# Evidence check of strategies to build the research capacity of healthcare professionals

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The Network of Alcohol and other Drugs Agencies (NADA) received funding from the NSW Ministry of Health to undertake this study. The study is a partnership initiative between NADA, the NSW Drug and Alcohol Clinical Research and Improvement Network (DACRIN), and the NSW Ministry of Health.

## ABOUT NADA

The Network of Alcohol and other Drugs Agencies (NADA) is the peak organisation for the non government alcohol and other drugs sector in NSW. They represent 100 organisational members that provide a broad range of alcohol and other drugs services including health promotion and harm reduction, early intervention, treatment and continuing care programs.

## ABOUT DACRIN

NSW Drug and Alcohol Clinical Research and Improvement Network (DACRIN) is a collaborative network of AOD services engaged in clinical research. DACRIN was formed to enhance research capacity and productivity across the AOD sector; collaboration between AOD services; clinician and consumer engagement in research; and access to research support and resources.

The Research Capacity project is supported by funding from the NSW Ministry of Health via a grant to NADA.

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We acknowledge the traditional custodians of country throughout NSW and ACT. We recognise, respect and value the deep and continuing connection of Aboriginal and Torres Strait Islander people to land, community, and culture. We pay our respect to Elders past, present and future.

**Suggested citation**

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# EXECUTIVE SUMMARY

## Introduction

Integrating research capacity building (RCB) into alcohol and other drugs (AODs) services may improve frontline care and the long-term physical and mental health outcomes of people receiving treatment for AOD use across Australia. The main aim of the current restricted review was to identify and summarise RCB strategies that could be used to build the research capacity of staff employed by AOD services in NSW, Australia. There is a lack of published literature on RCB initiatives that have been used within AOD services located in Australia or elsewhere. Therefore, the restricted review focused on published studies that have tested RCB approaches which build the research capacity of staff in primary healthcare, allied health and other sectors related to AOD treatment.

## Strategies to build research capacity

Forty-six studies were included in the restricted review (see Appendix 1). Sixteen studies directly tested RCB strategies within a healthcare setting. The RCB strategies varied according to whether they operated on individuals, teams, organisations, or a combination of these levels to build research capacity. Ten studies were designed to improve research capacity by directly influencing the research skill level of individuals. Five studies were designed to enhance individual research capacity without funding, whereas the remaining five included a funding component in their RCB strategy. Another three studies focused on the effectiveness of a team-based strategy to building research capacity called the Designated Research Team (DRT) approach. The final three studies included in the restricted review used RCB approaches comprising strategies that increased the likelihood of work environments being more conducive to individuals or teams participating in research activities, e.g., research culture, infrastructure, and collaborations.

## Synthesis of Findings

Sixteen studies were included in this restricted review - each assessed a strategy for improving the research capacity of primary healthcare professionals. Across the RCB strategies tested in these studies, several elements consistently demonstrated efficacy in improving research capacity within primary healthcare settings. Thus, these elements may also have the potential improve research capacity amongst staff working with NSW-based AOD services. These elements include:

1. Protected time to participate in research activity
2. Educational lectures or workshops which teach key research skills and competencies
3. Undertaking a practice aligned research project
4. Ongoing, supportive mentoring from an experienced researcher
5. Access to key research infrastructure
6. Management that promotes, is supportive of and values research.
7. Dedicated research position(s) embedded within services.

## Implications and Recommendations

The provision of protected time for staff to participate in research activities was a consistent element of highly effective and successful RCB strategies. However, this strategy may be difficult to implement in the NSW AOD service sector without a top-down approach that incorporates funding, availability of qualified backfill staff

and the support of upper management at an organisation. Of the remaining five themes, elements of each are already enacted in some form within the NSW AOD service sector, albeit to differing degrees for non-government (NGO) and Local Health District (LHD) services. Therefore, future RCB initiatives implemented in the NSW AOD service sector should aim to build upon these existing sources of RCB while also strengthening links between NGO and LHD services to encourage knowledge-sharing and collaboration on research projects with clear benefits for clinical practice.

Based on the findings of the restricted review, the following recommendations are proposed:

1. Development and repackaging of best-practice resources to enable research at Australian AOD services, with tools that respond to challenges unique to NGO and LHD services
2. Approach universities and propose collaborative arrangements in which NGO and LHD staff can access resources such as the library, mentorship and advice in exchange for promotion as institutions enabling socially impactful research
3. Explore training targeted at building research competencies that facilitate access for AOD service staff
4. Facilitate more opportunities for sharing of resources and networking between NSW-based NGO and LHD services related to building research capacity
5. Target advocacy efforts for RCB initiatives at projects, policies and funding which enable AOD staff to engage in practice-based research
6. Suggest that AOD services involved in funding applications for research, evaluation, or related projects in the AOD service sector to include a) a research position that is embedded in the service and b) protected time for AOD staff involved in projects to undertake research activities
7. NSW Ministry of Health, Centre for AOD to consider how research could be included in KPIs for LHD/NGOs, whereby research time could be counted towards KPIs.

