these structures by specifically identifying these formal and informal structures. Using this lens, it can be deduced that the organisation's current position on research is fragmented due to a combination of limited resourcing, a lack of supportive structures and limited expertise.

At present, the organisation relies heavily on the motivation and agency of individuals with an interest in research for research activity. However, individual agency by itself cannot overcome all the structural limitations identified, including a lack of visibility, a lack of strategic leadership, cumbersome systems and poor coordination. Geographic distances between sites and an emphasis on research centred on the organisation's largest hospital was also an issue. This centralised approach appears to inhibit research development in outlying sites. Previous research has identified that geographic barriers may be addressed instead by decentralising training [4]. It is important to recognise these barriers can exist at the individual, team and supra-organisational levels [20] as well as the organisational levels identified in this study.

Existing research training options available to staff are not well advertised and there was limited awareness of some public sector training options [5, 12, 13]. Those with an interest in learning about research are doing so via external institutions as research higher degrees, which may increase individual skill but limits the organisational benefit of this activity as there is a limited opportunity to align these projects with organisational goals; this alignment should provide a supportive structure in which individuals can receive support. While research is seen as an individual preference or activity, it remains external to the organisation's activities and priorities. This individual motivation is seen as important for research completion [21, 22], although this is not evidenced in rural areas [5]. Individuals undertaking research education via universities are given little encouragement to subsequently use these skills within the organisation, demonstrating evidence of a cultural structure that inhibits individual agency.

The concept of a research supportive culture is difficult to define and demonstrate [14]; however, greater promotion of research endeavours [23] is one measure. Addressing fragmentation of research efforts and publicising research education opportunities in conjunction with external partners would be meaningful steps towards a research-supportive culture in this organisation.

There was a recognised need for an introductory level of research education. Some participants were keen to build on existing skills in project work or quality improvement, while others discussed engaging in cross-

institutional research partnerships. This diversity of perceptions and ambitions aligns with what is known about the indicators of successful research capacity-building, with training at a level to meet individual needs, which may mean multiple levels of training are required within the one organisation [23].

Partnership between health services and universities is seen as a critical way for the organisation to engage research expertise [14] and this is known to be a way to improve research capacity [4, 20, 23, 24]. The vision of this partnership was multifaceted; a collaboration centred on a notion of reciprocity, a need for the organisation to retain control of the direction of research activity and ownership of the resultant research all featured. While expertise may need to be sourced from outside the organisation, the training must be visible within the workplace if it is to engage the workforce in a meaningful way. While there is a known link between 'close to practice' research as an enabler of research capacity-building [12, 20, 23], the concept of keeping research training support close to the workplace is one that is challenging for rural organisations and requires careful structural design for training programmes [4]. This close-to-practice approach also creates a tension for decision-makers at the organisational level who are responsible for determining the organisation's research priorities, which may potentially exclude relevant ideas from smaller communities or useful ideas from individual clinicians if those fall outside the big-picture priorities.

While staff at several levels of the organisation's leadership were approached, only a single operational manager agreed to participate. This limited engagement at the operational management level aligns with emerging research on the research capacity and culture of NSW rural health organisations [25] and the known operational responsibility for research within the organisation [14]. The use of purposive sampling at the leadership level targeted those with existing organisational responsibilities for research, which may have led to responses that reinforced an existing organisational position. Other leaders in the organisation may have presented an alternate vision for research.

There was limited engagement from smaller facilities within the organisation which may reflect issues with study design, an underlying belief that research is only for larger centres, a lack of operational responsibility for research in smaller centres [14] or the busyness of rural practice.

The lead researcher's knowledge of research training in a rural area informed the design of the study and allowed for nuanced exploration of issues in the interview and focus group process. This knowledge lent credibility to the retroductive process of exploring 'why things are as they are' using critical realism [15].

While this study included only a single rural organisation, this organisation is typical of many large rural

health services and, as such, the findings of this study may have a wider applicability.

Conclusion

This study has shown that research plays a limited role within the organisation and there is a need for research training that is both introductory and supported by external expertise. While there are multiple targets for training in research, this training needs to be supplemented with a range of supportive structures to ensure improved access to information, coordination of research activity, alignment with strategic goals and sustainability.

The organisation aspires increased research capability and activity. Changing perceptions toward research, leadership, ownership and valuing of research endeavours will be key components in the longer term to reach this aspiration.

Acknowledgements

Not applicable.

Authors' contributions

DS designed the study, collected data at interview and focus groups, analysed and interpreted the data and was the primary author of the manuscript. JR assisted with participant recruitment and data analysis and was a contributor in writing the manuscript. EW, SK and DL assisted in study design, analysis and interpretation, and were contributors in writing the manuscript. All authors read and approved the final manuscript.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due to privacy provisions but are available from the corresponding author on approval from the authorising ethics committee.

Ethics approval and consent to participate

Ethical approval was granted by the Greater Western Human Research Ethics Committee (ref LNR/16/GWAHS/72), with governance approval from the hosting organisation. All participants provided written consent prior to participating.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹The University of Sydney, Sydney School of Public Health, Faculty of Medicine and Health, Sydney, NSW 2006, Australia. ²Clinical Governance, Murrumbidgee Local Health District, Wagga Wagga, NSW 2650, Australia. ³School of Rural Health, Sydney Medical School, The University of Sydney, Dubbo, NSW 2830, Australia. ⁴Centre for Primary Health Care & Equity, University of New South Wales, Sydney, Australia. ⁵University Department of Rural Health (Broken Hill), Sydney Medical School, Faculty of Medicine and Health, The University of Sydney, Broken Hill, NSW 2880, Australia.

Received: 23 January 2020 Accepted: 21 May 2020

Published online: 15 June 2020

References

1. NSW Ministry of Health. NSW rural health plan: towards 2021. Sydney: NSW Ministry of Health; 2014.

2. Taylor J, Hughes C, Petkov J, Williams M. Unique issues in research and evaluation in rural and remote locations: Is there a place for specific research training? *Rural Remote Health*. 2005;5:351–62.
3. Moran A, Haines H, Raschke N, Schmidt D, Koschel A, Stephens A, Opie C, Nancarrow S. Mind the gap: is it time to invest in embedded researchers in regional, rural and remote health services to address health outcome discrepancies for those living in rural, remote and regional areas? *Aust J Prim Health*. 2019;25:104–7.
4. Schmidt DD, Kirby S. A modular approach to rural and remote research education: a project report. *Rural Remote Health*. 2016;16:3609.
5. Schmidt D, Robinson K, Webster E. Factors influencing attrition from a researcher training program. *Int J Res Dev*. 2014;5:56–67.
6. Bailey J, Veitch C, Crossland L, Preston R. Developing research capacity building for Aboriginal & Torres Strait Islander health workers in health service settings. *Rural Remote Health*. 2006;6:556.
7. Birden HH. The researcher development program: how to extend the involvement of Australian general practitioners in research? *Rural Remote Health*. 2007;7:776.
8. Fraser JD, Hawkins A, Alexander C, Robertson C, Fragar L. The impact of the research methods support structure on research capacity in rural New South Wales. *Aust Health Rev*. 2006;30:427–34.
9. Gausia K, Thompson SC, Lindeman MA, Brown LJ, Perkins D. Contribution of university departments of rural health to rural health research: an analysis of outputs. *Aust J Rural Health*. 2015;23:101–6.
10. Grundy J, Johnston F. Building research capacity in primary health care settings in the Northern Territory. *Aust J Prim Health*. 2003;9:9–17.
11. McIntyre E, Saltman D, Traynor V, Sims J, Richards J, Dollard J. Building research capacity in Australian departments of general practice and rural health: a document review of annual reports. *Prim Health Care Res Dev*. 2007;8:3–11.
12. Webster E, Thomas M, Ong N, Cutler L. Rural research capacity building program: capacity building outcomes. *Aust J Prim Health*. 2011;17:107–13.
13. Schmidt DD, Webster E, Duncanson K. Building research experience: Impact of a novice researcher development program for rural health workers. *Aust J Rural Health*. 2019;27:392–7.
14. Schmidt D, Reymont J, Kirby S, Webster E, Lyle DM. The place of research in the rural health workplace structure. *Rural Remote Health*. 2020;20:5493.
15. Ackroyd S, Karlsson J. Critical realism, research techniques and research designs. In: Edwards P, O'Mahoney J, Vincent S, editors. *Studying organizations using critical realism*. Oxford: Oxford University Press; 2014.
16. Marks A, O'Mahoney J. Researching identity: a critical realist approach. In: Edwards P, O'Mahoney J, Vincent S, editors. *Studying organizations using critical realism*. Oxford: Oxford University Press; 2014.
17. Pope C, Ziebland S, Mays N. Analysing qualitative data. *Br Med J*. 2000;320:114–6.
18. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3:77–101.
19. Fischer CT. Bracketing in qualitative research: conceptual and practical matters. *Psychother Res*. 2009;19:583–90.
20. Cooke J. A framework to evaluate research capacity building in health care. *BMC Fam Pract*. 2005;6:44.
21. Manson S. Personal journeys, professional paths: persistence in navigating the crossroads of a research career. *Am J Public Health*. 2009;99:520–5.
22. Australian Government. Defining quality for research training in Australia: a consultation paper. Department of Innovation Industry Science and Research ed. Canberra: Commonwealth of Australia; 2011.
23. Sarre G, Cooke J. Developing indicators for measuring research capacity development in primary care organizations: a consensus approach using a nominal group technique. *Health Soc Care Commun*. 2009;17:244.
24. Hulcombe J, Sturgess J, Souvils T, Fitzgerald C. An approach to building research capacity for health practitioners in a public health environment: an organisational perspective. *Aust Health Rev*. 2014;38:252–8.
25. Raschke N. The perceived research capacity and culture within non-metropolitan local health districts in NSW. Sydney: Health Education and Training Institute; 2017.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions



The preceding paper reveals several important facets of research training within a rural health organisation.

There is an inherent tension within a resource-constrained environment, such as a rural public health organisation, when it comes to ideal targets for research training: training those who are interested or those who are strategically important to train (Figure 12).

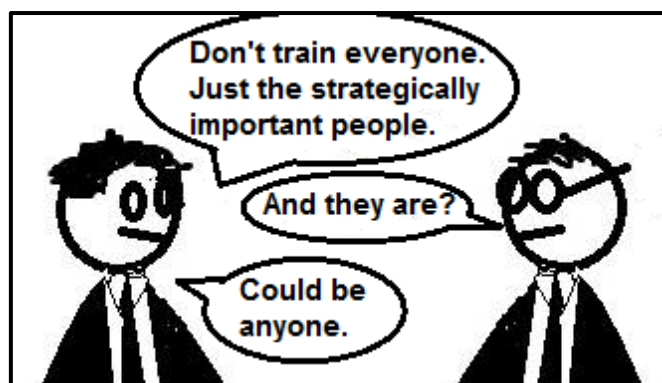


Figure 12: The tension inherent in choosing targets for rural research training

Resource constraint acts as a mechanism that influences who receives training. Ideally, those who are strategically important to train would be passionate about research, however this is not always the case. The personal drive to complete research does play a role as “high quality research is rarely produced by the unwilling” (Bernstein, 2014).

A revealing perspective was that rural organisations can be seen internally, as one of the study participants described, of being “too rural and too poor to do research”. This perception can be retroduced as a mechanism leading to decreased research activity and decreased investment in research.

Together, these two papers reveal structural inhibitors to research in rural health services that are visible, such as lack of organisational planning for research, blended with invisible inhibitors, such as a perception of being “too rural and too poor”.

While these factors have been considered as contextual, the stratified nature of reality inherent to critical realism mean that factors can be contextual in one circumstance, whilst simultaneously acting as outcomes or generative mechanisms in another circumstance. As an example, a lack of visibility of research occurring in a rural health organisation may be an *outcome* of research being afforded a low operational priority, and this lack of visibility can act as a *mechanism* that has the outcome of deterring staff from undertaking research. This co-existence as outcome and mechanism is not contradictory; instead it highlights the dynamic and complex interplay between context, mechanism and outcome (Vincent & O’Mahoney, 2014).

This chapter has explored the *context* for rural health workers and rural health organisations for research activity and research training. The next step in the process of uncovering explanatory mechanisms is to investigate *outcomes*.

Chapter 5: Outcomes of rural research training programs

Chapter 4 presented the opportunity to understand the context in which rural health research is undertaken. Understanding context is an important step in the search for generative mechanisms within a critical realist perspective (Vincent & O'Mahoney, 2014). Once context is understood, examining known outcomes provides the next foundation from which the retroductive search for explanation, the “what works for who in what circumstance” (Nielsen & Miraglia, 2017; Tikly, 2015) can be undertaken.

This chapter contains two papers examining the outcomes of rural research capacity building programs. Paper 4 (Schmidt & Kirby, 2016) is a project report on a small Australian research capacity building program conducted in remote New South Wales, regional Victoria and remote Northern Territory. Evaluation of this program provided opportunity to explore the short-term outcomes of a research capacity building endeavour along with some of the unique design features of this program.

Paper 5 (Schmidt et al., 2022) focuses on the long-term outcomes of a rural research capacity building program, this time in rural New South Wales, Australia. As these two studies are examining different programs and use different methods, they were conducted as independent studies.

5.1 Short-term outcomes of a rural research training program

The following paper describes the short-term outcomes of a rural and remote health research training program. It is important to note that the organisations examined in this paper are not the same organisations explored in Chapter 4. The organisation explored in Chapter 4 provided an example of an organisation working toward research training and there was no research training program exclusive to that organisation for which outcomes could be examined. Instead, the following research training program was conducted in different rural areas of New South Wales, Victoria and Northern Territory. The paper was published as:

Schmidt, DD & Kirby, S 2016, 'A modular approach to rural and remote research education: a project report', *Rural Remote Health*, vol. 16, no. 1, pp. 3609.

PROJECT REPORT

A modular approach to rural and remote research education: a project report

DD Schmidt¹, S Kirby²

¹*School of Public Health, The University of Sydney, New South Wales, Australia*

²*Broken Hill Department of Rural Health, Sydney Medical School, Broken Hill, New South Wales, Australia*

Submitted: 26 May 2015; Revised: 9 January 2016; Accepted: 14 February 2016; Published: 24 February 2016

Schmidt DD, Kirby S

A modular approach to rural and remote research education: a project report

Rural and Remote Health 16: 3609. (Online) 2016

Available: <http://www.rrh.org.au>

ABSTRACT

Introduction: A lack of support structures in rural and remote Australia has led to limitations in the ability of health services to develop research skills in their staff and to conduct research within their organisations. Distance, limited access to research expertise and a lack of established research networks are examples of structural contributors to limited research training and research activity.

Methods: To address this issue the Centre for Research Excellence in Rural and Remote Primary Health Care Research (CRE) established a Research Capacity Building Program (RCBP) in 2012. The program used a modular design built around hub sites at Alice Springs, Bendigo and Broken Hill. It sought to develop research skills in key health workers in collaboration with strategic primary healthcare (PHC) partners. These partners included health service organisations and federally funded networks designed to support the development of PHC. By training within the workplace and community, the program sought to develop research skills in novice researchers, with a view to building both individual and organisational capacity in health services research within their rural or remote environment. The RCBP was evaluated in late 2014. A survey was conducted using a combination of emailed paper questionnaires and phone surveys with trainees from the RCBP ($n=8$), the trainee's workplace managers ($n=4$) and staff of the CRE involved in supervising RCBP trainees ($n=8$). Participants were asked about both the processes and outcomes of the RCBP. Research skill development was assessed using the research spider instrument, a validated tool for assessing research confidence. This report both describes the RCBP and details the evaluation of the RCBP.

Results: This project has shown that in rural and remote Australia the use of collaborative processes and a decentralised capacity building research training model can develop research skills in rural or remote health workers and create potential for ongoing research activity. The RCBP produced measurable improvements in perceived research experience, with mean research spider



scores improving from 2.2/5 (standard deviation 0.5) to 2.8/5 (standard deviation 0.5), a change that was significant ($z=-2.8$, $p=0.005$). Projects completed through the program matched well with organisational goals of the partner organisations. Completing trainees and partnering organisations both expressed interest in ongoing research activity. The program's modular nature created local peer-support networks, with some additional cross-site collaboration.

Conclusions: Partnering with PHC organisations created the potential for ongoing PHC research activity, with organisational and individual interest in further research. The challenge for policy makers is to build on this potential by providing ongoing support for local research training.

Key words: Australia, research capacity building, rural and remote health services, staff training.

Introduction

Building research capacity is seen as a means of creating both locally relevant research, which informs practice, and the skills or organisational structures to enable ongoing research activities¹. A number of programs have attempted to solve the issue of building research capacity in the Australian rural health sector, notably the Australian Government's Primary Health Care Research, Evaluation and Development strategy and its Researcher Development Program²⁻⁵, and NSW Health's Rural Research Capacity Building Program⁶. Programs such as these demonstrate that outcomes for research capacity building, while difficult to measure, can be considerable and are often as the result of quite modest investment^{4,6,7}. In addition to building research skill, capacity building strategies stimulate an interest in undertaking further research⁸ in practice or policy related areas⁹, with small scale research projects leading to more ambitious research questions for larger scale, collaborative work³. Research capacity endeavours create an environment in which health professionals, policy makers and researchers can collaborate⁹.

The challenge of building rural and remote research capacity in Australia is complicated by many issues, many of which are structural issues beyond the scope of influence of the individual with an interest in research. These issues include a shortage of rural researchers, limited funding¹⁰, access to expertise¹¹ and the need for specific training in rural health research¹². Other structural challenges include busy

workloads with a lack of dedicated time to research and a lack of organisational support¹³. Many of these issues overlap: without access to knowledge, support and resources research activity does not occur, thus organisations do not see the value of research in action and may not see the need to support research activities within their sites. In these environments there is limited ability for an individual to undertake training in research or conduct research activity.

Given a lack of support structures in the rural health workplace, support may need to come from outside of rural health organisations, and one of the known drivers of successful research capacity building is meaningful collaboration¹⁰. Building meaningful collaborative relationships between university departments of rural health and rural clinical schools can assist health services and health providers to overcome limited access to expertise³.

It was in the context of these challenges that the Centre for Research Excellence in Rural and Remote Primary Health Care Research (CRE) created a Research Capacity Building Program (RCBP). This program aimed to:

- strengthen research capacity in those regions where the CRE operates (Bendigo, Alice Springs and Broken Hill)
- collaborate with key primary healthcare (PHC) organisations such as federally funded networks that are designed to support the development of PHC



and health service organisations in the geographical areas of responsibility

- build both individual and organisational capacity to undertake health services research, evaluation and development work
- develop, in collaboration with participating health service organisations, supervised, 'close to practice' research programs for novice researchers aimed at improving access to or performance of health services delivered by that organisation, individually or in partnership with other organisations
- develop a transferable capacity building program with supervision and support based on adult learning principles, to extend skills
- develop relationships with participating health service organisations
- promote the development of research writing skills and improve publications in the field of rural health services research.

The RCBP utilised philosophies of experiential learning and cultural constructivism, which can combine learning and research in a single framework¹⁴, namely that novice researchers learn research skills by undertaking a research project in a field of interest and importance to them and their organisation, and by associating with others undertaking research. This article aims to both describe the approach used within the RCBP and evaluate its effectiveness in meeting its aims as a development program.

The structure of the CRE RCBP was in response to the unique geographical challenges posed by the rural and remote landscape. Each faculty of the CRE hosted two or three trainees, with each site providing a postdoctoral researcher who acted as the research supervisor for trainees at that site. Thus the RCBP was designed in a modular fashion: a single program across three hub sites (Alice Springs, Bendigo, Broken Hill) which acted as self-contained units or 'modules', with both a vertical support structure, which allowed access to supervision and expertise from CRE staff, and a horizontal or peer support network within and across sites.

Research trainees were chosen with the support of the trainee's organisation, and projects needed to demonstrate congruity with CRE goals. Training was by a single short course in research methods, with a range of research topics (Table 1), although additional research methods mentoring was available by regular or ad hoc teleconference. The short course was followed by smaller group meetings at each hub site, which were facilitated at the discretion of the CRE staff at each hub site. Supports for trainees included mentoring over the 2-year period, and regular teleconference support was offered on a monthly basis.

Trainees were funded and supported by their workplaces to dedicate approximately 1 day per week on their research project, either as a day weekly or in blocks of time to balance research and usual workloads. Trainees were able to access library, statistical and technical support from staff at the CRE hub sites.

Projected outcomes of the RCBP included presentation of research findings at a workplace or organisational level and at an appropriate conference. A formal research report was required and trainees were required to submit an article to a peer-reviewed journal on completion of the research reporting phase.