## GLOSSARY OF TERMS

| | |
|---|---|
| **AHP** | Allied health professional |
| **AODs** | Alcohol and other drugs |
| **CMHDARN** | Community Mental Health, Drug and Alcohol Research Network |
| **DACRIN** | NSW Drug and Alcohol Clinical Research and Improvement Network |
| **DRT** | Designated Research Team |
| **LHD** | Local Health District |
| **NADA** | Network of Alcohol and other Drugs Agencies |
| **NGO** | Non government organisation |
| **RCB** | Research capacity building |
| **RCC tool** | RCC tool |
| **RDP** | Research Development Program |
| **RRCBP** | Rural Research Capacity Building Program |

# INTRODUCTION

Building the research capacity of the Australian AOD service sector may facilitate evidence-based practice and help to identify methods for optimising the delivery of AOD treatment. Research capacity building (RCB) initiatives are shown to improve service delivery and reduce patient mortality and morbidity in many primary healthcare organisations (Harding et al., 2016). However, RCB initiatives have not been widely trialled within AOD services located in Australia or elsewhere in the world. Integrating RCB within AOD services may prove an effective tool to improve frontline care and, ultimately, improve long-term AOD, physical and mental health outcomes of people receiving treatment for AOD use across Australia.

The primary aim of this restricted review is to identify and summarise RCB strategies that could be used to build the research capacity of staff employed by AOD services in NSW. This restricted review will focus on published studies that have evaluated RCB approaches shown to build the research capacity of staff in primary healthcare, allied health and other sectors related to AOD treatment.

## Current knowledge on building research capacity

RCB initiatives can be targeted at individuals, teams, institutions, or organisations. In line with this, Trostle (1992) defines RCB as "…a process of individual and institutional development which leads to higher levels of skill and a greater ability to perform useful research" (p. 1). Several factors contribute to RCB, including researcher involvement, research culture, research infrastructure, funding, collaborations, and partnerships. The main aim of building research capacity is to "…augment the ability to carry out research or achieve objectives in the field of research over the long term, with aspects of social change as an ultimate outcome" (Condell & Begley, 2007; p. 273). Building research capacity across all health system sectors is crucial for maintaining and improving the quality of care and patient outcomes.

In a broad sense, research seeks to generate knowledge that translates into sustainable benefits for patients, clinicians, and the community (Pickstone et al., 2008). This evidence base informs policy and funding, improves a clinician's ability to identify and understand health problems, and increases opportunities to address health problems with economically viable, efficacious, and evidence-based solutions (Pickstone et al., 2008). Ideally, this process translates into improved patient care and better health outcomes in the general population.

A strong primary healthcare sector can improve population health outcomes (Starfield et al., 2005). The primary healthcare sector is also an ideal context within which to carry out high-quality research. Health care clinicians with research skills can connect closely with patients, and this proximity enables clinically relevant research that is more likely to positively impact patient care (Pager et al., 2012). For teams and organisations, participating in clinical research may positively impact health care performance via improvements to infrastructure, increased practice of evidence-based patient care and enhanced treatment protocols.

Evaluating research findings from controlled clinical settings and encouraging the translation of that evidence into practice requires clinical environments willing and able to incorporate a research culture. Such a culture values the application of evidence-based practice and allows clinicians to participate in research-related activities. Moreover, it provides opportunities for staff to attain research skills and for resources to be invested in research activity.

However, several barriers limit the ability of allied health professionals and frontline healthcare workers to undertake research activity. These include a lack of time, financial resources, requisite research

infrastructure, confidence undertaking research, research competency, and adequate clinical backfill, along with heavy clinical caseloads, and other work roles taking priority (Golenko et al., 2012; Harvey et al., 2013; Lazzarini et al., 2013; Lee et al., 2020; Matus, et al., 2021; Pager et al., 2012; Williams & Lazzarini, 2015). With respect to research competency, several studies show that allied health professionals and primary healthcare workers have moderate skills in early phase research activities, such as finding and reviewing relevant literature. However, research skill level drops off markedly for later phase research activities, such as data analysis and writing for publication (Borkowski et al., 2016). These challenges are particularly prevalent within allied health and primary healthcare services (Finch et al., 2013; Orme & Powell, 2008).

Despite these barriers, various strategies have been shown to build research capacity within healthcare services effectively. Most RCB strategies use similar or overlapping elements, including *research skills training*, *mentoring*, *funding*, *infrastructure*, *quarantined time for research*, *budgeting for clinical backfill, research partnerships and collaborations,* or the *implementation of clinician/scientist career pathways*. All RCB strategies explicitly aim to improve the ability of individual clinicians, teams, and healthcare organisations to conduct, use, and promote research. The following section will summarise research evidence for individual-level, team-level, organisation-level, and blended RCB strategies.

## METHOD

- Key search terms included: Research Capacity Building, RCB strategies, RCB, RCB Allied Health, RCB primary healthcare, Research Capacity Building Allied Health, Research Capacity Building primary healthcare.
- Papers were searched for using Google Scholar and Scopus.
- Papers were also found by reviewing reference lists of papers found (using Google Scholar and Scopus) and by searching for papers citing those found (using Google Scholar and Scopus).
- Papers were excluded if they did not explicitly test the efficacy of an RCB intervention. Papers that simply assessed research capacity were excluded. To be included a paper had to test an RCB strategy. All study designs were included (i.e., pre-post design, cross-sectional, etc).

# STRATEGIES TO BUILD RESEARCH CAPACITY

Forty-six studies were included in the restricted review (see Appendix 1). Sixteen studies directly tested RCB strategies within a primary healthcare service (see Table 1 for more details). The RCB strategies varied according to whether they operated on individuals, teams, organisations, or a combination of these levels to build research capacity. Several methods were used to measure improvements in research capacity, including:

- The Research Capacity and Culture Tool (RCC tool; Holden et al., 2012)
- The Research Spider (Smith et al., 2002)
- The number of research outputs (e.g., peer-reviewed publications, conference presentations)
- Customised qualitative, quantitative, or mixed methods surveys specific to the study

## Individual level RCB strategies

Ten studies were designed to improve research capacity by directly influencing the research skill level of individuals. Five studies designed to enhance research capacity in the absence of funding are discussed first, followed by five studies that included a funding component in their RCB strategies.

### Individual RCB: No funding

Two studies enhanced individual research capacity by providing participants education targeted at developing certain research skills. Chugtai and Tanweer (2020) pilot-tested a simple RCB strategy in which two 45-minute, interactive educational sessions were shown to improve the research knowledge of practising dieticians. Topics covered within the two sessions included logical reasoning, sampling methods, data collection and data analysis. Compared to baseline, the dieticians reported significantly higher levels of research knowledge after completing both education sessions. Another study by Naidoo et al. (2013) evaluated how effective a graduate internship scheme was in developing research capacity amongst a group of nine UK podiatrists. The internship began with an eight-week intensive research placement which introduced participants to several aspects of the research process. During the remainder of the two-to-three-year internship, targeted mentorship and supported networking was also provided. The programme's effectiveness was evaluated qualitatively through semi-structured interviews with the participants and tallying their research outputs after completing the internship. All nine podiatrists presented at least one conference poster or seminar after their internships had finished, with a total of 23 conference abstracts and author contributions to 10 peer-reviewed journal publications in the podiatry and rheumatology literature.

The remaining three studies also used education to improve individual research capacity but integrated intensive RCB strategies into the participants' existing work schedules. Harding et al. (2010; 2016) reported on results from the Melbourne based Stepping into Research program, which is conducted over 12 weeks and comprises four 3-hour educational workshops, 12 half-days of quarantined time away from clinical duties, individual mentorship, and guidance through the process of writing a systematic review. Harding et al. (2016) tested the program's effectiveness across six intakes for 55 participants (2008 to 2013). Forty-nine participants (89%) completed all workshops and wrote draft findings for their systematic reviews. Twenty-two participants (40%) published their systematic reviews in peer-reviewed journals, and 21 participants (38%) presented their findings at state, national or international conferences. Five participants went on to enrol in a PhD program and contribute to a further sixteen peer-reviewed journal articles. After program completion, qualitative interviews with participants revealed marked increases in both their research skills and their confidence in conducting research. The Stepping into Research training program is now well established and is shown to produce positive outcomes in building research skills, confidence, the promotion of interdisciplinary networking and tangible research outputs from program participants.

**Table 1.**

*Summary of sixteen studies that tested a strategy for building research capacity included in the restricted review in primary care settings*

| Authors (Year) | Level | Funding | Mentoring/ Supervision | Education/ Training | Infrastructure | Partnership/ Network | Research Project/ Placement | Quarantined time from duties | Clinical backfill |
|---|---|---|---|---|---|---|---|---|---|
| Donley and Moon (2021) | Individual | | Y | Y | | | Y | | |
| Chughtai and Tanweer (2020) | Individual | | | Y | | | | | |
| Hilder et al. (2020) | Individual | Y | Y | Y | | | | | Y |
| Schmidt et al. (2019) | Individual | Y | Y | Y | | | Y | | Y |
| Wenke et al. (2018) | Individual | Y | | | | | Y | Y | Y |
| Harding et al. (2016) | Individual | | Y | Y | | | Y | Y | |
| Naidoo et al. (2013) | Individual | | Y | Y | | Y | Y | | |
| McIntrye et al. (2011) | Individual | Y | Y | Y | | | Y | | |
| Harding et al. (2010) | Individual | | Y | Y | | | Y | Y | |
| Ried et al. (2007) | Individual | Y | Y | | | | Y | | |
| Holden et al. (2012) | Team | Y | Y | Y | Y | Y | Y | Y | Y |
| Cooke et al. (2008) | Team | Y | Y | Y | Y | Y | Y | Y | Y |
| Cooke et al. (2006) | Team | Y | Y | Y | Y | Y | Y | Y | Y |
| Wenke et al. (2018) | Organisation | | | | | | | | |
| Wenke and Mickan (2016) | Organisation | | | | | | | | |
| Rosewall et al. (2009) | Ind/Team/Org | | Y | Y | Y | Y | | | |

Akin to the RCB strategies tested by Harding et al. (2010; 2016), Donley and Moon (2021) examined the benefits of a flexible research program for social work clinicians working within a busy metropolitan hospital. The authors utilised a multi-strategy approach that included educational tools, access to a research lead, and the development of a relevant, practice-based research project. Each social worker was instructed to identify a gap in their service provision and formulate a research project to address this individually or as part of a small team. After seven months of research training support, participants' overall confidence in doing research increased. This increase was driven by the participants' confidence increasing across all research areas, including formulating a research question, completing a literature review, developing a methodology, formulating a conclusion, and making a professional poster. Participants most often cited having ready access to a research lead as the strategy that helped to develop their research skills. If the research lead was approachable and enthusiastic, this effect was magnified. The authors also noted that a research lead's presence could also augment research capacity across an entire organisation by encouraging a culture of research. Participants also found it helpful and motivating to have quarantined time away from clinical duties for research, working on a practice-based research project and closely aligned with their clinical work, and receiving ongoing mentoring as their research developed.