Methods

Evaluation of the RCBP used a cross-sectional study, and a questionnaire adapted from that developed by McIntyre et al⁸, who provided permission to use the questionnaire in full or in part. Invitations to participate were sent by email by the one of this study's authors (SK), along with a participant information sheet, consent form and questionnaire to research trainees ($n=8$), managers ($n=4$) and CRE staff ($n=8$).

Only four managers were contacted due to lack of manager contact details or requests from trainees to not contact their manager. Questionnaires were completed and returned by email or completed verbally by phone with either the lead author (DS) or co-author (SK) if preferred. The survey was conducted at the completion of the 2-year RCBP period.



Table 1: Topics taught in research methods short course

Field	Topics
Quantitative research	Case study scenario Overview of main quantitative research strategies Introduction to bias in research Measures of frequency and association Questionnaire design Critically reviewing quantitative literature
Qualitative research	Qualitative research: core concepts Interviews Focus groups Coding and analysis Critically reviewing qualitative literature
Project development	Group and individually mentored project development sessions

Self-assessed research experienced was assessed using the research spider tool developed by Smith et al¹⁵, which is a commonly used tool for measuring self-reported research experience in 10 domains of research practice. Participants completed the baseline spider after an introductory research methods workshop that also included non-RCBP trainees. The spider was reassessed at program completion. Additional questions on support aspects of the RCBP were rated on a five-point scale from 1 ('very supportive') to 5 ('not at all supportive').

Due to the small numbers in each group of this study no attempt was made to complete detailed statistical analysis of findings, with the exception of accumulated research spider data, which was analysed using the same method applied by Harding et al, who used the Wilcoxon signed rank test to compare pre- and post-training scores and reported scores as mean and standard deviation⁷. All other responses were aggregated where appropriate, with the goal of providing as comprehensive an understanding of the RCBP as possible. Collation and analysis of the study data was completed by the lead author (DS) and analysis was completed using Excel and GraphPad software.

Ethics approval

Ethical approval was granted by the University of Sydney Human Research Ethics Committee (ref 2014/007).

Results

Responses were received from trainees ($n=7$ from 8), managers ($n=4$ from 4) and CRE staff ($n=8$ from 8), giving an overall response rate of 95%. The profile of the trainees engaged in the RCBP is shown in Table 2. All trainees came originally from nursing, allied health or population health backgrounds, all of which are traditionally female dominated.

Trainees applied to the RCBP for the purpose of developing research skill or to evaluate an existing work practice. Some saw an opportunity to experience research without committing to a research higher degree. Managers supported application to the program on the basis of organisational need and benefits, with personal development of the trainee often a secondary consideration.

While trainees were funded at the rate of A\$25,000 per participant to their employing organisation to undertake their project for 1 day per week, substantive workloads necessitated flexibility about the allocation of research time at points along the research journey and sometimes involved additional days or additional work out of paid hours. While four of the seven trainees largely used 1 day per week, some trainees used block release from time to time, which allowed the capacity to focus more comprehensively on the project.



Inability to quarantine time was reported as major barrier to progress.

Trainees were often required to work away from their regular workplace. Five trainees completed their projects whilst working from home, at a CRE campus or other offsite location. For those continuing to research at their existing workplace, managerial support and intervention facilitated project time.

Impact of undertaking the RCBP on the trainee's substantive role ranged from none to very substantial in the opinion of trainees and managers, with little agreement between managers and the trainees where responses could be paired.

Aspects of the support and supervision provided to trainees through the RCBP are summarised in Table 3.

At completion of the RCBP, two trainees had completed their research report, with three more in draft or partially complete and a further two trainees yet to complete. Four of the seven trainees had presented their research in a work or scientific forum, which included professional meetings, health service board meetings and a PHC research conference. Publication of research findings was a goal for the trainees, with one article accepted to the journal *Rural and Remote Health*, two stating that their manuscript was ready to submit and a fourth indicating two articles would be written in the coming months.

All trainees indicated that they would consider future research. Managers indicated that the RCBP experience was useful in encouraging future research by the trainee and within their organisation, provided future research activity is compatible with the organisational goals and sufficient alignment between the supporting organisation and the CRE is available.

Discussion

This project has shown that in a rural and remote area structural limitations to research training can be overcome by using a decentralised program spread across three hub sites in a modular fashion. Research activity was increased in those

regions where the CRE operates and collaborating with key PHC organisations in the geographical areas of responsibility built both individual and organisational capacity to undertake health services research, evaluation and development work.

The structure of the RCBP had some advantages, including the ability to adapt processes to suit the local needs of each site, the availability of both supervision and resources at a (relatively) local site and a cluster of peers at the same site. However, peer support between trainees appeared to occur primarily within clusters around the hub sites, thereby limiting the opportunities to build a broader support network, share resources or coordinate learning approaches between sites.

Demonstrating the effectiveness of programs such as the RCBP to build research capacity at a system or organisational level can be difficult. Webster et al examined the perspective of candidates, their managers and providers of NSW Health's Rural Research Capacity Building Program and found that participants reported that their research skills had improved and that they felt supported⁶. However, the consensus was that the processes within the participating organisations worked against achieving the goal of improving research capacity. Similarly, McIntyre et al surveyed participants of the PHC Research Development Program and found that most of participants agreed that the program was a valuable experience and that they were interested in undertaking further research⁸. The authors reported that their results indicated that this program had a positive effect on the program Fellows in terms of knowledge of research, attitude to research, and the way they used research in their work.

When the RCBP is examined alongside the criteria for measuring research capacity building in health proposed by Cooke¹ and further developed by Sarre and Cooke¹⁶ there are some elements of the RCBP that are likely to lead to increased research capacity. These include:

- skill development of the individual
- research that is close to practice for the individual
- research activity within the organisation
- dissemination of research findings
- leadership (on behalf of the CRE).



Table 2: Demographic characteristics of Research Capacity Building Program trainees

Characteristic	n
Age (years)	
31–40	1
41–50	3
51–60	3
Sex	
Female	7
Profession	
Allied health clinician	2
Manager	1
Mental health/community development	1
Nursing	1
Population health	1
Location	
New South Wales	2
Northern Territory	1
Victoria	3
Western Australia	1
Length of time with current employer (years)	
2–5	1
>5	6
Employer type	
Government	3
Non-government organisation	3
Private	1
Time since graduation as primary healthcare professional (years)	
6–10	2
11–20	1
>20	3
N/A	1

N/A, Not applicable: no primary healthcare professional qualification

Table 3: Supervision and support ratings of trainees, managers and Centre of Research Excellence staff

Support mechanism	Support rating (median (min–max))	Level of support	Comments
Manager support	1 (1–5)	Very high	Support higher where project aligned closely to existing work role
Centre of Research Excellence supervision	1 (1–3)	Very high	Supervision varied with stage of the research project. Input varied from 1 or 2 times per week to monthly
Short course in research methods	1.5 (1–3)	High – very high	Trainees found volume of material overwhelming. Offset by peer interactions at course
Peer support from other trainees	2.5 (1–4)	Moderate to high	Centred around hub sites with lesser amounts of cross-site collaboration
Teleconference support	3 (2–3)	Moderate	Low levels of engagement, but content valued



Less evident were aspects such as:

- continuity and sustainability of research activity
- establishment of a research culture within the organisations
- linkages and partnerships (beyond the relationship between the CRE and partnering organisations)
- investments in (research) infrastructure.

When considering self-reported research experience, several trainees indicated they had some prior research involvement through their previous work roles. However, the group as a whole displayed limited self-rated research experience at commencement. Figure 1 displays mean research spider response for the group at commencement and completion. The mean research spider scores improved from 2.2/5 (standard deviation 0.5) to 2.8/5 (standard deviation 0.5), a change that was significant ($z=-2.8$, $p=0.005$).

Some perspective on the growth of trainees can be achieved by comparing the work of Smith et al¹⁵. At commencement RCBP short course trainees indicated research experience equivalent to that of a 'recipient of [a small] bursary and/or author of non peer-reviewed article(s) or letter(s)'¹⁵.

At completion of the RCBP trainees reported experience equivalent to 'a holder of research grant funding between £5000 to £10,000 and/or author of at least two peer-reviewed publications'¹⁵.

This growth is particularly notable given the lack of funding opportunities and support otherwise available in a remote or outer rural area.

It is evident from this project that the RCBP was valued by trainees who participated in the RCBP. The level of engagement was extremely high and a program completion rate of 87% compares extremely favourably with the program's closest parallel, NSW Health's Rural Research Capacity Building Program, which has a completion rate of 72%¹³. Outputs from the RCBP are comparable in terms of

reports, publications and presentations to other Australian workplace-based novice researcher programs^{4,7,17}.

Many of the challenges facing the RCBP are those experienced by other education or training programs operating in the rural health environment and include isolation, the tyranny of distance and the challenge of remote support^{6,12,13,18}. Increased use of technologies such as video or web conferencing might have overcome some of the usual difficulties associated with rural and remote professional development for health professionals.

Continuity and sustainability are key elements of successful research capacity building^{1,16}. Whilst this program continues to see outputs from the research undertaken, both in terms of publications and ongoing practice change, the future of the capacity building efforts is contingent upon ongoing funding.

While this evaluation had a high engagement rate, with 19 of a possible 20 participants responding, the RCBP is a small program with a single cohort so there is a limit to how much can be drawn from the data. The use of a survey based data collection was a pragmatic choice which by its nature limits the depth of the data being collected; however, this is offset by the involvement of a range of key stakeholders, which provided a comprehensive overview of the program and its outcomes.

Conclusions

The program has produced outcomes that are consistent with building research capacity in health. It has met many of its establishment goals, demonstrating that through collaboration and a decentralised, modular model rural and remote research training is achievable. Measurable improvements in research experience created organisational and individual potential for ongoing PHC research activity. Ongoing support for local research training would build on this potential by enabling ongoing rural and remote research activity.

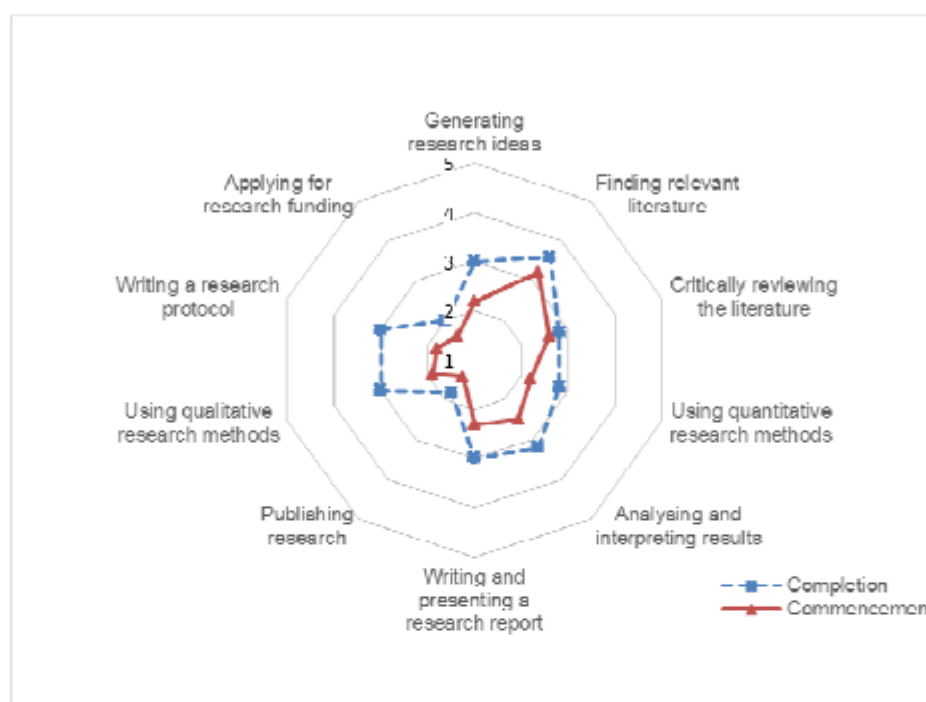


Figure 1: Trainees' mean self-assessed research experience at commencement and completion of Research Capacity Building Program, rated from 1 (no experience) to 5 (very experienced).

References

1. Cooke J. A framework to evaluate research capacity building in health care. *BMC Family Practice* (Internet) 2005; **6**: 44. Available: <http://www.biomedcentral.com/1471-2296/6/44> (Accessed 11 September 2011).
2. Bailey J, Veitch C, Crossland L, Preston R. Developing research capacity building for Aboriginal & Torres Strait Islander health workers in health service settings. *Rural and Remote Health* (Internet) 2006 **6**(4): 556. Available: www.rrh.org.au (Accessed 18 April 2012).
3. Birden HH. The researcher development program: how to extend the involvement of Australian general practitioners in research? *Rural and Remote Health* (Internet) 2007; **7**(3): 776. Available: www.rrh.org.au (Accessed 18 April 2012).
4. Cameron HE, Boreland FT, Morris JR, Lyle DM, Perkins DA, Magin PJ, et al. New South Wales and Australian Capital Territory Researcher Development Program 2005-07: modest investment, considerable outcomes. *Australian Journal of Primary Health* 2013; **19**(1): 59-67.
5. Brown LJ, McIntyre EL. The contribution of primary health care research, evaluation and development-supported research to primary health care policy and practice. *Australian Journal of Primary Health* 2012; **20**(1): 47-55.
6. Webster E, Thomas M, Ong N, Cutler L. Rural research capacity building program: capacity building outcomes. *Australian Journal of Primary Health* 2011; **17**(1): 107-113.
7. Harding KE, Stephens D, Taylor NF, Chu E, Wilby A. Development and evaluation of an allied health research training scheme. *Journal of Allied Health* 2010; **39**(4): e143-148.



8. McIntyre E, Brun L, Cameron H. Researcher development program of the primary health care research, evaluation and development strategy. *Australian Journal of Primary Health* 2011; **17(1)**: 114-121.
 9. Jansen MWJ, Hoeijmakers M. A masterclass to teach public health professionals to conduct practice-based research to promote evidence-based practice: a case study from The Netherlands. *Journal of Public Health Management and Practice* 2013; **19(1)**: 83-92.
 10. Dunbar JA. Building capacity for rural and remote research. *Australian Journal of Rural Health* 2010; **18(4)**: 133.
 11. Brett T, Sherrard R, Bower A. Research capacity building in general practice: a new opportunity in Fremantle, WA. *Australian Family Physician* 2006; **35(1-2)**: 65-66.
 12. Taylor J, Hughes C, Petkov J, Williams M. Unique issues in research and evaluation in rural and remote locations: is there a place for specific research training? *Rural and Remote Health* (Internet) 2005; **5(2)**: 351. Available: www.rrh.org.au (Accessed 6 August 2013).
 13. Schmidt D, Robinson K, Webster E. Factors influencing attrition from a researcher training program. *International Journal for Researcher Development* 2014; **5(1)**: 56-67.
 14. Stauffacher M, Walter AI, Lang DJ, Wiek A, Scholz RW. Learning to research environmental problems from a functional socio-cultural constructivism perspective. *International Journal of Sustainability in Higher Education* 2006; **7(3)**: 252-275.
 15. Smith H, Wright D, Morgan S, Dunleavy J, Moore M. The 'Research Spider': a simple method of assessing research experience. *Primary Health Care Research and Development* 2002; **3(3)**: 139-140.
 16. Sarre G, Cooke J. Developing indicators for measuring research capacity development in primary care organizations: a consensus approach using a nominal group technique. *Health & Social Care in the Community* 2009; **17(3)**: 244-253.
 17. Ried K, Montgomery BD, Stocks NP, Farmer EA. General practice research training: impact of the Australian Registrar Research Workshop on research skills, confidence, interest and involvement of participants, 2002-2006. *Family Practice* 2008; **25(2)**: 119-126.
 18. Lloyd B, Pfeiffer D, Dominish J, Heading G, Schmidt D, McCluskey A. The New South Wales Allied Health Workplace Learning Study: barriers and enablers to learning in the workplace. *BMC Health Services Research* (Internet) 2014; **14(1)**: 134. Available: <http://www.biomedcentral.com/1472-6963/14/134> (Accessed 27 March 2014).
-

This study reveals that, as intended, training rural and remote health workers via an experiential learning program increases self-assessed research experience. This is unremarkable as a short-term outcome as this was one of the goals of the program. Achieving this increased experience along with increased research activity and increased research capability in a widespread cohort of rural or remotely-based health workers, many of whom were geographically isolated from other learners within the program, is certainly valuable. The issue of geographic isolation is accompanied and compounded by social isolation from other learners (Figure 13).

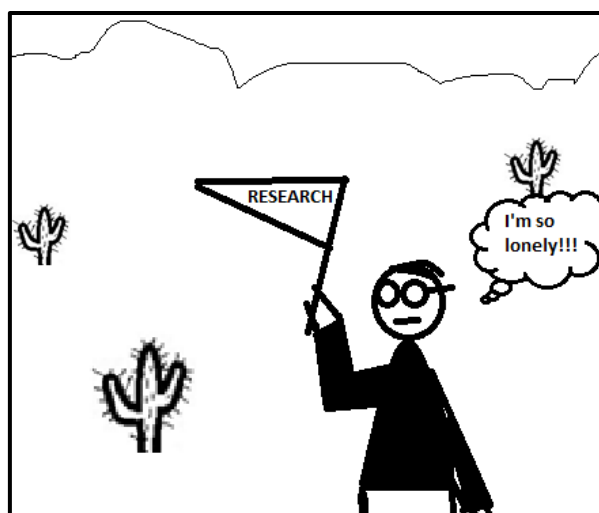


Figure 13: The social and geographical isolation of rural and remote research trainees

Social support is hypothesised as a factor in retaining rural researchers in workplace-based training programs (Schmidt, Robinson & Webster, 2014). The structural design solution in the research capacity building program (RCBP) described in this chapter is in itself a mechanism to produce connectedness and support, whilst being in and of itself a structure that enables researchers to undertake training. This is another example of how an understanding of stratified reality allows an entity such as program design to be seen as concurrently acting as a structure and a mechanism at different levels, in what has been referred to as a 'laminated system' (Bhaskar, 2008a; Gatenby & Rees, 2014).

One outcome of increasing research experience and research capability in rural health workers is the potential for that new capability to translate into an increase in individual agency. Given the short-term nature of the RCBP, it is difficult to explore whether this occurred. The next paper will examine long-term outcomes of a rural research capacity building program, where issues such as the role of individual agency are examined.

5.2 Long-term outcomes of a research training program

The results from this previous study, with relatively minor investment leading to increased activity, increased experience and increased capability, are typical of the outcomes of this type of capacity building endeavours. Other programs such as the NSW Health Rural Research Capacity Building Program (RRCBP) (Schmidt, Webster & Duncanson, 2019) and the New South Wales and Australian Capital Territory Researcher Development Program (Cameron et al., 2013) have shown similar outcomes.

The difficulty with programs of this type, such as the RCBP featured in Paper 4, is that these initiatives are typically both funded and evaluated in the short term (Ramkalawan & Dieppe, 2008). While short-term evaluation is appropriate for a limited funding period, it restricts those wishing to make decisions on investing in research capacity building to short-term outcomes and the longer-term outcomes are not known, or are described in broad, aspirational terms such as those aimed for in the capacity building literature (Cooke, 2005; Sarre & Cooke, 2009).

One exception to the short-term funding issue is the RRCBP, which has been funded and conducted in rural NSW, Australia since 2006 (Schmidt, Webster & Duncanson, 2019; Webster et al., 2011). The long-running nature of this rural research capacity building program means it offers an opportunity to observe and report on the long-term outcomes of such a program.

This study examining the long-term outcomes of the RRCBP was undertaken and is published in *BMJ Open* as:

Schmidt D, Duncanson K, Webster E, et al. Critical realist exploration of long-term outcomes, impacts and skill development from an Australian Rural Research Capacity Building Programme: a qualitative study. *BMJ Open* 2022;**12**:e065972. doi: 10.1136/bmjopen-2022-065972

BMJ Open Critical realist exploration of long-term outcomes, impacts and skill development from an Australian Rural Research Capacity Building Programme: a qualitative study

David Schmidt ^{1,2}, Kerith Duncanson,¹ Emma Webster,³ Emily Saurman,⁴ David Lyle⁴

To cite: Schmidt D, Duncanson K, Webster E, *et al.* Critical realist exploration of long-term outcomes, impacts and skill development from an Australian Rural Research Capacity Building Programme: a qualitative study. *BMJ Open* 2022;**12**:e065972. doi:10.1136/bmjopen-2022-065972

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-065972>).