Overall, the most interesting aspect of the five studies is that enhancing individual research capacity can be achieved without additional funding. Across six intakes into the Melbourne based Stepping into Research program, Harding et al. (2010; 2016) showed that the program led to tangible improvements in the research capacity of allied health clinicians. Structuring the program around a systematic review is a strong mechanism facilitating the development of research capacity. Systematic reviews are a highly rigorous process that encompasses skill development in formulating a research question and reviewing and critiquing relevant literature. They also provide a strong foundation for future research. The results of Harding et al. (2010; 2016) also demonstrate that with management support, mentorship and protected time for research activity, it is possible to embed research within allied health clinical practice and successfully build research capacity. The findings of Naidoo et al. (2013) also support the effectiveness of RCB strategies that do not require funding. Namely, the research capacity of clinical professionals can be improved through supportive mentorship, quarantined time away from clinical responsibilities, and targeted education that addresses key research competencies. Finally, the case of Chugtai and Tanweer (2020) indicates that short, interactive, educational sessions can increase the research knowledge of healthcare providers. Completing a research-based higher degree and intensive RCB strategies is not always feasible for clinical professionals; therefore, the gains in research capacity made in larger-scale studies could be partly replicated by less intensive RCB strategies.

**Individual RCB: Funding included**

The use of funding to enhance individual research capacity tends to provide protected time for staff to undertake research (Hilder et al., 2020; McIntyre et al., 2011; Reid et al. 2007; Schmidt et al., 2019; Wenke et al. (2018). Firstly, Hilder et al. (2020) evaluated an initiative that provided 34 Queensland allied health professionals (AHPs) with four weeks of clinical backfill to cover research activities (approx. $5800 to $9700). Eligible research activities included writing ethics applications, analysing and/or collecting data, undertaking systematic reviews and writing up research findings for publication. Participants were also paired with an allied health research fellow who offered support and troubleshooting advice where actual or potential barriers arose. Participants were able to attend research skill workshops if desired as well. Of the 34 AHPs who received funding for the clinical backfill, ten participated in semi-structured interviews assessing their experience of the funding initiative between 12 months and three years after the funding was first awarded. Medium-term outcomes included improvements in team research culture and increased research confidence, knowledge, and skills. Participants also reported that these improvements were amplified by the support received from the

research fellow and the library and their participation in focused research skills workshops. These qualitative findings aligned with the research outputs produced by the AHPs, which included two peer-reviewed journal publications, the preparation of another two manuscripts for journal submission, and three participants presenting their research at regional, national, or international conferences. Four participants also used the initiative to work on ethics applications, of which two were submitted. However, follow-up interviews conducted later revealed it was often difficult for participants to maintain research progress after their backfill period had ended. Participants also emphasised how important the support of their team leader was in providing access to research infrastructure at both health service and university settings.

Like Hilder et al. (2020), McIntyre et al. (2011) evaluated the Research Development Program (RDP) and its effectiveness in building research capacity. The RDP is an Australian Government-funded effort to increase research capacity within the Australian primary healthcare sector. The program allows individuals to undertake paid, part-time research placements for (on average) one year within academic environments. These placements enable a novice researcher to work on a research project, while receiving research training, support and mentoring. The program is particularly valued for its ability to provide protected time for research. McIntyre et al. (2011) invited RDP recipients from the 2005, 2006, 2007, 2008 and 2009 cohorts to complete an online survey to evaluate the program. In total, 105 participants from various allied health professions responded to the survey. Ninety-four per cent agreed or strongly agreed that the RDP had been a valuable experience, and 82% agreed that the RDP had helped them move from a novice to a more experienced researcher. In addition, 80 survey respondents had presented their research findings in some way, 29 had published their research in a peer-reviewed journal, and 20 reported that saw their research led to changes to clinical practice. Overall, 54% of respondents felt that their research had contributed to making their clinical practice more evidence based. McIntyre et al. (2011) also found that 84% of respondents received adequate supervisory support and that 84% also developed supportive relationships with other researchers during the program. These latter findings suggest that supervision, mentorship and networking contribute to the RDP's efficacy in building research capacity,

Reid et al. (2007) evaluated the effectiveness of a small grant funding scheme in building research capacity with a small group of primary healthcare practitioners. The scheme was similar in design to the RDP and incorporated academic mentoring and three types of funding support: bursaries, writing grants and research fellowships. Research bursaries were worth $5000 and were awarded to support the development and undertaking of a small research study. Writing grants were worth $500 were awarded to encourage the peer-reviewed publication of research findings. Research fellow positions were worth between 0.2 and 0.5 full-time equivalent employment for one year and were awarded to support research skills development in an academic environment. In addition, each funding recipient received access to training workshops, web-based educational material, an online discussion forum, and research networking opportunities. Academic mentors provided each funding recipient with ongoing guidance throughout all research steps, including ethics applications, developing a research plan, data collection, data analysis, and the write up of findings. Between 2002 and 2005, 38 individuals received grant funding, 24 received bursaries, 11 received writing grants, and three received research fellowships. After program completion, participants were interviewed to assess the impact of the funding scheme. In nine out of 10 skill areas assessed, participants reported increases in research skills, including writing for publication and qualitative and quantitative research methods. Moreover, 35% of funding recipients also considered themselves to have moved into a higher category of research experience. Sixty-two per cent of funding recipients reported disseminating their research findings, including over half presenting their findings at one or more research conferences. Four published articles in peer-reviewed journals, while seven who submitted articles to peer-review journals were awaiting publication. All three types

of funding support led to improvements in research capacity; however, the research fellowship had the greatest positive impact on research capacity and confidence, while the writing bursary had the lowest positive impact.