Received 24 June 2022

Accepted 08 November 2022



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Rural and Remote Portfolio, NSW Health Education and Training Institute, Gladesville, New South Wales, Australia

²School of Public Health, The University of Sydney, Sydney, New South Wales, Australia

³School of Rural Health, The University of Sydney, Dubbo, New South Wales, Australia

⁴Department of Rural Health, The University of Sydney, Broken Hill, New South Wales, Australia

Correspondence to

David Schmidt;
David.Schmidt@health.nsw.gov.au

ABSTRACT

Objectives Research capacity building programmes usually only examine short-term outcomes, following up participants after 1 or 2 years. Capacity building in health research requires a long-term view to understand the influence and impact of capacity building endeavours. This study examined long-term outcomes for individuals regarding the maintenance and use of research skills and the conduct of real-world research in a rural area. We also explored the changes individuals had seen in their career, work team or organisation as a result of this training.

Design A qualitative study underpinned by critical realism and based on interviews and focus groups with graduates of the Rural Research Capacity Building Programme (RRCBP), a researcher development programme that has been delivered since 2006.

Setting Rural and remote areas of New South Wales, Australia.

Participants 22 graduates of the RRCBP from the 2006 to 2015 cohorts (20 female, 2 male). All were experienced rural-based health workers at the time of training.

Results Focus groups and interviews yielded three themes about capacity building outcomes: (1) developed research capable individuals; (2) embedded research capability into teams and (3) real-world research that makes a difference within an organisation.

Conclusions Research training improved graduates' skill, experience, confidence and employability. Research capable individuals enabled others, enhancing team research capacity and raising the profile of research within their organisation.

Training in research, alongside tangible organisational support for research activity, creates real-world impacts for policy and clinical practice. Providing ongoing opportunities for researchers to undertake research would enhance return on investment and assist with retention of experienced staff.

BACKGROUND

The health of rural people is characterised by poorer health outcomes, associated with limited access to health services.¹ Rural

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This is the first study to examine long-term outcomes of a clinician researcher development programme in a rural area.
- ⇒ A critical realist framework allowed explanation of the underlying mechanisms that led to change for the individual, their team or organisational.
- ⇒ Stratified sampling was used to ensure participants with a range of experiences were included, however, it is possible that those who have been less connected with programme peers postgraduation were less likely to participate.
- ⇒ There is a potential lack of generalisability to other settings, but the rigour in analysis and theory along with existing literature indicate the findings may be applicable in other settings.

research capacity building is seen as one way for rural health organisations to understand and remediate this disparity.² Research in rural areas presents its own challenges and a need for specific rural research training has been identified.^{3,4} Numerous workplace-based programmes have been introduced to address rural health research capacity including scholarships, training in place, fellowships, participatory approaches and other capacity building endeavours.^{5–12}

There is a call for researchers to be embedded within rural health organisations.^{12,13} While this is consistent with known research capacity development principles,¹⁴ information on long-term outcomes of research capacity building endeavours is scant, with most programmes typically funded short term and with limited follow-up.¹⁵ Measuring research capacity building is complex¹⁶ and success in health services research development is often under-reported.¹⁷

The Rural Research Capacity Building Programme (RRCBP) was established in 2006 to improve research capability and capacity in rural New South Wales, Australia. The programme was intended as a response to the low levels of research activity and research skill in rural areas,¹¹ and supports rural clinicians to undertake a self-selected research project with an accompanying education programme aimed at building research experience.¹⁸ Clinicians enrolled in the RRCBP are based in rural or remote areas of New South Wales, Australia, and receive project funding and mentoring in addition to education support.^{11 18} Research is not routinely conducted by rural clinicians¹⁹ and in some cases these clinician-researchers may be the only person in their facility with research experience.²⁰

The RRCBP, unlike similar programmes,^{21 22} has received ongoing funding. The RRCBP and its adjunct educational strategies have demonstrated efficacy in increasing self-reported research experience,¹⁸ improving publication rates,²³ retaining researchers to complete the programme²⁰ and building research capacity.¹¹ Internal evaluation findings indicate that RRCBP candidature can be transformative, personally or professionally, beyond the field of research.

Since 2006, 245 rural health workers have received research methods education and training, with 137 completing their research project and submitting a report detailing their findings (graduates) at the time of this study. While research experience and some capacity has been built,^{11 18 23} long-term outcomes for programme candidates or the rural health organisations they work for has not yet been examined.

The aim of this study was to understand the impact of undertaking research training for graduates, their careers and their organisations.

METHODS

Study design

This qualitative study was underpinned by critical realism. Realist approaches uncover what works for whom, and in

what circumstance.^{14 24 25} Critical realism facilitated the exploration of the context of research skill development and the mechanisms underlying these changes.

Sampling and recruitment

One hundred and thirty-seven graduates from the 2006 to 2015 RRCBP cohorts were eligible to participate. Of these, 113 had remained in contact and were stratified by training cohort as 'early' (2006–2010) or 'recent' (2011–2015), and then by known research activity since graduation; either research active, not research active, or those whose research activities were unknown. Research activity was determined by recent contact from graduates and confirmed by a search of Google Scholar for post-graduation publications. Graduates who had not made recent contact with programme coordinators and who had not published in peer-reviewed publication were designated as research status unknown. From these six subgroups, individuals were randomly selected by an independent administration officer and invited via email. Individuals who were unavailable, uncontactable or who declined were replaced by another randomly selected person from that subgroup. Potential participants were sent a reminder email 2 weeks after the initial invitation if no response was received. Recruitment continued until the subgroup was represented by five participants or the subgroup list contained no other eligible participants. A recruitment flow chart is seen in figure 1.

Data collection

Individuals were invited to an online focus group to stimulate discussion and allow ideas to develop among participants. Those who wished to participate via individual interview were accommodated. Focus groups and interviews were conducted by an independent facilitator (ES) and were digitally recorded. All recordings were transcribed by a professional transcription company and deidentified by the facilitator.

After the first focus group, a debrief was undertaken, with the facilitator and lead researcher refining the focus group and interview strategy.

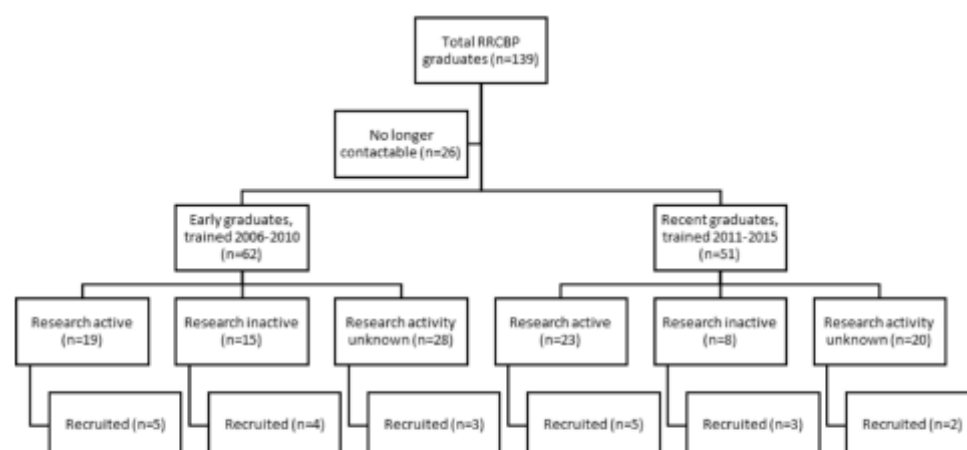


Figure 1 Recruitment flow chart. RRCBP, Rural Research Capacity Building Programme.



Four focus groups were held, with 4 participants per group, and 6 individual interviews conducted; a total of 22 participants sampled from the 6 subgroups.

Data analysis

Qualitative analysis was completed by DS using the cut-and-paste method of coding and thematic development.²⁶ Three coresearchers (ES, KD and EW) independently analysed randomly selected transcripts (one focus group and two interviews each) to ensure veracity of themes and corresponding subthemes. Theme refinement occurred through an iterative process of discussion and rereading transcripts. This staged inductive process was then considered deductively against Cooke's framework for capacity building, using the structural levels of the individual, their immediate work team and the hosting organisation.²⁷ Factors described as 'superorganisational' or outside the individual's organisation²⁴ were deemed unlikely to be affected by individual training and were therefore not included in the analysis.

The lead researcher (DS) read all transcripts with a view to assessing data saturation. After three focus groups and four interviews, no new ideas emerged and the remaining focus group and interviews ensured confidence in concept identification. When all team members reached agreement on the final iteration, analysis was deemed complete.

Reflexivity and rigour

Two of the researchers (DS and KD) are coordinators of the RRCBP and a third (EW) is a former coordinator. The use of an arms-length recruitment and independent facilitator was accompanied by a process of bracketing preconceptions²⁸ and oversight of theme development by independent researchers (ES and DL).

Patient and public involvement

No patient involved.

The original protocol for the study has been uploaded as online supplemental file along with a copy of the interview/focus group schedule.

RESULTS

The demographic characteristics of study participants are outlined in table 1. All graduates were rurally based at the time of their training. To maintain participant anonymity, professions were classified as nursing, allied health or other profession which may include Aboriginal health worker, doctor, health promotion officer, health manager, paramedic or project officer.

Three themes and their relationship to the structural levels of individual, team and organisational levels proposed by Cooke²⁷ emerged.

Developed research capable individuals

The programme successfully developed research capable individuals. Graduates identified (1) Growth in knowledge, skills, authority and confidence, (2) Ongoing

Table 1 Demographic details of graduates participating in the study (n=22)

	n (%)
Gender	
Female	20
Male	2
Profession	
Nursing	8
Allied Health	10
Other	4
Recency of training	
Recent (2011–2015)	10
Early (2006–2010)	12
Research activity post-training	
Research active	10
Research inactive	7
Research status unknown*	5

*Research status unknown at time of recruitment.

research activity and (3) Personal and professional transformation.

Growth in knowledge, skills, authority and confidence

Learning about and undertaking research was a means for graduates to extend themselves, both from a personal sense but also providing new career directions. Participants reported their understanding of research had improved, building on existing skill sets and knowledge.

What the program allowed me to do was to understand a much broader range of research methodologies and approaches. Focus Group 2

Knowledge and expertise development was unsurprising, given the educational goals of the programme.¹⁸ However, undertaking a research project was pivotal to the development of a range of transferable or 'soft' skills including project management, communication techniques and critical thinking; strengthening attributes that were useful in other roles or settings. Critical thinking in action is a known indicator of research capacity building at an individual level.²⁷

Maybe I can't articulate it perfectly, but the ability to uncomfortably question, to sort of reflect in that space and sit in a space of discomfort to evaluate something surrounding yourself... so those kind of critical thinking skills and evaluation skills go with you in every aspect of your work. Focus Group 2

Ongoing research activity

One result of developing research capable individuals was ongoing research activity; this included using their expertise to attract grant funding and extend their research activity.

There were opportunities to apply for sort of grant money to do other kinds of [research] projects and that then created new relationships and added to the body of evidence around that. Focus Group 1

Ongoing research activity did not always equate to independence or leading their own research agenda. This highlights the foundational nature of the training.

The project that I did with [a non-government organisation] recently... I actually did it all by myself, which I found I could do and I knew how to do... I think the project that I did in 2006 really taught me those skills and I know those skills but I just didn't feel confident to do that and the next one on, like totally on my own. Focus Group 1

Having research experience through the RRCBP enabled some graduates to take up new roles to pursue research opportunities.

I think everybody has moved onwards and upwards in roles, and I'm sure that, personally, the program helped me with a promotion upwards and, you know, it's good in that sense. Focus Group 2

Other graduates progressed to further formal study via higher degree research, often an extension of their research project with the programme.

I was very fortunate I was able to springboard my research into a master's degree. Focus Group 4

Not all graduates remained active in research, however the programme had value as a learning experience and their interest remained.

I'm not doing research, and I haven't done any research, but what I am surprised about is how much interest I maintained in research, and other people's research. Focus Group 2

A lack of research activity was not always due to individual factors. Organisational factors also influenced their ability to undertake research, including fitting research into a busy caseload. A lack of research opportunity impeded ongoing research activity for some graduates and for others around them.

With opportunity, I believe I've got the skills that I could contribute to further research in related areas ... but there's so little research happening that there aren't any people to supervise. Focus Group 4

Personal and professional transformation

Graduates described transformative aspects of learning including a sense of belonging in the world of research, with connections to others outside their immediate workspace. Transformational learning can refer to a process that encourages the learner to question and potentially change their worldview.²⁹ The sense of becoming part of the world of research extended to having and owning specialist knowledge of research tools, language and business processes. Similarly, transformation occurred when

graduates were challenged in their ways of thinking and the assumptions underlying these thought processes.

It sort of taught me that you can reach out to a lot of different people and that they're more than willing to help you ... it made me more empowered to look beyond my own patch.

Focus Group 3

The sense of becoming part of the world of research extended to having and owning specialist knowledge of research tools, language and business processes. Similarly, transformation occurred when graduates were challenged on their ways of thinking and the assumptions underlying these thought processes.

I was mentored by an Aboriginal man from [the university] which was really helpful. He would challenge me on a regular basis about my way of thinking. Focus Group 4

Embedded research capability into teams

The graduates' research experience led to changes within their immediate work teams. They became 'resource people' within the workplace for research or evaluation activities; a role that included providing feedback on research and evaluation proposals, providing guidance and adding rigour to existing activities.

I give feedback to peoples' quality improvement projects and I actually really like doing that. I wouldn't say it's pure academic research, but it's using the methodology of research, of a research project and applying that to smaller projects that are more practical. Focus Group 4

There's a project that was happening ... [and] I was able to sort of help them with [the ethics application], and they're really happy that they've done it. So that's as a direct result of my being in the program. Focus Group 2

This contribution to the skill development of others was a way to develop local research capability and embed local researchers into projects. The process of building research activity and capability were part of creating a local culture of research.

We can actually influence other people either informally by—with their work or encouraging them to do research or to encourage it within a discipline or a department, or other people to do the [RRCBP], or even just set a culture of research around where we work. Focus Group 2

Moving beyond the role as resource person, graduates became active collaborators or facilitators of research. Those in leadership positions engaged with and facilitated research activity within their local teams. Others began collaborating with fellow RRCBP graduates or current RRCBP trainees.

I've had a couple of staff members that are that are currently enrolled in the same program and we've sort of been involved in a number of orthopaedic and other projects as well in the department. So I think it really fuelled my already existing interest and passion in research and maybe gave me a little

bit of confidence to continue to support people to do that.
Focus Group 1

Graduates were able to use their interest in research to promote and facilitate research across departments and districts. They were now setting the agenda and making research part of it.

So the department didn't have a strong research focus before, but we're really developing that now. It's on every agenda, we've got a team looking at it, we're constantly looking for grants to field how we can build research around what we're doing. Focus Group 2

Real world research that makes a difference within an organisation

Participants wanted their research to be of value to the organisation and to make a difference in care for consumers. Making a difference was seen through: (1) research that influenced policy, practice and culture, (2) organisational support for research education and activity, and (3) retaining skilled workers within the organisation.

Research that influences policy, practice and culture

Graduates wanted to lead and engage with research that had impact and importance for clinical practice and underlying policy. They made a clear distinction between real-world, clinician-led research and theoretical research led by university academics, which was seen to be disconnected from clinical practice.

I think that's probably what we as rural researchers, we're going to research something that's really practical, something that's really doable, not something that's sort of very theoretical... We need stuff that we can actually put into action now. Focus Group 2

Using research to improve services justified the effort required to undertake clinical research, even when those changes were not what was expected or hoped for. The quality of the graduates' research was important for establishing credibility, which was necessary for practice change to be embraced. For some, the fact that the research was conducted by a clinician added to that perceived credibility.

I think once you can see that it can translate to service enhancements, and those sorts of things that everyone's talking about then you realise that there's such a huge benefit. Focus Group 3

I think that because [the research] had been done in quite a robust way and we were reporting it very clearly and very open with 'this is exactly what happened and what we found' and gave people kind of confidence to work with [the findings]. Focus Group 1

While changes that resulted from the graduates' research included system level and local changes, not all projects had a demonstrable impact on policy or practice.

It really sort of started a little spark in my brain about being interested in how to drive sort of large system level change... really trying to better create evidence that helps us know whether what we're doing is making a difference, and particularly models of care. Focus Group 1

I still have a clinical role and research—particularly the research that... led from my Rural Research Capacity Building Project has changed the way that I see my clients... there's been a big difference in the way I treat clients. Focus Group 3

I think from my research project, it hasn't, unfortunately, sort of been translated into practice much.... Interview 6

Some felt that their research contributed to change in clinical practice without change necessarily being the key driving factor.

I think that the practice for the cohort of patients that I wrote about has changed, but I don't think it was as a result of my research paper, but I think it contributed to the body of knowledge around the area. Focus Group 2

Others felt that their research was controversial or unpopular. While these projects may not have led to a policy or process change, the research activity and distribution of findings created discussion. There was also demonstrable resilience developed in response to these challenges.

I got attacked by people sometimes about my project. I thought, really, is it that polarising? Butit started a conversation at least. So there's still no resolution necessarily but people in [my profession] are talking about it. Interview 1

Graduates felt that research influenced the culture of the hosting organisation where recommendations were embraced and implemented. When recommendations were not implemented, the impact of the research was perceived to be minimal. In some workplaces research activity led to research becoming integrated into everyday work.

I worked with the [local] Aboriginal Medical Centre, but we had all the recommendations implemented that were in the report, and so that was a big change and there was a big cultural shift... it had a huge impact I think on our service. Focus Group 1

[The program] is bringing research into the workplace so influencing other people, encouraging other people, making research part of the language of the workplace. ...I think you'll find that every person that's been on the program, the area that they work in has – research has a higher profile in some shape or form than if they hadn't been on the program. Focus Group 2

Support for research education and activity

Support for research education and activity within the workplace was mixed. When support was lacking, high degrees of autonomy were required by the researcher.

I can't say I was totally surprised, but I didn't get any support from the health service. I did it all in my own time, basically. Focus Group 4

Other participants were well supported locally but that wasn't necessarily matched at higher organisational levels. Engaging leaders within the organisation was critical for obtaining dedicated time and resources for research learning and activity. Support for research activity was perceived as being linked to how closely the proposed topic aligned with organisational goals, or at least did not interfere with organisational functioning.

I don't think there's any particular encouragement. I haven't seen any managers who are resistant, but I wouldn't say any of them see it as any sort of priority. If they can do it with only moderate inconvenience to them, they'll support it. But, if not, it's not something that's on their radar. Focus Group 4

Graduates identified a gap between the rhetoric of research being valued and the reality when conducting research activities in the workplace. Engagement and endorsement from senior management was required to conduct the research and for research to enable change within the organisation. Graduates indicated the competing priorities faced by rural health organisations and the impact that this may have on support for research.

You can have all the structure in the world; if research is not a priority to senior management it ain't going to happen. Focus Group 4

Retaining skilled workers in the organisation

For some participants, the programme reinvigorated an interest in their work and an associated sense of ownership and control, encouraging them to continue in their role. This retention is important given the typical profile of an

RRCBP candidate is an experienced rural health worker with clinical, corporate and community knowledge.²⁰

I was bored to death at work. It kept me in that same job for a little bit longer, because it was something interesting... I was allowed this little bit of space where I could just find my own train of thought, and it was something where, yeah, it kept me there. Interview 1

For clinical roles, having research experience was not seen as a priority. With limited options for research-specific or research-compatible roles within the health system. Organisations risk losing the graduates if they are unable to use their newfound skills. However, there are opportunities for organisational recognition of research expertise within clinical roles via promotion or 'regrades' within existing roles, which may in turn assist with staff retention.

It's a bit of a dead end though in the sense that I've got these skills and there's not really much infrastructure to actually use these skills. Focus Group 4

DISCUSSION

This study examined the long-term outcomes of a research training programme from the perspective of graduates with up to 16 years' experience post-training. These outcomes and the proposed underlying generative mechanisms are summarised in table 2.

Graduates of the programme saw themselves and their research peers as possessing new and transferable skills, improved work performance and enhanced employability prospects. Undertaking research education through a supported research project developed knowledge in research and non-research related spheres, including critical thinking and project management. While this positive change was noted at the individual

Table 2 Context, mechanisms and long-term outcomes of rural research training

Context	Mechanism	Outcomes
For rural health workers with an interest in research	Foundational research training and support	New skills in research Transferable skills Improved work performance Enhanced employability Ongoing research capability
For graduates of foundational research training	A lack of formal ongoing research supports	Limited ongoing research capacity An overreliance on individual agency to create research opportunity
For research-experienced individuals	Perceived mismatch between organisational support and individual desire for research opportunity	Feelings of discontent Perception of limited organisational support
For rural health organisations	Having a research-experienced team member	Raised research profile Increased research activity that addresses local needs Strengthened team evaluation activities Retained experienced workers in the organisation

level, having a more competent, confident and skilled worker has obvious team and organisational benefits such as producing research which addresses local practice and policy needs, strengthening team evaluation activities and retaining a skilled workforce.