More recently, Schmidt et al. (2019) assessed the effectiveness of an initiative that provided funding for clinical backfill. This provision would, in turn, create protected time to engage in research activity and increased self-assessed research experience for rural primary healthcare workers. The Rural Research Capacity Building Program (RRCBP) was established to increase the research capacity of rural health staff in NSW, Australia. Over two years, the program allows experienced, rural, primary healthcare workers with limited research skills to conduct a 'close-to-practice' research project. Akin to the previously discussed funded RCB strategies, accepted candidates are supported by mentoring and research methods education. Candidates are also provided funding which covers 60 days of paid clinical backfill to dedicate to their research project. Schmidt et al. (2019) analysed data from eight annual RRCBP intakes (2006 to 2013) using the Research Spider (Smith et al., 2002). Data collected at RRCBP commencement and completion were available for 130 participants and was used to examine the program's effectiveness. Across all ten research competencies assessed, significant improvements were found between RRCBP commencement and completion. These included generating research ideas, finding relevant literature, critically reviewing the literature, using quantitative and qualitative research methods, analysing and interpreting results, writing and presenting a research report, publishing research, writing a research protocol, and applying for research funding. The largest improvements were found for writing a research protocol and writing and presenting a research report, both of which were targeted by the RRCBP's curriculum.

The final individual-level initiative containing a funding component was studied by Wenke et al. (2018). In line with the above RCB strategies, Wenke et al. (2018) evaluated the effects of a short-term funding initiative that enabled various AHPs to undertake research activity during rostered employment time. Funding for paid clinical backfill by another clinician was available to all AHPs working within the Gold Coast Hospital and Health Service. This, in turn, provided protected time for the participant to engage in research activity. Each funding recipient was paired with an allied health research fellow who helped the recipient devise a research plan. The research fellow also met with the participant weekly to offer guidance and troubleshoot issues as the research progressed. Before and after the program, research capacity was assessed using the RCC tool (Holden et al., 2012), which provided a baseline measure of each clinician's research capacity and indexed any improvements after participating in the funding and mentoring initiative. Twenty-five allied health clinicians were invited to participate in the funding initiative, and 16 completed both the pre and post evaluation (64%). On average, the 16 individuals utilised seventeen days of supported research activity. During their protected research time, research activities that the clinicians completed included writing up research findings for publication, preparing ethics applications, writing a systematic review, collecting data, and performing data analysis. After completing the funding initiative, participants' scores on the RCC tool increased significantly by approximately 50%. Moreover, 14 of 15 items on the individual research capacity subscale of the RCC tool showed a significant increase between pre and post participation in the program, including finding literature, analysing quantitative data, and writing for publication. In terms of tangible research outputs, six participants published their findings in peer-reviewed journals, and four had their manuscripts under review with a journal (at the time of the study). Additionally, all the clinicians received approval for ethics applications they had submitted, and three clinicians continued to collect data for their research. One project even went on to receive competitive grant funding. Several participating AHPs also went on to publish their research findings.

Overall, the studies that examined funded individual RCB strategies demonstrate the efficacy of RCB programs that allow participants to quarantine time for research activity and provide ongoing mentorship and educational workshops. Schmidt et al. (2019) found that the RRCBP, a two-year experiential learning program for research, significantly increased research skills across all assessed research competencies. Reid et al. (2007) showed that combining grant funding with supported mentoring effectively builds the research capacity of primary healthcare professionals. Feedback from the surveyed grant recipients revealed that this scheme contributed to an overall increase in the participants' core research skills and improved their confidence and interest in pursuing further research. McIntyre et al. (2011) suggest that the most productive element of the RDP is likely to be the protected time the program affords clinicians to dedicate towards building their research skills. The findings of Wenke et al. (2018) and Hilder et al. (2020) show that even short-term funding can improve individual research capacity. Given the limited research experience of the clinicians, the short-term RCB initiative studied by Wenke et al. (2018) was considered highly successful at building research capacity. Like other funded individual RCB strategy studies, access to mentorship, ongoing learning opportunities, and funding to provide quarantined research time were vital elements of the initiative's success. Notably, Hilder et al. (2020) findings indicate that improvements in research capacity are sensitive to how supportive team leaders and managers are towards AHP's research and whether the respective health service has the necessary infrastructure to support research activity. The latter study also highlights a risk of AHP's only undertaking research where a grant or bursary enabling them to quarantine time away from clinical responsibilities has been secured.