For individuals in this study there were improvements in the individual's knowledge and skills to undertake research, which is consistent with real-world research capacity building.³⁰ This individual capability was accompanied by changes in research capacity within the individual's immediate work team and their broader organisation.²⁷ While the programme has previously been shown to build research expertise, contribute to the research evidence base in rural health, and produce early capacity building outcomes,^{11 18 23} this study provides new insights into the long-term value of training in research for the individual and beyond.

Some graduates remained research active, either via higher degree research or through workplace-based projects. The level of research engagement for graduates varied and included being a research participant, research advocate, researcher in a team, or independent researcher. Transitioning from a foundational experiential research project to independent researcher depends on the individual agency of the worker, with some graduates actively seeking or creating research opportunities. However, as [figure 1](#) indicates, there does not appear to be a progressive decline in research active individuals over time (early vs recent), raising the hypothesis that if individuals become research active as a result of the programme that this is a sustainable behaviour. A mismatch between the graduates' desired level of research and limitations in their ability to reach that level led to feelings of discontent.

For novice clinician researchers who report limited growth in research agency, ongoing structural supports such as a second-stage research education stream or supported research mentorship could increase levels of research activity. Careful consideration of structural design in a research training programme has been shown to link with successful training outcomes.²¹ Further exploration of university partnerships would be a logical progression, such as host health organisations supporting doctoral students or post-doctoral researchers to undertake relevant research while embedded within the organisation.³¹

In teams where a rural health worker has research experience, that individual enabled, encouraged or enhanced research activity in others. This role went beyond enabling or encouraging others to access formal training programmes to active engagement, adding rigour to existing research or quality improvement activities. Embedding researchers in a health team raised the profile of research across the team and more broadly within the organisation. Future qualitative ethnographic study would provide valuable insights into the development of a research culture, with previous studies largely focusing on culture from a quantitative perspective.^{17 32 33}

The organisational return on investing in research training was enhanced by high organisational commitment to research in practical terms such as funding or dedicated roles. It is a recognised challenge for organisations to create structures in which these skills can be utilised, either within the person's existing role or potentially moving to roles such as an embedded researcher position.¹³ Providing opportunities for research was seen as a tool for retaining experienced staff, and can maximise the return on investment for organisations that support novice researchers.

Close-to-practice research, such as that completed in the programme, is a key element of capacity building.^{11 27 34} While graduates saw their research making a difference to practice and policy, this was associated with the graduates' perceptions of their organisation's support and willingness to embrace change. Clear strategic goals for research, matched with operational commitment, is necessary for close-to-practice research in rural areas.^{19 35}

It is important to note that the RRCBP is conducted within rural health workplaces that have seen attitudes and commitment to research fluctuate over time. Research capacity development strategies that target individual skill development will continue to lead to limited levels of research capacity development within and across organisations. There is limited ability for educating institutions to influence these supraorganisational factors, however, this serves as a reminder of the importance of understanding the context in which training occurs.^{19 35} While attitudes towards and support for research may have changed in the time since graduates were trained, a coordinated approach to research investment and policy is needed to move research capacity development beyond the level of the individual.

These findings have been drawn from the experiences of programme graduates and further researcher on broader organisational perspective would be helpful in understanding organisation-level changes.

To our knowledge, this study is the first study to examine long-term outcomes of a clinician researcher development programme in a rural area. While a stratified sampling frame was used to ensure participants with a range of RRCBP experiences were included, those who have been less connected to programme peers and programme coordinators may have been less likely to participate ([figure 1](#)).

As this is a single educational programme held in rural areas of one public health system in Australia, there is a potential lack of generalisability to other countries or health systems. However, the use of critical realism to provide practical recommendations, the procedural rigour of the study and alignment with existing research capacity development literature indicate the findings may be applicable in other settings.

CONCLUSIONS

This study demonstrates that investment in research training leads to long-term improvement in skills, confidence and employability of individual workers, enhances team research capacity, provides immediate answers to local clinical and policy priorities and raises the profile of research within rural health services.

Training individuals in research, in conjunction with organisational support for ongoing research activity, led to changes in policy and clinical practice. Creating ongoing opportunities for researchers to use and advance their newfound skills, along with continued research support, will maximise the individual and organisational benefits of research training.

Twitter David Schmidt @clin_researcher

Acknowledgements The authors wish to acknowledge Lynette Gillies for her assistance in the recruitment stage of the study.

Contributors DS designed the study with contributions from KD, EW and DL. All authors contributed to interview/focus group question development. ES collected all data. DS undertook primary data analysis with verification from KD, ES and EW. DS wrote the manuscript with contributions from KD, EW, ES and DL. All authors reviewed the study findings and read and approved the final version before submission. DS is responsible for the overall content as guarantor and accepts full responsibility for the finished work and/or the conduct of the study, had access to the data, and controlled the decision to publish. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Funding This work was supported by New South Wales Health. Award/Grant numbers are not applicable.

Competing interests DS and KD are programme managers for the Health Education and Training Institute (HETI), NSW Ministry of Health. HETI is the organisation that conducts and manages the program that was researched in this study. Emma Webster established the programme and is a former programme manager of the programme from 2006 to 2015.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Hunter New England Health Research Ethics Committee Ref 2020/ETH00835. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request. Data are available on reasonable request and with approval of authorising Human Research Ethics Committee.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID ID

David Schmidt <http://orcid.org/0000-0003-1515-2990>

REFERENCES

- 1 Australian Institute of Health and Welfare. *Rural & remote health*. Canberra: AIHW, 2019.
- 2 Dunbar JA. Building capacity for rural and remote research. *Aust J Rural Health* 2010;18:133.
- 3 Taylor J, Hughes C, Petkov J, et al. Unique issues in research and evaluation in rural and remote locations: is there a place for specific research training? *Rural Remote Health* 2005;5:351–62.
- 4 Lionis C, Dumitra G, Kurpas D. Building research capacity in rural health settings: barriers, priorities and recommendations for practitioners. *Aust J Rural Health* 2018;30:1–2. doi:10.1111/ajr.12422
- 5 Bailey J, Veitch C, Crossland L, et al. Developing research capacity building for Aboriginal & Torres Strait Islander health workers in health service settings. *Rural Remote Health* 2006;6:556.
- 6 Birden HH. The researcher development program: how to extend the involvement of Australian general practitioners in research? *Rural Remote Health* 2007;7:39.3KB.
- 7 Fraser JD, Hawkins A, Alexander C, et al. The impact of the research methods support structure on research capacity in rural New South Wales. *Aust Health Rev* 2006;30:427–34.
- 8 Gausia K, Thompson SC, Lindeman MA, et al. Contribution of university departments of rural health to rural health research: an analysis of outputs. *Aust J Rural Health* 2015;23:101–6.
- 9 Grundy J, Johnston F. Building research capacity in primary health care settings in the Northern Territory. *Aust J Prim Health* 2003;9:9–17.
- 10 McIntyre E, Saltman D, Traynor V, et al. Building research capacity in Australian departments of general practice and rural health: a document review of annual reports. *PHC* 2007;8:3–11.
- 11 Webster E, Thomas M, Ong N, et al. Rural research capacity building program: capacity building outcomes. *Aust J Prim Health* 2011;17:107–13.
- 12 Wolfenden L, Yoong SL, Williams CM, et al. Embedding researchers in health service organizations improves research translation and health service performance: the Australian Hunter New England population health example. *J Clin Epidemiol* 2017;85:3–11.
- 13 Moran A, Haines H, Raschke N, et al. Mind the gap: is it time to invest in embedded researchers in regional, rural and remote health services to address health outcome discrepancies for those living in rural, remote and regional areas? *Aust J Prim Health* 2019;25:104–7.
- 14 Cooke J, Gardois P, Booth A. Uncovering the mechanisms of research capacity development in health and social care: a realist synthesis. *Health Res Policy Syst* 2018;16:93.
- 15 Ramkalawan T, Dieppe P. Research capacity development and training. *J Health Serv Res Policy* 2008;13 Suppl 3:6–11.
- 16 Bilardi D, Rapa E, Bernays S, et al. Measuring research capacity development in healthcare workers: a systematic review. *BMJ Open* 2021;11:e046796.
- 17 Fradgley EA, Karnon J, Roach D, et al. Taking the pulse of the health services research community: a cross-sectional survey of research impact, barriers and support. *Aust Health Rev* 2020;44:160–7.
- 18 Schmidt DD, Webster E, Duncanson K. Building research experience: impact of a novice researcher development program for rural health workers. *Aust J Rural Health* 2019;27:392–7.
- 19 Schmidt D, Reymont J, Kirby S, et al. The place of research in the rural health workplace structure: a content analysis of a rural health organisation's strategic and operational documents. *Rural Remote Health* 2020;20:5493.
- 20 Schmidt D, Robinson K, Webster E. Factors influencing attrition from a researcher training program. *International Journal for Researcher Development* 2014;5:56–67.
- 21 Schmidt DD, Kirby S. A modular approach to rural and remote research education: a project report. *Rural Remote Health* 2016;16:3609.
- 22 Cameron HE, Boreland FT, Morris JR, et al. New South Wales and Australian Capital Territory researcher development program 2005–07: modest investment, considerable outcomes. *Aust J Prim Health* 2013;19:59–67.
- 23 Duncanson K, Webster EL, Schmidt DD. Impact of a remotely delivered, writing for publication program on publication outcomes of novice researchers. *Rural Remote Health* 2018;18:4468.
- 24 Ajjawi R, Crampton PES, Rees CE. What really matters for successful research environments? A realist synthesis. *Med Educ* 2018;52:936–50.
- 25 Tikly L. What works, for whom, and in what circumstances? Towards a critical realist understanding of learning in international and comparative education. *Int J Educ Dev* 2015;40:237–49.
- 26 Pope C, Ziebland S, Mays N. Analysing qualitative data. *British Medical Journal* 2000;320:114–6.
- 27 Cooke J. A framework to evaluate research capacity building in health care. *BMC Fam Pract* 2005;6:44.

- 28 Fischer CT. Bracketing in qualitative research: conceptual and practical matters. *Psychother Res* 2009;19:583–90.
- 29 Christie M, Carey M, Robertson A, et al. Putting transformative learning theory into practice. *Australian journal of adult learning* 2015;55:9–30.
- 30 Matus J, Walker A, Mickan S. Research capacity building frameworks for allied health professionals - a systematic review. *BMC Health Serv Res* 2018;18:716.
- 31 Paradis G, Hamelin A-M, Malowany M, et al. The University–Public health partnership for public health research training in Quebec, Canada. *Am J Public Health* 2017;107:100–4.
- 32 Matus J, Wenke R, Hughes I, et al. Evaluation of the research capacity and culture of allied health professionals in a large regional public health service. *J Multidiscip Healthc* 2019;12:83–96.
- 33 Raschke N. *The perceived research capacity and culture within non-metropolitan local health districts in NSW*. Sydney: Health Education and Training Institute, 2017.
- 34 Sarre G, Cooke J. Developing indicators for measuring research capacity development in primary care organizations: a consensus approach using a nominal group technique. *Health Soc Care Community* 2009;17:244–53.
- 35 Schmidt D, Reymont J, Webster E, et al. Workplace-Based health research training: a qualitative study of perceived needs in a rural setting. *Health Res Policy Syst* 2020;18:67.

This important study has seen several reported long-term outcomes for individuals, teams and organisations, as summarised in Figure 14.

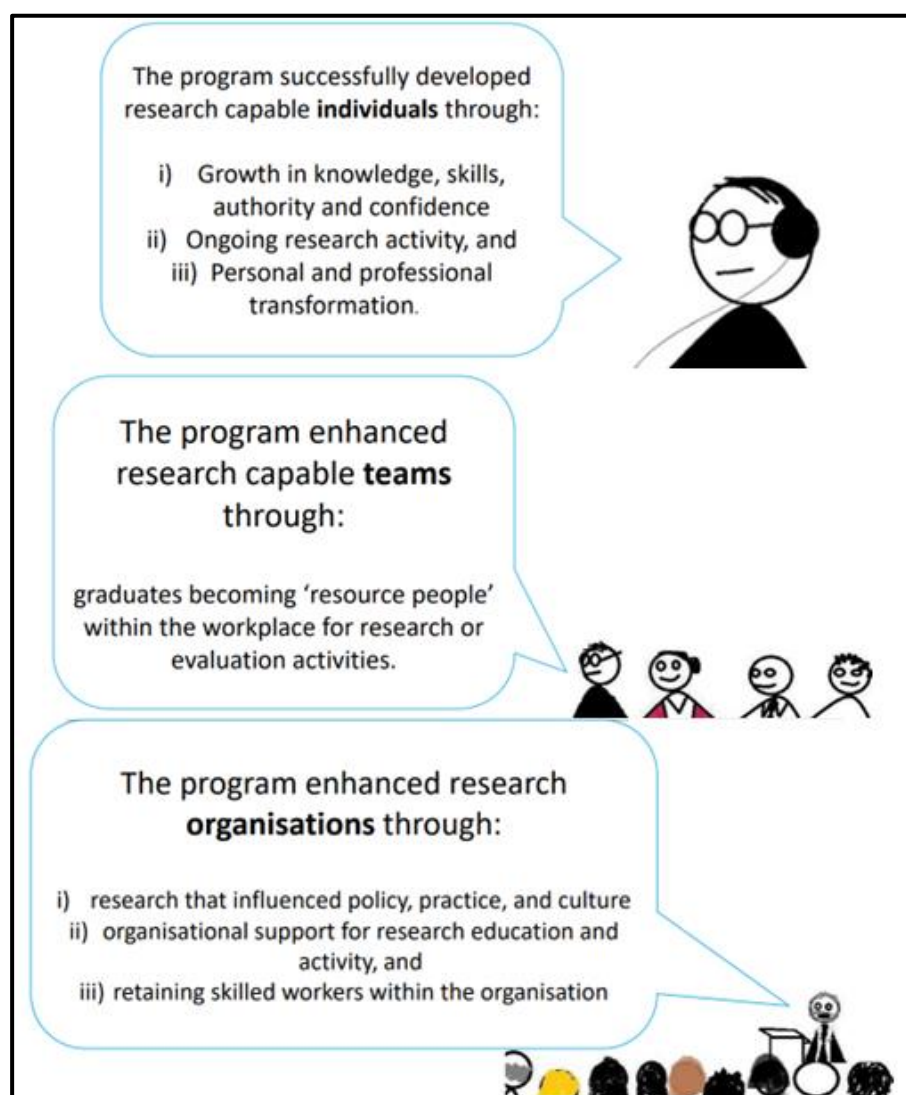


Figure 14: Long-term individual, team and organisational outcomes as a result of rural health workers participating in a rural research capacity building program

It must be noted that these are outcomes from the perspective of the trainees themselves, and this may not be representative of the larger organisational viewpoint.

The relationship between increased research capability and increased individual agency leading to increased research capacity is not straightforward. While some researchers, by virtue of their agency, had continued to undertake research, others had their aspirations for ongoing research limited by perceived organisational structures. Individual agency is highlighted in this paper as important, but not sufficient, for ongoing research activity.

Due to the state-wide nature of the RRCBP, it covers the organisation explored in the papers contained in Chapter 4, and has a degree of geographic overlap with the RCBP program described earlier in this chapter (Schmidt & Kirby, 2016) and the case study included in Chapter 1 (Schmidt, 2016). This overlapping context acts to tie together these individual studies to some extent; this allows for outcomes arising from these overlapping contexts to be explored together and for mechanisms to be derived with reference to this broader context.

The studies contained in this chapter have outlined both the short and long-term outcomes of rural research education programs. These outcomes, when combined with the contextual understandings from Chapter 4, will allow the development of hypothetical mechanisms as to why things are as they are in research capacity building in the rural health workplace. These mechanisms are explored in the analysis section, Chapter 6.

Chapter 6: Analysis

The introductory paper in Chapter 1 and the results section chapters have provided insights on; the context for rural health workers wanting to undertake research (Chapter 1), the context for research activity and research training within a rural health organisation (Chapter 4), and the short and long-term outcomes of research capacity building programs (Chapter 5). In this chapter, these component studies are consolidated into new knowledge about these contexts and outcomes. They are then used to derive explanatory mechanisms, in line with critical realist principles, which explain why things are as they are for research capacity building within rural New South Wales.

This thesis brings together five papers centred on rural research capacity building. As discussed in the methods section in Chapter 3, to understand this complex area there was a need to bring together perspectives from multiple programs, organisations and geographical areas. These studies present a diversity of sources, paralleling the fact that rural communities are not homogenous (Pong, DesMeules & Lagacé, 2009). Bringing these studies together creates a necessary richness to the data. This analysis section compiles and synthesises these individual studies together, engaging critical realism tenets of stratified reality, agency and structure to reveal the underlying lessons and generative mechanisms drawn from each of these studies to produce a new understanding. In keeping with the tenet of stratified reality, the words empirical, actual and real through this chapter refer to these layers of reality (Bhaskar, 2008b; Marks & O'Mahoney, 2014; Vincent & O'Mahoney, 2014).

To maintain consistency with critical realist approaches, and as outlined in the methods section and depicted in Figure 8, the new information about Context and Outcomes are extracted from papers 1-5, aligned with the structural levels of research capacity building (Cooke, 2005; Sarre & Cooke, 2009) and positioned within information from the existing body of literature. Once context and outcome are explored, these are used to reproduce explanatory mechanisms. These mechanisms will apply to the development of research capacity within rural New South Wales, which is being used as an exemplar of a rural area. The applicability and generalisability of these mechanisms to other contexts is explored in the discussion section, Chapter 7.

Understanding the context of research capacity building within New South Wales rural health services

The first aim of this thesis was to understand the context in which rural research training occurs within rural New South Wales. In line with the structural levels at which research capacity building occurs (the individual, team, organisational and supra-organisational) (Cooke, 2005; Sarre & Cooke, 2009) we will examine what we now know about the individual, team and organisational context for rural health research capacity building. While the supra-organisational context is acknowledged in the literature, none of the included papers focused on this structural level and as a result it is not a focus in this analysis.

The individual context

Rural clinicians work with the challenges of rural health service delivery, which means not only do they see the problems, but also where opportunities lie for investigation, as seen in Paper 1 (Schmidt, 2016). While opportunities are present in an actual sense, not all rural clinicians are interested in, or capable of, undertaking independent research. Those who are interested in or responsible for

undertaking research empirically present logical targets for research training, as outlined in Paper 3 (Schmidt et al., 2020b).

Rural individuals may be working in a context where there is limited operational planning for research. This limited operational planning can act as a real and inhibitory structure for rural staff who want to learn about or undertake research (Paper 2) (Schmidt et al., 2020a). Rural clinicians want rural research to be immediately useful (Paper 5) (Schmidt et al., 2022) and rural health organisations have expressed a need for a greater focus on research translation and knowledge transfer (Paper 2) (Schmidt et al., 2020a).

It should be noted that the individual context and the way the individual interacts with that context is constantly evolving. Developing research experience and research capability can contribute to development of confidence in rural individuals (Paper 5) (Schmidt et al., 2022), which may translate to real changes in their individual agency, or ability to take action within their context.

With that increased agency, there is the potential for research training conducted within the workplace to create a cohort of clinician-researchers that keeps experienced health professionals in their roles whilst building research experience (Schmidt et al., 2022). It is important to recognise that not everyone who learns about research wants to continue to apply research skills in their work role (Schmidt et al., 2022).

While obtaining empirical and actual organisational support for research training can be challenging, support for the ongoing conduct of research where individuals can use their new skills in practice is also challenging (Paper 5) (Schmidt et al., 2022). Without this organisational support for the individual researcher, a real disconnect between workplace and individual can arise. Research becomes seen as an individual pursuit unrelated to the organisation and its goals (Paper 3) (Schmidt et al., 2020b).

When considering research capacity building, the context for the individual learning must be considered. Given the actual low base of research activity and research expertise in rural areas (Paper 2) (Schmidt et al., 2020a) research training generally needs to be introductory in nature, matched to the learner's needs, and supported by expertise from experienced researchers (Paper 3) (Schmidt et al., 2020b). However while specific research experience may be lacking, many clinicians in rural New South Wales have empirical existing research-relevant skills, so training may in fact be building on existing project management or quality improvement skills (Paper 1) (Schmidt, 2016). This may mean a multilevel training strategy (Sarre & Cooke, 2009) is necessary. Individual training needs can and should be identified (Jones et al., 2003) allowing for training targeted at an appropriate level.

The team context

Given that Papers 2 and 3 (Schmidt et al., 2020a; Schmidt et al., 2020b) focused on the organisational level and Papers 1, 4 and 5 (Schmidt et al., 2022; Schmidt, 2016; Schmidt & Kirby, 2016) described individual level experiences or interventions, these studies provide fewer insights into the team context. A supportive work team was an important facilitator of research (Wenke et al., 2020), and the attitudes of colleagues within the work team can be a real and powerful structure that influences rural clinicians undertaking workplace-based research. There is some evidence that research-emergent and novice clinician researchers can make their own research networks to provide actual team level support in a way that their workplace team may not (Paper 5) (Schmidt et al., 2022). Often there is a vision that training the individual will in turn have an empirical impact in creating research activity and an actual effect of upskilling their work team (King et al., 2022; Schmidt et al., 2022).

Developing researchers who work within a team is one part of the team context. Considering the context in which teams as a whole can develop research capacity is another. In rural health workplaces there is limited emphasis on research capacity building for teams of workers, again evidenced from the studies included in this thesis. While team-based approaches have long been advocated (Cooke et al., 2008; Janssen et al., 2013; Nelson & Morrison-Beedy, 2008), there have been limited numbers of training approaches for teams in rural areas, with newer models planned but not yet fully operational (Flenady et al., 2022b).

The organisational context

A large proportion of the research conducted within rural health organisations in New South Wales is not conducted for or by these organisations (Paper 2) (Schmidt et al., 2020a). This empirical mismatch between activity and ownership can result in the limited engagement of local staff within these research projects, perpetuating the real perception that research is not something that rural health organisations can do: the “too rural and too poor” view mentioned in Paper 3 (Schmidt et al., 2020b). The perception of limited capacity is both a real outcome of the limited health research expertise within rural health organisations (Taylor et al., 2005) and the actual difficulty accessing research funding (Barclay, Phillips & Lyle, 2018), and is also a mechanism of limited research activity. This co-occurring role of both cause and outcome again reflect a stratified reality: organisations that *really* see themselves as incapable of undertaking their own research may *actually* engage with outside organisations in a passive way, thus *empirically* limiting opportunities for research capacity building within rural health organisations.

External partnerships are seen as a potential solution to the issue of limited access to research expertise in rural areas (Schmidt et al., 2020b, Taylor et al., 2005). These collaborative approaches across sectors including primary health, private, and tertiary education sectors, either formally or informally, can actually help provide access to research knowledge and support vital for research capacity development.

An important contextual element for those wanting to learn about research is the ability to access practical support. This practical support may include empirical factors such as operational planning, positional responsibility, (Paper 2) (Schmidt et al., 2020a) actual factors such as valuing and promoting research endeavours (Paper 3) (Schmidt et al., 2020b) and real factors such as organisational commitment (Paper 5) (Schmidt et al., 2022). Practical support may include actual creative solutions as seen in the case study in Paper 1 (Schmidt, 2016), where research activity was incorporated into routine work to offset an empirical lack of funding. Organisational support is a real enabler for research retention and completion (Schmidt, Robinson & Webster, 2014) and other authors have emphasised the value of actual practical organisational support, particularly in promoting and valuing research activity as a component of research capacity building (Cooke, 2005; Cooke, Gardois & Booth, 2018; Sarre & Cooke, 2009).

The value placed on research in rural health organisations may vary between strategic and operational levels (Paper 2) (Schmidt et al., 2020a). There may also be a mismatch between the organisational language and actions concerning the value of research activity and research capacity building (Paper 5) (Schmidt et al., 2022), which creates a real and inhibitory influence on rural health staff. Where improved research capability is desired in a rural area, a real perception that research is a low-value individual activity actually inhibits the uptake of research opportunities and learning in research (Paper 3) (Schmidt et al., 2020b). Demonstrating that research is valued is a key facet of research capacity building (Cooke, 2005; Cooke, Gardois & Booth, 2018; Sarre & Cooke, 2009).

This real perception that research is an individual, rather than an organisational, activity can lead to research activity being driven largely by the agency of individuals (Papers 2 and 3) (Schmidt et al., 2020a; Schmidt et al., 2020b). In rural health organisations in particular this reliance on individual agency as a primary driver of research activity empirically leads to a limited number of nursing and allied health research projects (Paper 2) (Schmidt et al., 2020a).

Paper 5 demonstrated the ability to maintain research activity outside of the supportive structure of training programs is reliant upon the individual agency of the worker (Schmidt et al., 2022). However, there is a limit to how much individual agency can overcome structural limitations and a mismatch between research capability and research capacity can lead to actual discontent (Schmidt et al., 2022). Where rural health workers have foundational research skill, an actual lack of structured opportunity to further these skills can have a real and inhibitory effect on levels of independence in research. While receiving training in research has been shown to equip some health workers for ongoing research activity, (Schmidt et al., 2022; Schmidt, Webster & Duncanson, 2019; Webster et al., 2011), this training is important but not sufficient: supportive structures at the organisational level are still required.

Understanding outcomes of research capacity building within New South Wales rural health services

The second aim of this thesis was to understand the short and long-term outcomes of rural health research training within rural New South Wales. Again, these will be explored under the structural levels of research capacity building (Cooke, 2005; Sarre & Cooke, 2009), focusing on the individual, team and organisational levels.

Individual outcomes

Rural health workers may be interested and willing to learn about and undertake research, however this may be tempered by actual issues with individual research capability, as discussed in Paper 1 (Schmidt, 2016). Training programs, such as the RCBP described in Paper 4 and RRCBP examined in Paper 5, have shown improvements for individual capability through an empirical change of research experience (Schmidt & Kirby, 2016; Schmidt, Webster & Duncanson, 2019) and a range of actual research-specific and transferable skills such as project management experience, enhanced critical thinking, improved communication and improved confidence (Paper 5) (Schmidt et al., 2022). Individuals report that seeing research making a difference to practice and policy provided real validation for their decision to pursue research training (Paper 5) (Schmidt et al., 2022).

Close-to-practice research, such as that completed in experiential rural research programs described in Papers 4 and 5 (Schmidt et al., 2022; Schmidt & Kirby, 2016), is a key enabler of capacity building (Cooke, 2005; Sarre & Cooke, 2009; Webster et al., 2011). This research activity, along with the actual changes in individual research capability, skill and experience amount to real-world research capacity building (Matus, Walker & Mickan, 2018) and continue to demonstrate that individual training can have actual capacity building outcomes (Webster et al., 2011).

Outcomes for teams

There were few team level outcomes described in the Papers 1-4. Paper 5 indicated that building a more capable, confident and skilled worker as a result of research experience and research training has actual and real team benefits, with improved evaluation rigour, raised profile of research within a team and retaining a skilled workforce (Schmidt et al., 2022). Changes in research capacity within the individual's immediate work team is necessary, given that actual research capacity in rural teams is perceived as being lower than in their metropolitan counterparts (Raschke, Bradbury & Yoxall, 2022).

It is plausible that this team research capacity or organisational research capacity may be cumulative, with the collective individual capability outcomes contributing to team and organisational level capacity.

Organisational outcomes

Some of the outcomes for organisations that result from research training as described in Papers 3, 4 and 5 include empirical outcomes such as increased research activity within rural health organisations, dissemination of research findings, demonstrable leadership and the establishment of partnerships (Schmidt et al., 2022; Schmidt et al., 2020b; Schmidt & Kirby, 2016). These outcomes have been evidenced elsewhere (McIntyre, Brun & Cameron, 2011; Webster et al., 2011).

Ensuring that research is actually valued and supported at multiple levels of an organisation can lead towards a research-supportive culture (Paper 2) (Schmidt et al., 2020a). Research training can also be important for rural health organisations in creating a positive research culture. Research culture is often measured by self-report (Holden et al., 2012; Matus et al., 2019; Raschke, Bradbury & Yoxall, 2022). There is opportunity for future ethnographic study to better understand the development of a research culture within rural health teams and their respective organisations.

From an organisational point of view research training can be viewed as an actual investment rather than a cost burden, as discussed in Paper 1 (Schmidt, 2016), if the organisation acknowledges that retaining experienced staff whilst improving policy and practice (Paper 5) (Schmidt et al., 2022) is an actual and real return on that investment. Furthermore, rural health organisations that have clinicians trained in research skill can see those clinicians with research experience empirically act as mentors and resource people within the workplace. In terms of stratified reality, these individuals have capability as an *outcome* of a capacity building endeavour, whilst act as an enabling *mechanism* of research activity by assuming the roles of researcher, resource person and mentor.

Synthesis and new generative mechanisms

The third aim of this thesis was to use this new understanding of short and long-term outcomes in context to reveal generative mechanisms that underlie research capacity building for the rural workforce. As described in the methods section (Chapter 3), the development of these mechanisms was both an iterative and an intuitive process of constant questioning and integration of stratified reality, structure and agency. The researcher's position as an embedded insider of the New South Wales rural health system with deep knowledge of the research capacity building process provided a robust foundation from which retroduction could be applied. Using "creative imagination" (Bhaskar, 2008b), the synthesised contexts and outcomes were explored, and explanatory mechanisms were hypothesised, checked for coherence and logic, and refined through a number of repeated cycles. A suite of proposed mechanisms were derived as a result. A summary of the mechanisms arising from

this synthesis are expressed as CMO chains in Table 3, with Figure 15 demonstrating the logical flow of ideas inherent from Context to Mechanism then Outcome.



Figure 15: The logical flow of context, mechanism and outcome

Table 3: Generative mechanisms of research capacity building in rural health workplaces expressed as Context, Mechanisms Outcome (CMO) chains

Context	Mechanism	Outcome
In rural health services	A perception that the organisations are “too rural and too poor” [#] to undertake research	Limited research activity
Where individual and organisational rural research capability exists	Limited operational planning for, organisational prioritisation of, and valuing of research	Limited engagement with research and a reliance on individual agency as a primary driver for internal research activity
Viewing research as an individual activity	A disconnect between individual and organisational research priorities	Research seen as being of low organisational value
Rural health workers with an interest in research are seeking to build on their existing skills, and seek an introductory level of education and support by experts in research	Limited access to research expertise in rural health services	A need for collaborative approaches where health services and training organisations, research units and universities create mutually beneficial relationships
Where there is little funding to create formal partnership arrangements	Informal collaborations based on existing relationships	Collaborations that are contingent upon goodwill, flexibility and mutual goals
When research capacity building activities occur in rural health services	The experiential nature of research capacity building programs used in rural Australia	Builds individual skill, increases research activity, and produces research that changes practice
Where research capacity building programs are designed to upskill individuals	Training delivered at an individual level	Produces changes primarily at the individual level and primarily in capability, with fewer team and organisational benefits
When undertaking research capacity building with rurally-based health workers	Structural solutions such as the design of program, creative ways to enable protected research time, and strategic engagement with the hosting organisation	Can overcome some of the inherent limitations which include a small, dispersed workforce, lack of organisational support and limited funding
Where introductory research training has been undertaken	Limited opportunities and structural inhibitors	Reinforce that individual skill development is important, but

(Schmidt et al., 2020b)

Perceptions and beliefs can exert influence (Cochran-Smith et al., 2014), and in a critical realist sense are therefore real. In rural health services a real and underlying perception that the organisations are “too rural and too poor” to undertake research can lead to empirical limited research activity (Paper 3) (Schmidt et al., 2020b). Beliefs can, at an organisational level, stifle new approaches (Lawani, 2021) and this appears to be real for rural health research. Belief and knowledge can intersect as explanations of the social world (Vincent & O’Mahoney, 2014), and in this instance there is some evidence that when considering research grant funding, at least, rural organisations are empirically disadvantaged (Barclay, Phillips & Lyle, 2018). However, it is the real perception that rural health organisations are inherently incapable to undertake research that is a key driver of low levels of research activity.

While research capability is an important part of research capacity within rural health services, limited operational planning for research, low organisational prioritisation of research, and a perceived low organisational valuing of research directly are real factors that impact on engagement with research. This limited engagement with research at an organisational level can lead to a reliance on individuals to drive research activity. Organisational leadership and valuing of research are key elements of research capacity building (Cooke, 2005; Cooke, Gardois & Booth, 2018; Sarre & Cooke, 2009). In rural New South Wales, Australia, there was empirically a clear gap identified in organisational planning for research (Paper 2) (Schmidt et al., 2020a) and this real lack of operational responsibility, and by extension organisational ownership, that leads to a reliance on individual agency to undertake research.

This real reliance on individual agency leads to research being seen as an individual activity that is disconnected from organisational research priorities, which in turn creates the impression that research activities are of low organisational value. The alignment between individual and organisational priorities for research is critical, given that an actual lack of organisational support will lead to limited research activity (Paper 5) (Schmidt et al., 2022) and is a potential cause of withdrawal from research training programs (Schmidt, Robinson & Webster, 2014).

As previously highlighted in Paper 3, the limited research expertise in rural health organisations (Schmidt et al., 2020b) is an actual mechanism leading to a real need for collaborative approaches to provide both introductory research education and expert support for research. Collaborative approaches are essential for providing access to expertise, particularly when the rural context is considered (Walsh et al., 2021; Wenke et al., 2018; Wong Shee et al., 2022).

Rural partnership arrangements are often relationship-based (see Paper 4) (Schmidt & Kirby, 2016) and are actually contingent upon goodwill, flexibility and mutual goals. Mutual goal-setting is an actual and important part of collaborative approaches to research partnerships (Nyström et al., 2018) and in rural areas these relationships can be effective where the goals of the workplace and the learning institution align (Paper 3) (Schmidt et al., 2020b).

When training in research occurs in rural areas the experiential nature of training programs used in rural New South Wales, as described in Papers 4 and 5 (Schmidt et al., 2022; Schmidt & Kirby, 2016), empirically builds individual skill, increases research activity, and produces research that changes practice. Experiential learning aligns closely with adult learning principles (Dernova, 2015; Knowles, Holton & Swanson, 2005), and the outcomes described in this thesis also align with the goals of the

research trainees who seek to make a positive contribution to their community and workplace whilst building their own skill (Schmidt et al., 2022).

As seen when exploring the outcomes of rural research training, training programs designed to upskill individuals which are delivered at an individual level lead primarily to individual outcomes, with fewer team and organisational benefits. It must be noted that often the tools used to empirically assess outcomes, such as the research spider (Smith et al., 2002) which is commonly used in assessing research experience (Harding et al., 2010; Schmidt, Webster & Duncanson, 2019), are aimed at the individual level so could fail to identify actual team and organisational outcomes that might also occur. Raschke et al (2022) posits that team research capability and culture are less well developed in rural areas than individual or organisational capability (Raschke, Bradbury & Yoxall, 2022) and thus an avenue for future research capacity building in rural areas should focus on team approaches as have been trialled elsewhere (Cooke et al., 2008; Nelson & Morrison-Beedy, 2008; Priest et al., 2007; Whitworth, Haining & Stringer, 2012).

When delivering rural research education some of the inherent empirical and actual limitations of rural research education, such as a small, dispersed workforce, lack of organisational support and limited funding, can be accommodated by actual structural solutions such as the design of program (Paper 4) (Schmidt & Kirby, 2016), creative ways to enable protected research time (Paper 1) (Schmidt, 2016; Wong Shee et al., 2022), and strategic engagement with the hosting organisation (Paper 4) (Schmidt & Kirby, 2016; Wong Shee et al., 2022).

Where introductory research training has been undertaken, as described in Chapter 5, limited opportunities to use these skills and structural inhibitors such as a lack of time and resources, reinforce that individual skill development is *important*, but not *sufficient* for ongoing independent research. This, perhaps, demonstrates the difference between research capability, and research capacity; trained clinician-researchers *could* undertake independent research, but this does not mean that they *can* undertake independent research.

It may be hypothesised that research training might be a mechanism to increase individual agency and increase research activity across organisation from grassroots level. This may have a cumulative effect where multiple research-capable individuals with high levels of agency could influence research capacity.

Testing research capacity building theory

The proposed mechanisms developed within this thesis were discussed with two experienced researchers with responsibility for research capacity building. This approach of drawing on expertise to examine proposed mechanisms is a means of testing these proposed mechanisms for coherence (Kempster & Parry, 2014). This iterative process led to refinement of the mechanisms and the corresponding CMO chains.

A second process for testing these proposed mechanisms from this thesis was to compare them to the mechanisms of research capacity development proposed by Cooke, et al., (2018) in their realist synthesis (see Table 4). In some ways the mechanisms described by Cooke et al (2018) represent a 'best evidence available' model, one that is unencumbered by the constraints of the rural environment. Thus, this level of testing allows a comparison of "what is" in the rural environment of New South Wales, to "what could be" in Cooke, et al's (2018) model. Demonstrating concordance between the two models confirms that these proposed mechanisms derived in this thesis display coherence, whilst allowing an exploration of the rural and non-rural differences of the two models.

Table 4: Emerging mechanisms from this thesis contrasted with mechanisms of research capacity development proposed by Cooke et al (2018)

Research capacity building mechanisms		Mechanisms of research capacity development ^a
A perception that the organisations are “too rural and too poor” to undertake research	<i>contrasts with</i>	Modelling positive behaviours
A limited amount of research expertise in rural areas		
Limited operational planning for, organisational prioritisation of, and valuing of research	<i>contrasts with</i>	Signalling importance
A disconnect between individual and organisational research priorities	<i>contrasts with</i>	Exceeding the sum of the parts
Limited opportunities and structural inhibitors		
Informal collaborations based on existing relationships	<i>aligns with</i>	Exceeding the sum of the parts Coproducting knowledge
The experiential nature of training programs used in rural Australia that build individual capability, increases research activity, and produces research that changes practice	<i>aligns with</i>	Learning by doing Feeling that you are making a difference
Structural solutions such as the design of program, creative ways to enable protected research time, and strategic engagement with the hosting organisation	<i>aligns with</i>	Releasing resources Liberating the talents

^a Cooke et al 2018

Of note, the areas where the mechanisms proposed in this thesis contrast with those of Cooke et al (2018) is in role modelling, signalling importance (where individuals see that engaging in research is a valued part of the organisation’s business) and exceeding the sum of the parts. In the rural context, a shortage of rural researchers and organisational commitment lead to limited role modelling and limited visibility of research (Papers 2 and 3) (Schmidt et al., 2020a; Schmidt et al., 2020b). This contrast highlights that rural and metropolitan approaches to research capacity building differ due to important structural influences, such as geographical spread of the workforce, availability of research experts and ability to access to research funding. While the increasing the number of rural researchers is a long-term solution, rural health organisations can influence other elements such as increasing the visibility of research and signalling its importance within rural health organisations.

Chapter 7: Discussion

The aims of this thesis were as follows:

1. To describe and understand the contexts in which rural health research training occurs.
2. To understand both the short and long-term outcomes of research capacity building endeavours in the rural health workplace.
3. To use these short and long-term outcomes in context to understand the mechanisms at play in the education of research for the rural workforce which have led to the kinds of outcomes we see.
4. To develop general principles to guide the development of rural research training programs.

In addressing these aims, this thesis allowed the development and testing of generative mechanisms that explain “why things are as they are” in research capacity building in rural health services, using the public health system in rural New South Wales as an exemplar. In this discussion chapter these mechanisms of research capacity building in rural health services will be further explored. To help build understanding, the same structure that was used in the background section is used, revisiting the following in light of these new mechanisms:

- Approaches and models used to train, educate and increase capacity in research in rural health workers
- Underlying educational philosophies underpinning approaches used to train, educate and increase capacity in research in rural health workers
- Educational content taught in rural research training
- Who has been targeted for rural research training, and where they are targeted

The purpose of revisiting these points is to contextualise these proposed mechanisms into the existing literature and to develop useful recommendations for others with an interest in research capacity building. For clarity, mechanisms developed in this thesis have been italicised throughout the discussion, and for ease of reading may be reworded or referred to in part rather than presenting the entire mechanism.

Approaches and models used to train, educate and increase capacity in research in rural health workers

The idea of embedded researchers, academic researchers based within rural health services, is one that provides a number of solutions to problems within rural organisations (Moran et al., 2019). Given the challenges associated with attracting and retaining rural academics (Ndebele, Muhuro & Nkonki, 2016), the idea of creating research-capable rural health workers that function as clinician-researchers is an appealing one.

Based on the understanding of context from Chapter 4 and the analysis in Chapter 6, there is no single model of research capacity building that can be applied across rural environments. This thesis has examined research training programs built on a capacity building framework (papers 4 and 5) (Schmidt et al., 2020a; Schmidt et al., 2020b) within the New South Wales context. Other programs also aim to build elements of research capability such as experience and research skill, or increase both research

capability and research capacity in individuals (Aggarwal et al., 2011; Awaisu et al., 2015; Back-Pettersson et al., 2013; Harding et al., 2010; Jones et al., 2003).

Regardless of the format of the capacity building endeavour there are fundamental elements of education that should be included, commencing with ensuring educational and capacity building approaches have an *experiential learning* component. Research capacity building programs are most effective when they are experiential (Cooke, Gardois & Booth, 2018). This experiential element extends the learning experience from building capability to building capacity, simply by the act of doing. From a learning point of view, 'doing' demonstrates a greater level of expertise than 'learning about' (Williams et al., 2016).