## Team level RCB strategies

Thus far, the studies reviewed for individual research capacity show that 1) RCB strategies do not necessarily need to be funded to be effective, and 2) the main advantage of funding for individual RCB strategies is to provide participants protected time to conduct research. The next three studies to be discussed studied the effectiveness of a team RCB strategy. Namely, the Designated Research Team (DRT) approach to building research capacity. The earliest of these studies, Cooke et al. (2006), examined whether the DRT approach possessed efficacy in building research capacity with a team of podiatrists in the United Kingdom. The DRT approach involves funding for two years (£14,000 per year). The funding provides teams with protected time for three members to perform research activities, such as developing research ideas, improving research skills, working on existing research, or applying for external grant funding. Each year, a further £2,000 was also provided for teams to put towards academic and technical support costs such as software, equipment, or training. DRT team members were also offered ongoing mentorship and research training delivered through educational workshops, training days and a dedicated 'new researchers' course'. Training included courses in using reference management software, analysing qualitative data, how to conduct focus groups and interviews. Teams were also encouraged to build external research partnerships.

The team of podiatrists evaluated in the Cooke et al. (2006) study consisted of three team members who held PhDs, including the project lead[1], one team member currently completing a PhD and three clinicians. Assessment after completion of the DRT showed that the podiatrist team published three papers and prepared two more for publication when the Cooke et al. (2006) study was published. The podiatrist team also gave six conference presentations to a range of health service research audiences. The team also established effective partnerships and network contacts with the local Workforce Development Confederation and with podiatrists in other countries. Participation in the DRT approach significantly improved the research capacity of the podiatry team, and several DRT elements were identified as having a substantial effect on this finding. These

[1] This member was also the head of a podiatry services department and had a strong research track record.

included funding for protected time to do research, a management structure that enabled backfill of clinical time, training with a research practice focus, and immediate access to supervision and mentorship that provided ongoing problem-solving support and help with managing team member workloads. Team-based elements that facilitated the team's performance included clear, negotiated team outcomes, regular team meetings, clear delegation of tasks, effective communication, transparent accountability, acknowledgement of success, and a 'critical mass' of research expertise within the team. Moreover, the team structure of the DRT approach allows less-experienced research members to ask for help from more experienced research members without feeling self-conscious.

Rather than only focusing on one team's experience, Cooke et al. (2008) examined the effectiveness of the DRT approach across six different teams[2]. The six teams were comprised of individuals from various primary healthcare professions, including general practitioners, allied health professionals, community nurses, social workers, and pharmacists. Each DRT team was awarded £32,000 of funding for two years to provide three members with protected time to engage in research. This time, the funding could also be allocated towards specific skills training for team members. Each team was comprised of at least one novice researcher and one researcher with strong academic department links. This enabled a master-apprentice style learning environment for the less experienced researchers within each team. Each team also received research training delivered through short courses and structured learning programs, mentorship, supervision, and networking opportunities. All six teams showed signs of improvement in their research skills[3]. Five of the six teams completed a research project during the lifetime of their DRT funding[4], and all teams produced peer-reviewed journal publications and/or conference presentations. Four teams were awarded external funding to continue their research, demonstrating that the DRT approach contributes to building sustainable research capacity.

The third study by Holden et al. (2012), who examined a team RCB strategy, built upon the findings of Cooke et al. (2006; 2008) by evaluating the DRT approach with the RCC tool and assessing how effective the approach is in building research capacity at the individual, team, and organisational level. The study was conducted in Queensland, Australia, with 69 primary healthcare professionals. Holden et al. (2012) also utilised a matched-pairs trial design in which four intervention teams were paired with four control teams[5]. Like Cooke et al. (2006; 2008), intervention teams were supported in producing a piece of research relevant to their clinical practice (Holden et al., 2012). Also, like Cooke et al. (2006; 2008), several RCB strategies were employed, such as training in research skills and ongoing mentoring for each team. The financial support allocated to the teams depended on their research costs and ranged between $1000 and $21,000 (Holden et al., 2012). After finishing the DRT program 15 months later, members of the intervention teams showed a significant improvement in individual research capacity compared to the control groups. In comparisons between the intervention and control groups, Holden et al., 2012 also found significant improvements in six of the 15 individual level RCC items. These individual RCC items involved writing a research protocol, securing research funding, submitting an ethics application, analysing qualitative data, writing a research report, and advising less experienced researchers. Despite these improvements, no significant improvements were found in the intervention teams' team or organisational research capacity.

[2] Cooke et al. (2008) included the team of podiatrists discussed in Cooke et al. (2006).

[3] Cooke et al. (2008) evaluated improvement in research capacity of each team using a standardised set of indicators (see Cooke et al., 2008 for details). These improvements were most often achieved via the research training provided to the six teams.

[4] Team six were unable to begin a research project. This team had not formulated a focussed research idea prior to receiving the DRT funding. As a result their funding was withdrawn at an early stage.

[5] The pairing of teams controlled for both service role and the teams' size.

The three studies examining team RCB strategies provide insight into the key elements of the DRT approach, which facilitate improvements in research capacity (Cooke et al., 2006, 2008; Holden et al., 2012). The findings of Holden et al. (2012) supported those of Cooke et al. (2006; 2008) and demonstrated that a multi-strategy RCB intervention targeted at the team level could significantly improve individual research skills. Holden et al. (2012) suggest that working on a clinically relevant research question was vital in sustaining research activity beyond the intervention period. Other factors that led to the success of the program implemented by Holden et al. (2012) included protected time for research, managerial support, and an encouraging work environment. Applied research skills training, mentorship, and having a 'critical mass' of research experience in one's team were also essential. Also paralleling the results of Cooke et al. (2006; 2008), a team-based approach to RCB was effective for novice researchers with demanding clinical loads, as it enabled research responsibilities to be shared flexibly among a group (Holden et al., 2012). Cooke et al. (2008) also found that novice researchers developed skills more quickly when working with more experienced peers. The culture of each team's 'host' organisation appeared to influence their productivity and research output. More successful DRTs included managers who were able to establish protected research time for team members. Cooke et al. (2006) noted that work culture played a role in the success of the DRT approach. For example, research being valued as a way of enhancing practice and advancing individuals' professional statuses.