Independent of the chosen educational or capacity building model, those looking to build research capacity need to account for the unique characteristics of the rural environment. This means providing education or capacity building that accounts for context; i.e. the organisation's goals, the individual's position within the organisation and the willingness of the organisation to support the individual. That support needs to be tangible through funding or another means to allow protected time for research to be undertaken. The model may need to be *designed with a structure* that assists learners in overcoming rural or remote challenges, which could include careful consideration of program design to reduce isolation for learners (Paper 4) (Schmidt & Kirby, 2016). Peer support which can reduce isolation is associated with completion of a researcher training program in rural areas (Schmidt, Robinson & Webster, 2014).

Another form of support is access to expertise. As there is *limited research expertise* within rural health services, a capacity building approach must include partnering for this expertise. Partnering may be internal to access expertise within the organisation or with an external partner such as a university, but must be mutually beneficial and without the rural health organisation ceding control of the direction of the research (Paper 3) (Schmidt et al., 2020b). In a rural environment, there is a need for creative approaches to accessing expertise, and maximising the value in *existing relationships using a collaborative approach* is a logical means of extending support.

Underlying educational philosophies underpinning approaches used to train, educate and increase capacity in research in rural health workers

The use of a clear educational philosophy is a logical, but sometimes overlooked, component of research capacity building literature. However, underlying educational philosophy did not emerge as a causative mechanism within the analysis included in this thesis. Health research education programs are commonly led by health researchers who have extensive experience in health research but may not have a background in education. It may be that explicitly stating an educational philosophy is not seen as important to program coordinators, who see the philosophy as implied or embedded and not needing to be explained. It may also reflect a larger reluctance for the education sector to embrace evidence-based foundations, unlike the way that health services have moved to clinical practices based on research evidence (Goldacre, 2014). There is sufficient evidence in the literature to demonstrate the success of models built on capacity building principles at building health research capacity (Cooke, Gardois & Booth, 2018; Schmidt et al., 2022; Schmidt & Kirby, 2016; Schmidt, Webster & Duncanson, 2019; Webster et al., 2011), and this is a logical place for such educational endeavours to begin. Ensuring that educational foundations are clearly described in health research capacity building literature would allow future exploration of foundations other than capacity building principles and the resultant outcomes of applying these educational approaches.

Educational content taught in rural research training

Alongside this experiential component there is a need for targeted education. This education should be needs-based. Given the *limited critical mass of research expertise in rural areas* this education is likely to be introductory research methods. However, maximising the use of existing skills, or “liberating the talents” (Cooke, Gardois & Booth, 2018) may mean that education builds on existing skills rather than assuming all rural staff are commencing their research experience as absolute novices. To establish that education is needs-based, an assessment of learning needs should inform educational approaches.

One feature of the existing literature is the limited number of research capacity building approaches that publish the educational content used within their programs, with a minority (Flenady et al., 2022b; Harding et al., 2010; Schmidt & Kirby, 2016) featuring an outline of educational content in their publications. Whilst some organisations may have concerns over intellectual property when sharing full curricula, an understanding of the scope of content covered within programs would be assist those looking to establish research capacity building approaches.

Who has been targeted for rural research training, and where they are targeted

Selecting individuals for research capacity building opportunities should be a pragmatic decision weighing up the passion of the individual and the needs of the hosting organisation. A committed and enthusiastic individual may become an independent researcher given the right support. It is important to remember that *delivering training at the individual level* will produce primarily individual level outcomes.

There remains limited amount of research evidence of using a team approach to research capacity building, yet a team approach to research capacity building does present as a structural solution to address the risk of isolation for rural health workers undertaking research. By training in teams there is also potential to maximise existing expertise with a rural team, or “liberating the talents” (Cooke, Gardois & Booth, 2018)

One of the risks for training organisations is to assume all rural health workers can and should receive training in research. While there is merit in all rural clinicians being informed consumers of research, knowing how to understand and use research as part of evidence-based practice does not mean that all rural clinicians need to be capable of undertaking a research project.

Within the setting for this thesis

Within the New South Wales context, the solution to a shortage of rural research activity and expertise has been to develop interested rural clinicians into research-capable clinicians, or clinician-researchers. There is evidence that providing an experiential learning experience via a research capacity building program can create research experience (Schmidt, Webster & Duncanson, 2019) and potential for ongoing research activity (Schmidt & Kirby, 2016). That potential, this capability, can be realised with supportive structures, or stymied where organisational barriers prevent this capability being actualised into research activity (Schmidt et al., 2022).

Transforming research interest into research capability and research capacity involves several key steps, the first of which is identifying those interested in research. Shorter duration programs covering aspects of the research process, such as a systematic review course (Harding et al., 2010) can be of value in themselves, and may also identify those with an interest and aptitude for further research development. Those interested in further developing research capability can then be supported via an *experiential program* at the level of research engagement that suits the needs of the learner and the hosting organisation. It is incumbent upon those providing research education to deliver educational opportunities at the level required by the learner, rather than a generic approach. This approach will identify those with an interest in research and assist them in taking their next steps in building research capability. While this approach can identify and enhance those who want to do research, it does risk overlooking those who should do research. Systems that identify the interested parties can also be used to introduce research to those with responsibility for research but not an interest.

In addition to formal learning, research capacity can be enhanced through peer learning, with those who have research experience taking a role in building research activity and capacity with those around them (Schmidt et al., 2022). Learning about research by interacting with others who are undertaking research can be a form of cultural constructivism (Schmidt & Kirby, 2016; Stauffacher et al., 2006), where the development of a sense of belonging in the world of research is constructed through interaction and immersion, as well as activity and education. Connecting research capable and research interested individuals is a means of providing a supportive environment.

Extending that capability into research capacity is more than an educational endeavour (Grundy & Johnston, 2003). While *experiential learning* is key to developing research capacity (Cooke, Gardois & Booth, 2018; Schmidt et al., 2022), structural changes in terms of supportive structures (Schmidt et al., 2020b) and meaningful opportunity to conduct research post-training (Schmidt et al., 2022) are essential for individual capability to become capacity. This addresses the *limited opportunities and structural inhibitors* that prevent the transformation of research capability into research capacity. In essence, an organisation committing to developing a rural health worker into a clinician-researcher is implicitly making a similar organisational commitment to creating conditions in which a clinician-researcher can function as both clinician and researcher, if this development is to be successful. This combination of “smart and motivated people positioned in supportive environments that allow(ed) them to ask hard questions and pursue hard problems” is the key to success for clinician-researchers (Jain et al., 2019).

As a health system the focus has often been on developing the motivated individual without the accompanying supportive environment (Grundy & Johnston, 2003). Recent research on clinician-researchers in rural health has started to shift this focus (Fry & Dombkins, 2017), ensuring supportive structures and access to infrastructure accompany the learning process. Delivery of research capacity building programs or approaches by those internal to the health system may influence the development of these supportive environments in a way that external education providers cannot. While *informal relationships* are a cornerstone of rural collaboration, training providers from outside the health system may need to partner with rural health organisations in a formal way which ensures that training support is underpinned by formal agreements in addition to reciprocity and mutual respect (Schmidt et al., 2020b). Continuity is important to building relationships, and consistent long-term offering of a research capacity building program as seen in Paper 5 (Schmidt et al., 2022) adds to this continuity.

Extending this concept of organisational commitment to the developing researcher by way of a commitment to a supportive environment, there needs to be an accompanying commitment to ownership of research direction and activity. As discussed in Paper 2 (Schmidt et al., 2020a), there

needs to be an *operational responsibility for research*. In Paper 3 it was highlighted that *aligning individual research effort to organisational direction* is needed (Schmidt et al., 2020b). The provision of a clear research direction for the rural health organisation, one that is signalled as important (Cooke, Gardois & Booth, 2018), will allow clinicians to align their own research agenda to that of their hosting organisations. Having specific research directions within an organisation can allow external education partners to align teaching goals and processes to this direction. This will allow effective partnering without the public health organisation ceding control of the direction of research activity and education (Schmidt et al., 2020b).

Organisations can also commit to developing researchers by moving away from emphasising urban-centred research conducted in rural areas which does little to enhance research capacity in the rural workforce. Ensuring urban-developed research has a rural individual as part of the project team will bring rural staff into contact with experienced researchers, an example of a strategy to maximise the rural benefit of this level of research activity (Paper 2) (Schmidt et al., 2020a). Other models such as embedded researchers may also provide a more engaged organisation (Moran et al., 2019; Wenke et al., 2017; Wolfenden et al., 2017). Similarly, a more egalitarian funding model that emphasises partnerships may provide greater capacity building potential (Auld et al., 2018).

Lastly, organisations can address the “*too rural and too poor*” perception by adjusting the way in which they perceive and value research. Structures such as the hierarchy of evidence (Evans, 2003) and the way in which small-scale clinician-led research has been gradually subsumed by larger research driven by networks (Murdoch, 2009a; Murdoch, 2009b) may have led rural organisations to view smaller, clinician-led projects to be of little or no value. Supporting, acknowledging, valuing and celebrating these smaller projects, or as Cooke et al (2018) expressed, signalling importance, are important organisational approaches that can add to real-world research capacity. This research capacity, while small-scale, can become a foundational building block upon which future research capacity is built. Where organisations are supported with a training program, promoting the visibility of the program, publishing and promoting the results of studies to profile the clinician researchers and their research, and acknowledging the system-wide value and contribution of the program are all ways in which organisations can signal importance.

Transforming the research which happens in rural areas requires a systematic approach that goes beyond research education for rural health workers. For those in settings other than New South Wales, consideration of the unique characteristics of their rural environment and health service is necessary. In New South Wales the combination individual health districts with a centralised “system manager” (New South Wales Government, 2023) presents an opportunity for an educational body within the central system to interact with and influence the individual rural organisations. Australian states with a greater or lesser degree of centralisation will have different challenges. Internationally the difference in health funding models and health system structures should also be acknowledged.

Given these differences, the following recommendations are intentionally broad to allow consideration and adaptation to a wide range of settings.

Recommendations

The final aim of this thesis was to develop general principles to guide the development of rural research capacity building programs. Drawing from the mechanisms outlined above, and considering the unique challenges associated with rural health research, the following recommendations are made:

Recommendations for research capacity building in rural areas

Those delivering rural health research education should carefully consider the key elements as follows:

For the individual:

Systems should be implemented to identify research-interested individuals whose research interests match the health organisation's research plan. Offering short training courses on research related topics like systematic reviews or evidence-based practice can be a way of identifying these individuals. An assessment of the learner's individual needs, the characteristics of the team in which the learner operates and levels of organisational support should be undertaken. This assessment is required to ensure that training matches the learning needs of the individual, delivers this education in a way that is appropriate to the learner's context and ensures the organisation is capable of, and willing to, create an environment in which the development of research capacity and activity can occur.

For teams:

Rural research training should, in addition to building individual capability and experience, integrate skills for teamwork and relationship building into learning experiences. This will emphasise the importance of researching in teams and the value of collaborative relationships. Specific research training for teams that is developed, trialled and evaluated is a strategy that can be implemented.

For organisations:

Rural health organisations should have a clearly defined and communicated research plan that explicitly includes investment in research capacity building and that will allow researchers and training organisations to align their activities and goals for mutual benefit.

Dedicated roles and resources via a research office that ensures ongoing coordination and commitment by senior leaders within the health organisation to ensure capacity building is progressing in line with organisational planning.

Formal partnership arrangements between the organisation in which the trainee works and any external partnering body should be implemented to develop structures to support the development of research capacity.

For educators:

Training in research methods should be underpinned by capacity building principles, as the short and long-term outcomes for programs built on this platform are evidenced within the literature (Cooke, Gardois & Booth, 2018; Schmidt et al., 2022; Schmidt & Kirby, 2016; Schmidt, Webster & Duncanson, 2019; Webster et al., 2011). If another specific educational theory is applied, this should be explicitly named to allow future study of the outcomes from alternative educational theories. Training could be

tailored to needs of groups or individuals and timed to maximise applicability to any research being undertaken.

Peer support, mentoring and supervision aspects are critical. The risk of social isolation for rural researchers can be mitigated by developing opportunities for connection between research capable people within and beyond any research capacity building program. These connection processes can be extended to link those with a research interest to those with research capability.

Given the importance of informal relationships, continuity and consistency in training delivery is needed. The design of research education can provide this continuity by avoiding short-term funded projects and favouring long-term partnership-based approaches.

Recommendations for further research

This thesis has considered factors at three of the four structural levels of capacity building; individual, team and organisational (Cooke, 2005). Additional research considering the supra-organisational level, that is system-wide and policy factors, again from a critical realist perspective, would add another layer of depth in addition to the levels explored in this thesis. This would be possible only in a program or programs that have been running for a sufficient length of time for outcomes of this type to be realistically achieved; the study in Paper 5 focused on a period of five years or greater post-training and this would seem a minimum time for change at the supra-organisational level.

While strategies to build research capacity within teams in rural areas are a logical application of capacity building principles, there is not yet compelling research evidence of the effects of research capacity building strategies for teams. Development and trialling of a team-level rural research capacity building is a realistic future direction for research in this area.

While valid measures of research culture are available (Holden et al., 2012) and have been used to gauge research culture in rural areas (Raschke, Bradbury & Yoxall, 2022), these measures are quantitative in nature. To understand culture in healthcare, an ethnographic approach is both viable and valuable (Jones & Smith, 2017; Watson, 2012). An ethnographic study exploring the impact on research culture within a team as a result of training individuals in research would provide valuable insights, and could be incorporated into a critical realist perspective (Gatenby & Rees, 2014).

As more rural research programs emerge and develop, the same process of exploring Context, Mechanism and Outcome could be applied within and across a community of practice of rural research capacity program managers, leading to collaborative undertake research on rural research education across multiple rural and remote settings.

There has been no economic or impact evaluations of rural research capacity building programs. This is in part due to the complexity outlined throughout this thesis and the difficulty in measuring the opportunity cost of taking no action. A nuanced economic evaluation of a capacity building program for rural areas may add insights about the longer-term value of investment in research capacity building from a business perspective.

Strengths and limitations of this thesis

Size of the samples

Rural health services are often characterised by small numbers of health researchers. As a result the studies comprising this thesis draw from small samples, which may be considered a limitation,

although the size of these studies are consistent with similar studies in this field. The single case study used in Chapter 1 approach comes with concerns about generalisability consistent with its design if viewed from a positivist perspective (Ackroyd & Karlsson, 2014). In realist studies case study design is viewed as a crucial tool for the development of knowledge (Ackroyd & Karlsson, 2014), and are a useful tool for testing theory (Løkke & Sørensen, 2014). The studies examining program outcomes in Chapter 5 draw from small populations. While the studies themselves have samples representative of their trainees, it is acknowledged that these are small programs. The studies in Chapter 4 included only a single rural organisation. It should be noted this organisation is typical of many large rural health services within NSW.

Insider perspective

The researcher's position, my position, is as an insider who works in rural health research. This positioning can be viewed as both a strength and limitation of this thesis. This insider perspective and my knowledge of research training in a rural area informed the design of the studies in this thesis. It also created opportunity, with the studies contained in Chapter 4 possible due to being known as someone knowledgeable in rural health research issues. This knowledge and understanding allowed for nuanced exploration of issues raised in interviews and focus groups. My experience in this area allowed me to have the expertise to apply retroductive processes and develop explanatory mechanisms of 'why things are as they are' using critical realism (Stutchbury, 2022). Offsetting these strengths is the limitation inherent with the personal biases that I bring as a researcher. Reflexive practices and consistent application of bracketing were used to enhance the rigour of this thesis.

Pragmatic and disparate data sources

This thesis brings together several studies that intentionally span different organisations, research types and data collection methods. These approaches were all appropriate choices for exploring the research question for the individual studies as evidenced by their publication. This diversity of source and approach is a strength of this thesis and combining these as a single body of work in this thesis is made possible by the use of critical realism, which embraces diversity in research methods.

Chapter 8: Conclusion

Accessible research education is important but not sufficient for developing rural clinicians into clinician-researchers. Post-training organisational support is essential to transform research capability into research capacity. Structural supports are needed within rural health organisations, including organisational commitment to create environments in which rural health workers can learn about research, develop research experience and opportunities to undertake research. It is this combination of research training and supportive environments that will lead to optimised rural research capacity.

This thesis has explored research capacity building in a rural environment. Rural health research training is a complex process that occurs in a complex and evolving context. At the organisational level, rural health organisations can positively impact research capacity building by addressing structural impediments to research training and research activity, which include limited operational planning for research and limited opportunity for research capable individuals to undertake research post-training. Research capacity building operates in a learning context where decision-making about targets for training and approaches to research development are influenced by limited resourcing, available supports and existing collaborative relationships, but awareness of these limitations can allow organisations to make change to develop structural responses to them.

Individual research training using an experiential learning process by training in the workplace, engaging the hosting organisation, embedding and normalising research as an activity for rural health workers, and providing supports from peers, mentors and supervisors provides short-term outcomes. These outcomes include increased research capacity, activity and capability, along with the potential for future cooperative research activities. Research capacity building contributes to staff retention, sees research that influences policy and practice, and raises the profile of research within teams and organisations.

Articulating these outcomes and context reveals a range of the mechanisms at play in the education of research for the rural workforce. These mechanisms include prevailing attitudes of being “too rural and too poor” to undertake research, limited organisational valuing of research and a disconnect between individual and organisational research priorities, along with a limited amount of access to research expertise in rural health services. These inhibitory mechanisms are countered by the use of existing relationships to build informal collaborations based on goodwill, along with actions to negate or eliminate these inhibitory mechanisms. Further structural solutions such as the design of program, creative ways to enable protected research time, and strategic engagement with the hosting organisation are important aspects of research capacity building.

Developing and delivering rural health research training should emphasise collaboration and teamwork, within teams and organisations to maximise the use of existing expertise, as well as strategic partnering between health organisations and external education partners. Capacity building endeavours should carefully consider the learner context and commit to long-term relationship-based approaches to rural research training programs. Capacity building approaches delivered by educators within the public health system have the potential to influence the learning environment to provide a support space for clinicians to become clinician-researchers.

The past has shown that individual level interventions have driven individual level outcomes. There are important but missing opportunities to maximise the potential to move from individual capability to individual and organisational research capacity in rural health organisations. Considering and

addressing structural supports will not only inform the next stage of organisational investment but will maximise the benefits in rural research capacity building.

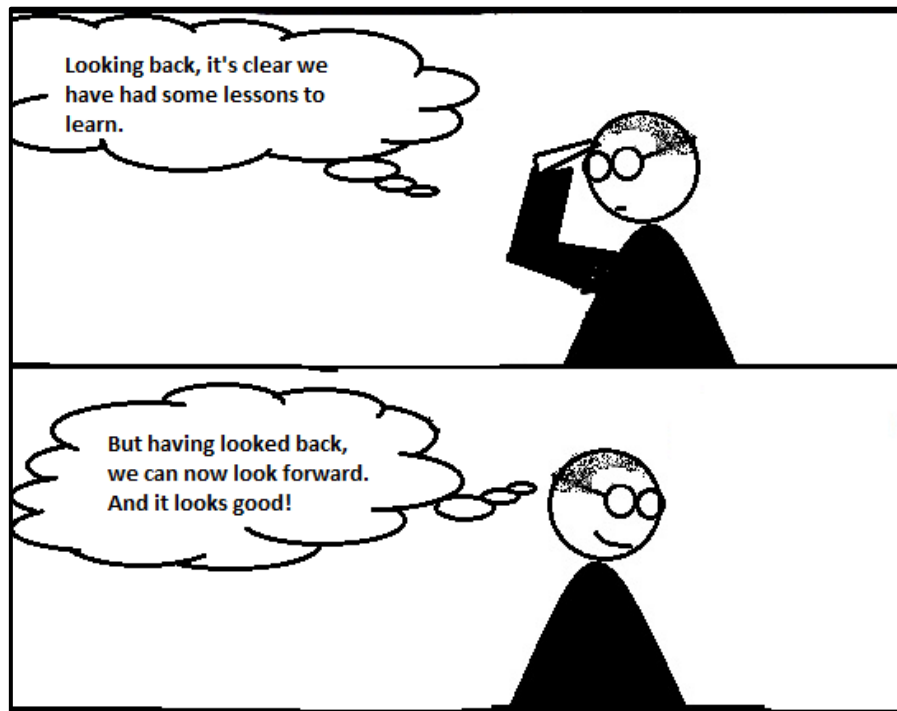


Figure 16: Looking forward, having looked back

References

- Ackroyd, S & Karlsson, J 2014, 'Critical Realism, Research Techniques and Research Designs', in Edwards, P, O'mahoney, J & Vincent, S (eds.), *Studying Organizations Using Critical Realism*, Oxford University Press, Oxford.
- Aggarwal, R, Gupte, N, Kass, N, Taylor, H, Ali, J, Bhan, A, Aggarwal, A, Sisson, SD, Kanchanaraksa, S, Mckenzie-White, J, McGready, J, Miotti, P & Bollinger, RC 2011, 'A comparison of online versus on-site training in health research methodology: a randomized study', *BMC Medical Education*, vol. 11, no. 1, pp. 37-37.
- Allan, J, Ball, P & Alston, M 2007, 'Developing sustainable models of rural health care: a community development approach', *Rural and Remote Health*, vol. 7, no. 4, pp. 1-13.
- Alston, L, Bourke, L, Nichols, M & Allender, S 2020, 'Responsibility for evidence-based policy in cardiovascular disease in rural communities: implications for persistent rural health inequalities', *Australian Health Review*, vol. 44, no. 4, pp. 527-534.
- Alston, L, Field, M, Brew, F, Payne, W, Aras, D & Versace, VL 2022, 'Addressing the lack of research in rural communities through building rural health service research: Establishment of a research unit in Colac, a medium rural town', *Australian Journal of Rural Health*, vol. 30, no. 4, pp. 536-539.
- Asghari, S, Heeley, T, Bethune, C, Graham, W, Maclellan, C, Button, C, Porter, N & Parsons, S 2021, 'Evaluation plan of the 6for6 research skills program for rural and remote physicians', *Evaluation and Program Planning*, vol. 87, pp. 101933.
- Asghari, S, Heeley, T, Walsh, A, Rourke, J, Bethune, C & Graham, W 2019, 'Rural360: incubating socially accountable research in the Canadian North', *International Journal of Circumpolar Health*, vol. 78(1), pp. 1633191.
- Auld, R, Loppacher, T, Rose, S, Milat, AJ & Penna, A 2018, 'Translational Research Grants Scheme (TRGS): a new approach to strengthening health system research capacity', *Public Health Research & Practice*, vol. 28, no. 3.
- Australian Government 2020, *National Strategic Framework for Rural and Remote Health*, Care, Department Of Health and Ageing, Canberra.
- Australian Institute of Health and Welfare 2019, 'Rural & remote health', AIHW, Canberra.
- Australian Institute of Health and Welfare 2022, 'General practice, allied health and other primary care services', AIHW, Canberra.
- Awaisu, A, Kheir, N, Alrowashdeh, HA, Allouch, SN, Jebara, T, Zaidan, M & Mohamed Ibrahim, MI 2015, 'Impact of a pharmacy practice research capacity-building programme on improving the research abilities of pharmacists at two specialised tertiary care hospitals in Qatar: A preliminary study', *Journal of Pharmaceutical Health Services Research*, vol. 6, no. 3, pp. 155-164.
- Axe, D 2011, *Pentagon plots comic book therapy for troops*, viewed 15/12/2017, <https://www.wired.com/2011/04/comic-book-therapy/>
- Back-Pettersson, SRNP, Jensen, KPRNML, Kylen, SRPP, Sernert, NRPTP & Hermansson, ERP 2013, 'Nurses' experiences of participation in a research and development programme', *Journal of Clinical Nursing*, vol. 22, no. 7-8, pp. 1103-1111.
- Badli, TS-ZT & Dzulkifli, MA 2013, 'The effect of humour and mood on memory recall', *Procedia-Social and Behavioral Sciences*, vol. 97, pp. 252-257.
- Bailey, J, Veitch, C, Crossland, L & Preston, R 2006, 'Developing research capacity building for Aboriginal & Torres Strait Islander health workers in health service settings', *Rural and Remote Health*, vol. 6, no. 4, pp. 556.
- Barclay, L, Phillips, A & Lyle, D 2018, 'Rural and remote health research: Does the investment match the need?', *The Australian Journal of Rural Health*, vol. 26, no. 2, pp. 74-79.
- Bell, E 2008, 'Great 21st Century Debates About The Usefulness Of Research: Can They Help Rural Research?', *Rural Society*, vol. 18, no. 1, pp. 3-16.

- Bell, E, Harpur, S, Doherty, K, Struber, J & Davies, L 2011, 'What is translational research? Background, concepts, and a definition', *Public Health Yearbook 2011*, pp. 141.
- Bernstein, J 2014, 'CORR Insights®: Does research participation make a difference in residency training?', *Clinical Orthopaedics and Related Research®*, vol. 472, no. 1, pp. 377-378.
- Bethune, C, Heeley, T, Graham, W & Asghari, S 2019, 'There is no "I" in rural research capacity building', *The Australian Journal of Rural Health*, vol. 27, no. 3, pp. 268-268.
- Bevilacqua, JJ, Morris, JA & Pumariega, AJ 1996, 'State services research capacity: Building a state infrastructure for mental health services research', *Community Mental Health Journal*, vol. 32(6), pp. 519-533.
- Bhaskar, R 1975, *A realist theory of science*, Leeds Books Ltd., Leeds.
- Bhaskar, R 2008a, *Dialectic: the pulse of freedom*, Routledge, London.
- Bhaskar, R 2008b, *A realist theory of science*, Routledge, London.
- Bhaskar, R & Hartwig, M 2010, *The formation of critical realism a personal perspective*, 1st ed. edn, Routledge, Abingdon, Oxfordshire.
- Brett, T, Sherrard, R & Bower, A 2006, 'Research capacity building in general practice: a new opportunity in Fremantle, WA', *Australian Family Physician*, vol. 35, no. 1-2, pp. 65-6.
- Brown, JB, Morrison, T, Bryant, M, Kassell, L & Nestel, D 2015, 'A framework for developing rural academic general practices: a qualitative case study in rural Victoria', *Rural and Remote Health*, vol. 15, no. 2.
- Brown, LJ, Urquhart, L, Squires, K, Crowley, E, Heaney, S, Kocanda, L & Schumacher, T 2021, 'Starting from scratch: Developing and sustaining a rural research team lessons from a nutrition and dietetics case study', *Australian Journal of Rural Health*, vol. 29, no. 5, pp. 729-741.
- Caingcoy, M 2020, 'Research Capability of Teachers: Its Correlates, Determinants and Implication for Continuing Professional Development', *Determinants and Implication for Continuing Professional Development (June 20, 2020)*.
- Cameron, HE, Boreland, FT, Morris, JR, Lyle, DM, Perkins, DA, Magin, PJ, Marshall, MJ & Zwar, NA 2013, 'New South Wales and Australian Capital Territory Researcher Development Program 2005-07: modest investment, considerable outcomes', *Australian Journal of Primary Health*, vol. 19, no. 1, pp. 59-67.
- Cañas, AJ, Carff, R, Hill, G, Carvalho, M, Arguedas, M, Eskridge, TC, Lott, J & Carvajal, R 2005, 'Concept Maps: Integrating Knowledge and Information Visualization', in Tergan, S-O & Keller, T (eds.), *Knowledge and Information Visualization: Searching for Synergies*, Springer Berlin Heidelberg, Berlin, Heidelberg.
- Carter, B & New, C 2004, *Making Realism Work: Realist Social Theory and Empirical Research*, Routledge, Florence.
- Cheung, MMY, Saini, B & Smith, L 2016, 'Using drawings to explore patients' perceptions of their illness: a scoping review', *Journal of Multidisciplinary Healthcare*, vol. 9, pp. 631-646.
- Clark, AM, Lissel, SL & Davis, C 2008, 'Complex critical realism: tenets and application in nursing research', *Advances in Nursing Science*, vol. 31, no. 4, pp. E67-E79.
- Cochran-Smith, M, Ell, F, Grudnoff, L, Ludlow, L, Haigh, M & Hill, M 2014, 'When Complexity Theory Meets Critical Realism: A Platform for Research on Initial Teacher Education', *Teacher Education Quarterly*, vol. 41, no. 1, pp. 105-122.
- Collett, J, Webster, E, Gray, A & Delany, C 2022, 'Equipping medical students for ward round learning', *The Clinical Teacher*, vol. 19, no. 4, pp. 316-322.
- Cooke, J 2005, 'A framework to evaluate research capacity building in health care', *BMC Family Practice*, vol. 6, no. 44.
- Cooke, J, Gardois, P & Booth, A 2018, 'Uncovering the mechanisms of research capacity development in health and social care: a realist synthesis', *Health Research Policy and Systems*, vol. 16, no. 1, pp. 93.

- Cooke, J, Nancarrow, S, Dyas, J & Williams, M 2008, 'An evaluation of the 'Designated Research Team' approach to building research capacity in primary care', *BMC Family Practice*, vol. 9, no. 1, pp. 37-37.
- Crozier, K, Moore, J & Kite, K 2012, 'Innovations and action research to develop research skills for nursing and midwifery practice: The Innovations in Nursing and Midwifery Practice Project study', *Journal of Clinical Nursing*, vol. 21, no. 11-12, pp. 1716-1725.
- Cruickshank, J 2004, 'A tale of two ontologies: an immanent critique of critical realism', *The Sociological Review (Keele)*, vol. 52, no. 4, pp. 567-585.
- Dernova, M 2015, 'Experiential learning theory as one of the foundations of adult learning practice worldwide', *Comparative Professional Pedagogy*, vol. 2, no. 5, pp. 52-57.
- Dixon, J & Welch, N 2000, 'Researching the rural–metropolitan health differential using the 'social determinants of health'', *Australian Journal of Rural Health*, vol. 8, no. 5, pp. 254-260.
- Doel, M & Shardlow, S (eds.) 2009, *Educating Professionals : Practice Learning in Health and Social Care*, Ashgate, Farnham.
- Dörfler, V & Stierand, M 2020, 'Bracketing: a phenomenological theory applied through transpersonal reflexivity', *Journal of Organizational Change Management*.
- Duncanson, K, Webster, EL & Schmidt, DD 2018, 'Impact of a remotely delivered, writing for publication program on publication outcomes of novice researchers', *Rural and Remote Health*, vol. 18, no. 2.
- Duplass, J 1996, 'Charts, Tables, Graphs, and Diagrams: An Approach for Social Studies Teachers', *Social Studies*, vol. 87, no. 1, pp. 32.
- Ecob, A 2012, 'The graphic power of knowledge: visual aids to understanding, such as diagrams, maps, charts and models, flourished long before we called them 'graphic design'. Here are eight striking examples of information designs that have made a difference--in science, medicine, geography, politics and news media', *Eye: the International Review of Graphic Design*, vol. 21, no. 82, pp. 24.
- Evans, D 2003, 'Hierarchy of evidence: a framework for ranking evidence evaluating healthcare interventions', *Journal of Clinical Nursing*, vol. 12, no. 1, pp. 77-84.
- Ewen, SC, Ryan, T & Platania-Phung, C 2019, 'Capacity building of the Australian Aboriginal and Torres Strait Islander health researcher workforce: a narrative review', *Human Resources For Health*, vol. 17(1), pp. 10.
- Far West Local Health District 2023, *About the Far West LHD*, viewed 1/5/2023, <https://www.nsw.gov.au/health/fwlhd/about-us>
- Finch, E, Cornwell, P, Ward, EC & Mcphail, SM 2013, 'Factors influencing research engagement: research interest, confidence and experience in an Australian speech-language pathology workforce', *BMC Health Services Research*, vol. 13, pp. 1-11.
- Finefter-Rosenbluh, I 2017, 'Incorporating perspective taking in reflexivity: A method to enhance insider qualitative research processes', *International Journal of Qualitative Methods*, vol. 16, no. 1, pp. 1609406917703539.
- Fischer, CT 2009, 'Bracketing in qualitative research: Conceptual and practical matters', *Psychotherapy Research*, vol. 19, no. 4-5, pp. 583-590.
- Flenady, T, Dwyer, T, Kahl, J, Sobolewska, A, Reid-Searl, K & Signal, T 2022a, 'Research capacity-building for clinicians: understanding how the research facilitator role fosters clinicians' engagement in the research process', *Health Research Policy and Systems*, vol. 20, no. 1, pp. 1-13.
- Flenady, T, Dwyer, T, Kahl, J, Sobolewska, A, Reid-Searl, K & Signal, T 2022b, 'Research Ready Grant Program (RRGP) protocol: a model for collaborative multidisciplinary practice–research partnerships', *Health Research Policy and Systems*, vol. 20, no. 1, pp. 62.
- Fletcher, AJ 2017, 'Applying critical realism in qualitative research: methodology meets method', *International Journal of Social Research Methodology*, vol. 20, no. 2, pp. 181-194.

- Fry, M & Dombkins, A 2017, 'Interventions to support and develop clinician-researcher leadership in one health district', *International Journal of Health Care Quality Assurance*, vol. 30(6), pp. 528-538.
- Gatenby, M & Rees, C 2014, 'Critical Realism and Ethnography', Oxford University Press, Oxford.
- Giles, G, Malin, M & Harvey, P 2006, 'The Centre of Clinical Research Excellence in Aboriginal and Torres Strait Islander Health: An operational rationale and some reflections on progress so far', *Australian Journal of Primary Health*, vol. 12(2), pp. 97-104.
- Goldacre, B 2014, *I think you'll find it's a bit more complicated than that : selected writing*, Fourth Estate, London.
- Golenko, X, Pager, S & Holden, L 2012, 'A thematic analysis of the role of the organisation in building allied health research capacity: a senior managers' perspective', *BMC Health Services Research*, vol. 12, pp. 276.
- Gorski, PS 2013, 'What is critical realism? And why should you care?', SAGE Publications Sage CA: Los Angeles, CA.
- Greenhill, J, King, D, Lane, A & Macdougall, C 2009, 'Understanding resilience in South Australian farm families', *Rural Society*, vol. 19, no. 4, pp. 318-325.
- Grimmer, K, Lizarondo, L, Kumar, S, Bell, E, Buist, M & Weinstein, P 2014, 'An evidence-based framework to measure quality of allied health care', *Health Research Policy and Systems*, vol. 12, no. 1, pp. 10-10.
- Grundy, J & Johnston, F 2003, 'Building research capacity in primary health care settings in the Northern Territory', *Australian Journal of Primary Health*, vol. 9, no. 1, pp. 9-17.
- Harden, JT & Watman, RA 2015, 'The National Hartford Center of Gerontological Nursing Excellence: An Evolution of a Nursing Initiative to Improve Care of Older Adults', *The Gerontologist*, vol. 55(Supplement 1), pp. S1-S12.
- Harding, KE, Stephens, D, Taylor, NF, Chu, E & Wilby, A 2010, 'Development and evaluation of an allied health research training scheme', *Journal of Allied Health*, vol. 39, no. 4, pp. e143-8.
- Harvey, D, Plummer, D, Nielsen, I, Adams, R & Pain, T 2016, 'Becoming a clinician researcher in allied health', *Australian Health Review*, vol. 40, no. 5, pp. 562.
- Harwood, L & Clark, AM 2012, 'Understanding health decisions using critical realism: home-dialysis decision-making during chronic kidney disease', *Nursing Inquiry*, vol. 19, no. 1, pp. 29-38.
- Hawk, M, Nimgaonkar, V, Bhatia, T, Brar, JS, Elbahaey, WA, Egan, JE, Konasale, P, Kumar, S, McDonald, MC, Singh, R, Swaminathan, S, Wood, J & Deshpande, SN 2017, 'A 'Grantathon' model to mentor new investigators in mental health research', *Health Research Policy and Systems*, vol. 15(1), pp. 92.
- Hay-Smith, EJC, Brown, M, Anderson, L & Treharne, GJ 2016, 'Once a clinician, always a clinician: a systematic review to develop a typology of clinician-researcher dual-role experiences in health research with patient-participants', *BMC Medical Research Methodology*, vol. 16, no. 1, pp. 95.
- Hellawell, D 2006, 'Inside-out: analysis of the insider-outsider concept as a heuristic device to develop reflexivity in students doing qualitative research', *Teaching in Higher Education*, vol. 11, no. 4, pp. 483-494.
- Holden, L, Pager, S, Golenko, X & Ware, RS 2012, 'Validation of the research capacity and culture (RCC) tool: measuring RCC at individual, team and organisation levels', *Australian Journal of Primary Health*, vol. 18, no. 1, pp. 62-67.
- Hulcombe, J, Sturgess, J, Souvlis, T & Fitzgerald, C 2014, 'An approach to building research capacity for health practitioners in a public health environment: An organisational perspective', *Australian Health Review*, vol. 38(3), pp. 252-258.
- Hunter New England Local Health District 2023, *Hunter New England*, <https://www.health.nsw.gov.au/lhd/pages/hnelhd.aspx>
- Hurrell, SA 2014, 'Critical Realism and Mixed Methods Research', Oxford University Press, Oxford.

- Jain, MK, Cheung, VG, Utz, PJ, Kobilka, BK, Yamada, T & Lefkowitz, R 2019, 'Saving the Endangered Physician-Scientist — A Plan for Accelerating Medical Breakthroughs', *New England Journal of Medicine*, vol. 381, no. 5, pp. 399-402.
- Janssen, J, Hale, L, Mirfin-Veitch, B & Harland, T 2013, 'Building the Research Capacity of Clinical Physical Therapists Using a Participatory Action Research Approach', *Physical Therapy*, vol. 93, no. 7, pp. 923.
- Jessop, B 2005, 'Critical Realism and the Strategic-Relational Approach', *New Formations: A Journal of Culture, Theory and Politics*, no. 56, pp. 40-53.
- Johnston, RB & Smith, SP 2010, 'How critical realism clarifies validity issues in theory-testing research analysis and case', in Hart, DN & Gregor, SD (eds.), *Information Systems Foundations: The Role of Design Science*, ANU Press.
- Jones, A, Burgess, TA, Farmer, EA, Fuller, J, Stocks, NP, Taylor, JE & Waters, RL 2003, 'Building research capacity. An exploratory model of GPs' training needs and barriers to research involvement', *Australian Family Physician*, vol. 32.
- Jones, J & Smith, J 2017, 'Ethnography: challenges and opportunities', *Evidence-Based Nursing*, vol. 20, no. 4, pp. 98-100.
- Keane, S, Lincoln, M, Rolfe, M & Smith, T 2013, 'Retention of the rural allied health workforce in New South Wales: a comparison of public and private practitioners', *BMC Health Services Research*, vol. 13.
- Kearney, KS & Hyle, AE 2004, 'Drawing out emotions: the use of participant-produced drawings in qualitative inquiry', *Qualitative Research*, vol. 4, no. 3, pp. 361-382.
- Kempster, S & Parry, KW 'Critical realism and grounded theory'.
- King, OA, Wong Shee, A, Howlett, O, Clapham, R & Versace, VL 2022, 'Research training incorporating education and mentoring for rural and regional allied health professionals: An evaluation study', *Australian Journal of Rural Health*, vol. 30, no. 5, pp. 654-665.
- Knowles, MS, Holton, EF & Swanson, RA 2005, *The adult learner: The definitive classic in adult education and human resource development*, 6th edn, Elsevier, Boston.
- Kujala, J, Rehbein, K, Toikka, T & Enroth, J 2013, 'Researching the gap between strategic and operational levels of corporate responsibility', *Baltic Journal of Management*, vol. 8, no. 2, pp. 142-165.
- Kuzhabekova, A & Lee, J 2018, 'International faculty contribution to local research capacity building: A view from publication data', *Higher Education Policy*, vol. 31, pp. 423-446.
- Laven, G & Wilkinson, D 2003, 'Rural doctors and rural backgrounds: how strong is the evidence? A systematic review', *Australian Journal of Rural Health*, vol. 11, no. 6, pp. 277-284.
- Lawani, A 2021, 'Critical realism: what you should know and how to apply it', *Qualitative Research Journal*, vol. 21, no. 3, pp. 320-333.
- Løkke, A-K & Sørensen, PD 2014, 'Theory testing using case studies', *Electronic Journal of Business Research Methods*, vol. 12, no. 1, pp. pp66-74-pp66-74.
- Macdonald, S, Newburn-Cook, C, Schopflocher, D & Richter, S 2009, 'Addressing non-response bias in postal surveys', *Public Health Nursing*, vol. 26, no. 1, pp. 95-105.
- Macleod, ML & Zimmer, LV 2005, 'Rethinking emancipation and empowerment in action research: Lessons from small rural hospitals', *Canadian Journal of Nursing Research Archive*, pp. 68-84.
- Manahan, CM, Hardy, CL & Macleod, ML 2009, 'Personal characteristics and experiences of long-term allied health professionals in rural and northern British Columbia', *Rural and Remote Health*, vol. 9, no. 4, pp. 1-13.
- Marks, A & O'mahoney, J 2014, 'Researching identity: a critical realist approach', in Edwards, P, O'mahoney, J & Vincent, S (eds.), *Studying Organizations Using Critical Realism*, Oxford University Press, Oxford.
- Matus, J, Walker, A & Mickan, S 2018, 'Research capacity building frameworks for allied health professionals – a systematic review', *BMC Health Services Research*, vol. 18, no. 1, pp. 716.