## Organisation and Multi-level RCB strategies

In alignment with several RCB strategies summarised thus far in this review, protected time to conduct research was a crucial factor in the DRT approach. The results of Cooke et al. (2006, 2008) and Holden et al. (2012) show the DRT approach to be a highly effective method of building research capacity across different types of primary healthcare professionals. These improvements were attributed mainly to the focus on individual skill development and research activities relevant to practice rather than changes to policy and practice. A team based RCB strategy may enable more people to gain research experience than is possible when attempting to implement strategies that support individuals working on a separate project. Organisational and multi-level RCB strategies go one step further than individual and team level strategies by employing a top-down approach to building research capacity. Rather than focusing only on individuals or teams, these RCB strategies target the workplace's research culture, research infrastructure, and research collaborations. In turn, this creates an environment more conducive to individuals or teams participating in research activities, and helps to protect against any loss of research capacity attributable to staff turnover.

Wenke et al. (2018) studied how a dedicated allied health research fellow position within a regional health service impacted research capacity. The authors also examined the factors that enabled and hindered the success of the research fellow's ability to build research capacity. Wenke et al. (2018) used semi-structured and qualitative interviews to ascertain the efficacy of a dedicated research fellow in facilitating research capacity building. These interviews were conducted with staff from Darling Downs Hospital and Health Service in Toowoomba, Queensland, including the Allied Health research fellow. Each interview explored the achievements of the research fellow and the factors that hindered or facilitated their successes. Five key themes were found, including clinical service changes, improved research culture and research skill development, research infrastructure development, the establishment of research networks and strategic collaborations, and academic research outputs. According to interviewed staff, the research fellow supported several research initiatives which, at times, resulted in sustained clinical and workforce changes. Moreover, the research fellow contributed to several key infrastructure projects that supported research across the health service. Examples include advocating for and securing funding for a research officer to support clinicians with training and developing a research strategy for the health service. The research fellow also developed several

research partnerships with external stakeholders, including placements for honours and PhD students from the University of Southern Queensland.

In another study, Wenke and Mickan (2016) conducted a systematic review of eight other studies focused on embedded dedicated research positions in healthcare settings. Each study evaluated the efficacy of the dedicated research positions to build research capacity in Australia (three studies), New Zealand (one study), the United Kingdom (three studies), and the United States (one study). The authors found that these embedded research positions improved individual, team, and organisational research skills and attitudes towards research. Increases were also found in individual participation in research and overall research outputs. Three of the eight studies reported improvements in individual research capacity were indicated by increased self-confidence in disseminating findings, writing funding applications and collecting data. Three of the eight studies also found that increases in research activity were linked to the embedded research positions, which was demonstrated by the number of staff participating in research tasks or research skills training and the number of research outputs generated. Finally, in two of the eight studies, changes in research culture and attitudes towards research were reported, including improved orientation towards research, greater confidence in conducting research, increased interest and enthusiasm for research, and improved patient care. Overall, the systematic review by Wenke and Mickan (2016) found that embedded research positions improve research capacity within primary healthcare settings.

The final study included in this review, Rosewall et al. (2009), evaluated a multi-strategy, multi-level RCB initiative instituted within a Canadian radiotherapy department. The initiative was comprised of a comprehensive suite of RCB strategies targeted at the individual, team and organisational levels. Rosewall et al. (2009) aimed to identify the various RCB strategies' contribution to research outputs, such as peer-reviewed publications and conference presentations. The RCB strategies employed aimed to either build research knowledge and skills (e.g., lectures, workshops), provide the necessary infrastructure to sustain research (e.g., the establishment of a research committee) or promote the dissemination of research findings (e.g., writing groups, finance conference attendance). At the centre of the strategies targeted at infrastructure was the introduction of an "Academic Integrated Practice Model", which led to the creation of blended radiotherapy clinician/scientist roles[6]. Between 2004 and 2008, the number of radiotherapists who published articles as the principal author increased from four to 14. In addition, across 59 published papers, members of the radiotherapy team were included as first, second, third or last authors 67 times. Over time, articles were also published in increasingly prestigious journals[7]. This improved quality of published research was also paralleled by an increase in the number of radiotherapy team members who published their research in international journals (from 40% in 2004 to 80% in 2008). Between 2004 and 2008, 253 conference presentations were delivered by radiotherapy team members. During the four-year timeframe, the number of conference presentations increased from 32 in 2004 to 63 in 2008.

Overall, the three studies by Wenke et al. (2018), Wenke and Mickan (2016) and Rosewall et al. (2009) suggest that targeting the organisational elements of RCB can enhance research capacity for allied health professionals. Embedding dedicated research positions within primary healthcare settings shows promise as a strategy to improve individual, team, and organisation level research skills, increase participation in research activity, increase research outputs, and improve research culture. Wenke et al. (2018) found that four key mechanisms enabled the research fellow's success in building research capacity: strong leadership, ongoing support and regular communication with allied health clinicians, clear expectations for building research

[6] These generally comprised 0.5 FTE of clinical load, and 0.5 FTE of academic research load.