- Matus, J, Wenke, R, Hughes, I & Mickan, S 2019, 'Evaluation of the research capacity and culture of allied health professionals in a large regional public health service', *Journal of Multidisciplinary Healthcare*, vol. 12, pp. 83-96.
- Maybery, D, Pope, R, Hodgins, G, Hitchenor, Y & Shepherd, A 2009, 'Resilience and well-being of small inland communities: Community assets as key determinants', *Rural Society*, vol. 19, no. 4, pp. 326-339.
- Mccarthy, P, Bethune, C, Fitzgerald, S, Graham, W, Asghari, S, Heeley, T & Godwin, M 2016a, 'Curriculum development of 6for6: Longitudinal research skills program for rural and remote family physicians', *Canadian Family Physician*, vol. 62, no. 2, pp. e89-e95.
- Mccarthy, P, Bethune, C, Fitzgerald, S, Graham, W, Asghari, S, Heeley, T & Godwin, M 2016b, 'Needs assessment for development of 6for6: Longitudinal research skills program tailored to rural and remote family physicians', *Canadian Family Physician*, vol. 62, no. 2, pp. e80-e88.
- Mccurtin, A & O'connor, A 2020, 'Building a collaborative research community of practice and supporting research engagement in speech-language pathology: identification of stakeholder priorities', *International Journal of Evidence Based Healthcare*, vol. 08.
- Mcdonald, EL, Bailie, R & Michel, T 2013, 'Development and trialling of a tool to support a systems approach to improve social determinants of health in rural and remote Australian communities: the healthy community assessment tool', *International Journal for Equity in Health*, vol. 12, no. 1, pp. 1-10.
- Mcevoy, P & Richards, D 2003, 'Critical realism: a way forward for evaluation research in nursing?', *Journal of Advanced Nursing*, vol. 43, no. 4, pp. 411-420.
- Mcgrail, MR, O'sullivan, BG & Russell, DJ 2018, 'Rural training pathways: the return rate of doctors to work in the same region as their basic medical training', *Human Resources for Health*, vol. 16, no. 1, pp. 1-10.
- Mcgrath, R 2021, 'Journalling and memoing: reflexive qualitative research tools', *Handbook of Qualitative Research Methodologies in Workplace Contexts*, Edward Elgar Publishing.
- Mcintyre, E, Brun, L & Cameron, H 2011, 'Researcher development program of the primary health care research, evaluation and development strategy', *Australian Journal of Primary Health*, vol. 17, no. 1, pp. 114-121.
- Meurer, LN, Denomie, M, Morzinski, JA, Nelson, DA, Meurer, JR, Chandler, TE & Ahmed, S 2020, 'Incorporating Community Engagement in Primary Care Research Training: Eleven-Year Outcomes', *Progress in Community Health Partnerships: Research, Education, and Action*, vol. 14(1), pp. 63-74.
- Mickan, S & Coates, D 2022, 'Embedded researchers in Australia: survey of profile and experience across medical, nursing and midwifery and allied health disciplines', *Journal of Clinical Nursing*, vol. 31, no. 3-4, pp. 417-426.
- Moran, A, Haines, H, Raschke, N, Schmidt, D, Koschel, A, Stephens, A, Opie, C & Nancarrow, S 2019, 'Mind the gap: is it time to invest in embedded researchers in regional, rural and remote health services to address health outcome discrepancies for those living in rural, remote and regional areas?', *Australian Journal of Primary Health*, vol. 25, no. 2, pp. 104-107.
- Mulholland, MJ 2004, 'Comics as art therapy', *Art Therapy*, vol. 21, no. 1, pp. 42-43.
- Murdoch, JC 2009a, 'Clinical researchers', *British Journal of General Practice*, vol. 59, no. 563, pp. 450.
- Murdoch, JC 2009b, 'The end of practice-based research?', *British Journal of General Practice*, vol. 59, no. 558, pp. 52.
- Murphy, K, Stockton, D, Kolbe, A, Hulme-Chambers, A & Smythe, G 2015, 'Building research capacity in a regional Australian health service: A management strategy analysis', *Asia Pacific Journal of Health Management*, vol. 10, no. 1, pp. 14-22.
- Ndebele, C, Muhuro, P & Nkonki, V 2016, 'Rurality and the professional development of university teachers', *South African Journal of Higher Education*, vol. 30, no. 6, pp. 127-145.
- Nelson, LE & Morrison-Beedy, D 2008, 'Research team training: moving beyond job descriptions', *Applied Nursing Research*, vol. 21, no. 3, pp. 159-64.

- New South Wales Government 2022, *Service Agreement 2022-23*, Ministry of Health.
- New South Wales Government 2023, *Our structure*, viewed 27/03/2023, <https://www.health.nsw.gov.au/about/nswhealth/Pages/structure.aspx>
- Nielsen, K & Miraglia, M 2017, 'What works for whom in which circumstances? On the need to move beyond the 'what works?' question in organizational intervention research', *Human Relations*, vol. 70, no. 1, pp. 40-62.
- Nightingale, J, Fowler-Davis, S, Grafton, K, Kelly, S, Langham, C, Lewis, R, Bianco, B & Harrop, D 2020, 'The role of Allied Health Professions and Nursing Research Internships in developing a research culture: a mixed-methods exploration of stakeholder perspectives', *Health Research Policy and Systems*, vol. 18(1) (no pagination).
- Nyström, ME, Karlton, J, Keller, C & Andersson Gäre, B 2018, 'Collaborative and partnership research for improvement of health and social services: researcher's experiences from 20 projects', *Health Research Policy and Systems*, vol. 16, no. 1, pp. 46.
- O'sullivan, BG & Worley, P 2020, 'Setting priorities for rural allied health in Australia: a scoping review', *Rural and Remote Health*, vol. 20, no. 2.
- Office of Health and Medical Research 2017, *NSW Translational Research Grants Scheme*, viewed 7/10/2017,
- Offredy, MBaMP 2007, 'Supporting research in primary care: building capacity from within', *Quality in Primary Care*, vol. 15, no. 2, pp. 73-75.
- Oladele, D, Clark, AM, Richter, S & Laing, L 2013, 'Critical realism: a practical ontology to explain the complexities of smoking and tobacco control in different resource settings', *Global Health Action*, vol. 6, no. 1, pp. 19303.
- Pager, S, Holden, L & Golenko, X 2012, 'Motivators, enablers, and barriers to building allied health research capacity', *Journal of Multidisciplinary Healthcare*, vol. 5, no. 53, pp. e9.
- Pain, T, Petersen, M & Fernando, M 2018, 'Building Allied Health Research Capacity at a Regional Australian Hospital: A Follow-up Study', *Internet Journal of Allied Health Sciences and Practice*, vol. 16, no. 4, pp. 8.
- Parliament of New South Wales 2022, *Report 57 - Health outcomes and access to health and hospital services in rural, regional and remote New South Wales*, 2, LCPCN, Sydney.
- Pawson, R, Greenhalgh, T, Gill, H & Walshe, K 2005, 'Realist review - a new method of systematic review designed for complex policy interventions', *Journal of Health Services Research & Policy*, vol. 10, pp. 21-34.
- Pedigo, AS & Odoi, A 2010, 'Investigation of disparities in geographic accessibility to emergency stroke and myocardial infarction care in East Tennessee using geographic information systems and network analysis', *Annals of Epidemiology*, vol. 20, no. 12, pp. 924-930.
- Playford, D, Wheatland, B & Larson, A 2010, 'Does teaching an entire nursing degree rurally have more workforce impact than rural placements?', *Contemporary Nurse*, vol. 35, no. 1, pp. 68-76.
- Pong, RW, Desmeules, M & Lagacé, C 2009, 'Rural-urban disparities in health: How does Canada fare and how does Canada compare with Australia?', *Australian Journal of Rural Health*, vol. 17, no. 1, pp. 58-64.
- Priest, H, Segrott, J, Green, B & Rout, A 2007, 'Harnessing collaboration to build nursing research capacity: a research team journey', *Nurse Education Today*, vol. 27.
- Ramkalawan, T & Dieppe, P 2008, 'Research capacity development and training', *Journal of Health Services Research and Policy*, vol. 13, no. Suppl 3, pp. 6-11.
- Raschke, N, Bradbury, J & Yoxall, J 2022, 'Perceptions of research capacity in public health organisations: comparison of NSW metropolitan and non-metropolitan Local Health Districts', *Australian Health Review*, vol. 46, no. 6, pp. 746-755.
- Rettke, H, Pretto, M, Spichiger, E, Frei, IA & Spirig, R 2018, 'Using reflexive thinking to establish rigor in qualitative research', *Nursing Research*, vol. 67, no. 6, pp. 490-497.
- Ried, K, Farmer, EA & Weston, KM 2006a, 'Setting directions for capacity building in primary health care: a survey of a research network', *BMC Family Practice*, vol. 7.

- Ried, K, Farmer, EA & Weston, KM 2006b, 'Setting directions for capacity building in primary health care: a survey of a research network', *BMC Family Practice*, vol. 7, pp. 8.
- Ried, K, Farmer, EA & Weston, KM 2007, 'Bursaries, writing grants and fellowships: a strategy to develop research capacity in primary health care', *BMC Family Practice*, vol. 8, no. 19.
- Ried, K & Fuller, J 2005, 'Building a culture of research dissemination in primary health care: the south Australian experience of supporting the novice researcher', *Australian Health Review*, vol. 29.
- Ried, K, Montgomery, BD, Stocks, NP & Farmer, EA 2008, 'General practice research training: impact of the Australian Registrar Research Workshop on research skills, confidence, interest and involvement of participants, 2002-2006.', *Family Practice*, vol. 25, no. 2, pp. 119-126.
- Robin, KR & Linda, CL 2013, 'Recruitment and retention of occupational therapists and physiotherapists in rural regions: a meta-synthesis', *BMC Health Services Research*, vol. 13, no. 1, pp. 59-59.
- Salmon, L, Curtin, M, Ginnivan, D & Neumayer, R 2007, 'Building sustainable rural research capacity: The experiences of a brain injury rehabilitation service', *Australian Journal of Rural Health*, vol. 15, no. 3, pp. 155-158.
- Sambrani, T, Mani, S, Almeida, M & Jakubovski, E 2014, 'The effect of humour on learning in an educational setting', *International Journal of Education and Psychological Research*, vol. 3, no. 3, pp. 52-55.
- Sarre, G & Cooke, J 2009, 'Developing indicators for measuring Research Capacity Development in primary care organizations: a consensus approach using a nominal group technique', *Health & Social Care in the Community*, vol. 17, no. 3, pp. 244.
- Schmidt, D, Duncanson, K, Webster, E, Saurman, E & Lyle, D 2022, 'Critical realist exploration of long-term outcomes, impacts and skill development from an Australian Rural Research Capacity Building Programme: a qualitative study', *BMJ Open*, vol. 12, no. 12, pp. e065972.
- Schmidt, D, Reyment, J, Kirby, S, Webster, EL & Lyle, D 2020a, 'The place of research in the rural health workplace structure: a content analysis of a rural health organisation's strategic and operational documents', *Rural and Remote Health*, vol. 20, no. 2, pp. 5493.
- Schmidt, D, Reyment, J, Webster, E, Kirby, S & Lyle, D 2020b, 'Workplace-based health research training: a qualitative study of perceived needs in a rural setting', *Health Research Policy and Systems*, vol. 18, no. 1, pp. 67.
- Schmidt, D, Robinson, K & Webster, E 2014, 'Factors influencing attrition from a researcher training program', *International Journal for Researcher Development*, vol. 5, no. 1, pp. 56-67.
- Schmidt, DD 2016, 'What a great idea! Someone should evaluate that', *Australian Health Review*, vol. 40, no. 3, pp. 270-272.
- Schmidt, DD & Kirby, S 2016, 'A modular approach to rural and remote research education: a project report', *Rural Remote Health*, vol. 16, no. 1, pp. 3609.
- Schmidt, DD, Webster, E & Duncanson, K 2019, 'Building research experience: Impact of a novice researcher development program for rural health workers', *Australian Journal of Rural Health*.
- Scott, D & Bhaskar, R 2015, *Roy Bhaskar A Theory of Education*, 1st ed. 2015. edn, Springer International Publishing, Cham.
- Smith, H, Wright, D, Morgan, S, Dunleavey, J & Moore, M 2002, 'The 'Research Spider': a simple method of assessing research experience', *Primary Health Care Research and Development*, vol. 3, no. 3, pp. 139-140.
- Smith, KB, Humphreys, JS & Wilson, MGA 2008, 'Addressing the health disadvantage of rural populations: how does epidemiological evidence inform rural health policies and research?', *Australian Journal of Rural Health*, vol. 16, pp. 56-66.
- Snowden, J, Darden, P, Palumbo, P, Saul, P & Lee, J 2018, 'The institutional development award states pediatric clinical trials network: building research capacity among the rural and medically underserved', *Current Opinion in Pediatrics*, vol. 30, no. 2, pp. 297-302.

- Stajic, J, Harfield, S, Brown, A, Dawson, A, Davy, C, Aromataris, E & Braunack-Mayer, A 2019, 'Evaluating a research capacity strengthening program for Aboriginal community-controlled health organisations', *Australian Journal of Primary Health*, vol. 25(1), pp. 72-81.
- Stauffacher, M, Walter, AI, Lang, DJ, Wiek, A & Scholz, RW 2006, 'Learning to research environmental problems from a functional socio-cultural constructivism perspective', *International Journal of Sustainability in Higher Education*, vol. 7, no. 3, pp. 252-275.
- Sturgiss, EA & Clark, AM 2020, 'Using critical realism in primary care research: an overview of methods', *Family Practice*, vol. 37, no. 1, pp. 143-145.
- Stutchbury, K 2022, 'Critical realism: an explanatory framework for small-scale qualitative studies or an 'unhelpful edifice'?', *International Journal of Research & Method in Education*, vol. 45, no. 2, pp. 113-128.
- Sword, W, Clark, AM, Hegadoren, K, Brooks, S & Kingston, D 2012, 'The complexity of postpartum mental health and illness: a critical realist study', *Nursing Inquiry*, vol. 19, no. 1, pp. 51-62.
- Taylor, J, Hughes, C, Petkov, J & Williams, M 2005, 'Unique issues in research and evaluation in rural and remote locations: Is there a place for specific research training?', *Rural and Remote Health*, vol. 5, no. 2, pp. 351-362.
- Thomas, P, Graffy, J, Wallace, P & Kirby, M 2006, 'How primary care networks can help integrate academic and service initiatives in primary care', *Annals of Family Medicine*, vol. 4, no. 3, pp. 235-9.
- Tikly, L 2015, 'What works, for whom, and in what circumstances? Towards a critical realist understanding of learning in international and comparative education', *International Journal of Educational Development*, vol. 40, pp. 237-249.
- Tribull, CM 2017, 'Sequential science: A guide to communication through comics', *Annals of the Entomological Society of America*, vol. 110, no. 5, pp. 457-466.
- Tufford, L & Newman, P 2012, 'Bracketing in Qualitative Research', *Qualitative Social Work*, vol. 11, no. 1, pp. 80-96.
- Van Leeuwen, T & Jewitt, C (eds.) 2004, *Handbook of visual analysis*, SAGE, London.
- Vincent, S & O'mahoney, J 2014, 'Critical Realism as an Empirical Project', Oxford University Press, Oxford.
- Vogel, CW, Whippy, HJ & Robinett, NR 2010, 'A partnership between the cancer research center of Hawaii and the University of Guam in Cancer Research, Education, Training, and Outreach', *Hawaii Medical Journal*, vol. 69(6 Suppl 3), pp. 56-58.
- Walny, J, Huron, S & Carpendale, S 2015, 'An Exploratory Study of Data Sketching for Visual Representation', *Computer Graphics Forum*, vol. 34, no. 3, pp. 231-240.
- Walsh, A, Heeley, T, Furlong, B, Bethune, C, Graham, W & Asghari, S 2021, 'Rural health research capacity building: an anchored solution', *Rural and Remote Health*, vol. 21(2), pp. 6162.
- Walsh, D & Evans, K 2014, 'Critical realism: An important theoretical perspective for midwifery research', *Midwifery*, vol. 30, no. 1, pp. e1-e6.
- Ward, V, Tooman, T, Reid, B, Davies, H & Marshall, M 2021, 'Embedding researchers into organisations: a study of the features of embedded research initiatives', *Evidence & Policy*, vol. 17, no. 4, pp. 593-614.
- Watson, TJ 2012, 'Making organisational ethnography', *Journal of Organizational Ethnography*, vol. 1, no. 1, pp. 15-22.
- Webster, E, Thomas, M, Ong, N & Cutler, L 2011, 'Rural research capacity building program: capacity building outcomes', *Australian Journal of Primary Health*, vol. 17, no. 1, pp. 107-13.
- Wells, M 2009, 'Resilience in rural community-dwelling older adults', *The Journal of Rural Health*, vol. 25, no. 4, pp. 415-419.
- Wenke, R & Mikan, S 2016, 'The role and impact of research positions within health care settings in allied health: a systematic review', *BMC Health Services Research*, vol. 16, no. 1, pp. 355.

- Wenke, R, Noble, C, Weir, KA & Mickan, S 2020, 'What influences allied health clinician participation in research in the public hospital setting: a qualitative theory-informed approach', *BMJ Open*, vol. 10, no. 8, pp. e036183.
- Wenke, RJ, Tynan, A, Scott, A & Mickan, S 2018, 'Effects and mechanisms of an allied health research position in a Queensland regional and rural health service: a descriptive case study', *Australian health review : a publication of the Australian Hospital Association*, vol. 42(6), pp. 667-675.
- Wenke, RJ, Ward, EC, Hickman, I, Hulcombe, J, Phillips, R & Mickan, S 2017, 'Allied health research positions: A qualitative evaluation of their impact', *Health Research Policy and Systems*, vol. 15(1) (no pagination).
- Western Alliance 2022, *STaRR Training*, viewed 15/06/2022, <https://www.westernalliance.org.au/starr/starr-training>
- Whitworth, A, Haining, S & Stringer, H 2012, 'Enhancing research capacity across healthcare and higher education sectors: development and evaluation of an integrated model', *BMC Health Services Research*, vol. 12, pp. 287.
- Williams, BW, Byrne, PD, Welindt, D & Williams, MV 2016, 'Miller's pyramid and core competency assessment: a study in relationship construct validity', *Journal of Continuing Education in the Health Professions*, vol. 36, no. 4, pp. 295-299.
- Wilson, J, Mandich, A & Magalhães, L 2016, 'Concept Mapping: A Dynamic, Individualized and Qualitative Method for Eliciting Meaning', *Qualitative Health Research*, vol. 26, no. 8, pp. 1151-1161.
- Wiltshire, G 2018, 'A case for critical realism in the pursuit of interdisciplinarity and impact', *Qualitative Research in Sport, Exercise and Health*, vol. 10, no. 5, pp. 525-542.
- Wolfenden, L, Yoong, SL, Williams, CM, Grimshaw, J, Durrheim, DN, Gillham, K & Wiggers, J 2017, 'Embedding researchers in health service organizations improves research translation and health service performance: the Australian Hunter New England Population Health example', *Journal of Clinical Epidemiology*, vol. 85, pp. 3-11.
- Wong Shee, A, Quilliam, C, Corboy, D, Glenister, K, McKinstry, C, Beauchamp, A, Alston, L, Maybery, D, Aras, D & Mc Namara, K 2022, 'What shapes research and research capacity building in rural health services? Context matters', *Australian Journal of Rural Health*.
- Wright, D, Fry, M, Adams, J & Bowen, C 2020, 'Building research capacity in musculoskeletal health: qualitative evaluation of a graduate nurse and allied health professional internship programme', *BMC Health Services Research*, vol. 20(1), pp. 751.
- Yanos, PT & Ziedonis, DM 2006, 'The patient-oriented clinician-researcher: advantages and challenges of being a double agent', *Psychiatric Services*, vol. 57, no. 2, pp. 249-253.
- Zamfir, I 2017, 'Understanding capacity-building/capacity development: A core concept of development policy', European Parliament.

Appendices

Appendix 1

Cartoonography: a novel approach to qualitative data analysis

Abstract: The use of visual approaches for data collection and data representation in qualitative research is well accepted. Less familiar are approaches using visual approaches as a form of data analysis.

This paper introduces the use of cartoonography, the process of mapping or outlining concepts using cartoons, as a novel qualitative data analysis method. The role of this method in the context of other visual approaches is discussed. True to the process of cartoonography, visual methods are employed throughout to demonstrate this analysis method.

Keywords: Qualitative analysis, cartooning, visual analysis