[7] According to impact factor.

capacity, and good interpersonal skills when engaging with clinicians. However, Wenke et al. (2018) also highlighted several barriers that hindered the research fellow's effectiveness. These included the time demands intrinsic to being the sole research position servicing a large staff base and geographical area, feelings of isolation, difficulties recruiting participants within a non-metropolitan health service, and physical resource constraints that limited access to the requisite space and technology for conducting research. Interviewees also suggested several methods for addressing these barriers. These included additional funding for dedicated research roles and research support staff, greater promotion of the research fellow's abilities to help clinicians and ongoing advocacy to safeguard the continuation of the research fellow role.

Like Wenke et al. (2018), the Wenke and Mickan (2016) findings support the utility of embedded research positions as an effective way to build research capacity at the organisational level. However, a potential weakness of both studies was the use of subjective data collection methods to assess research capacity. To remedy this, Wenke and Mickan (2016) propose that future evaluations use mixed methods designs that include quantitative data collection to measure changes in research capacity more objectively. It is also unclear if embedded research positions improve the research skills of individual staff at allied health services. The broad improvements observed by Wenke et al. (2018) and Wenke and Mickan (2016) concerning research culture were also observed by Rosewall et al. (2009). The combination of RCB initiatives seemed to establish a workplace culture that supports the research pursuits of radiotherapists. The research capacity of the radiotherapist team also increased the quality and quantity of research outputs. The authors highlighted that the Academic Integrated Practice model, which led to creating a new career path for radiotherapists, was a key strategy driving improvements in research output. This new clinician/scientist role allowed radiotherapists to make an academic contribution while maintaining and using their clinical skills.

## SYNTHESIS OF FINDINGS

The sixteen studies included in this review each tested a strategy for improving the research capacity of primary healthcare professionals. The purpose of the review was to identify RCB strategies that would be effective for staff working in NSW-based AOD services. The review highlighted that some elements of approaches to building research capacity often overlap between different studies. These shared elements repeatedly demonstrate the most efficacy in improving the research capacity of staff within healthcare settings. For staff working with AOD services, the most relevant strategies for RCB could be grouped into the below seven themes:

1. Protected time to participate in research activity
2. Educational lectures or workshops which teach key research skills and competencies
3. Undertaking a practice aligned research project
4. Ongoing supportive mentoring from an experienced researcher
5. Access to key research infrastructure
6. Management that promotes, is supportive of and values research
7. Dedicated research position(s) embedded within services.

### 1. Protected Time

The provision of protected time for staff to participate in research activities was a consistent element of highly effective and successful RCB strategies. One of the key barriers primary healthcare workers faced was a lack of time to conduct research. This is often due to the significant clinical demands of their role (Golenko et al., 2012; Harvey et al., 2013; Pager et al., 2012). Any means by which time can be protected to undertake research activity appears to be an effective way to build research capacity. Specifically, six out of the sixteen reviewed studies (38%) evaluated a strategy that incorporated protected, or quarantined, time for research. Six studies included RCB strategies in which clinical backfill was provided to allow time for clinicians to participate in research activity[8] (6/16, 38%). Eight studies also provided funding that could be allocated towards covering the cost of clinical backfill.

### 2. Education

A majority of the sixteen studies evaluated RCB strategies that included an educational component (12/16, 75%). The educational training was designed to introduce participants to a range of research competencies, such as quantitative and qualitative research skills, data collection and analysis and writing for publication. Educational training was delivered via several methods, including lectures, workshops, web-based intranet services, or regular seminars. Educational training may also play a crucial role in providing a foundation of research knowledge. It can help to address specific gaps in research knowledge or competencies for primary healthcare professionals who have undertaken clinically focused training.

### 3. Practice-based research

Participants undertook a research project in most of the sixteen studies (11/16, 69%). This RCB strategy allowed the participants to gain hands-on experience in conducting research and become familiar with the different stages of research projects. The positive effect of undertaking a research project may be enhanced if the project being worked on is closely aligned with an individual's clinical work (Donley & Moon, 2021).

[8] There was some overlap between strategies providing ‘protected time’ and strategies that provided ‘clinical backfill’.

Improvements in research capacity could also be more sustainable when an individual undertakes a 'close-to-practice' research project, suggesting that working on a clinically relevant research question was vital in sustaining research activity beyond the intervention period. (Holden et al., 2012).

## 4. Mentorship

Receiving supportive mentoring appeared to be a powerful enabler of RCB. Twelve out of the sixteen studies reviewed included RCB strategies with a mentoring component (75%). Mentoring provided ongoing guidance, troubleshooting when problems arose and helped participants balance their clinical and research workloads. Mentoring from an experienced researcher also served as an educational aid to help address key research knowledge gaps. Overall, mentoring had the effect of assisting a clinician to maintain momentum as their research projects progress over time.

## 5. Research Infrastructure

A quarter of the reviewed sixteen studies highlighted the importance of improving research infrastructure to build research capacity (4/16, 25%). Infrastructure for research is essential to facilitate research activities. It includes access to ethics committees, grant schemes, collaborations with external partners, library access, literature database access, computers with statistical software and administrative support. Improving research infrastructure provides the necessary tools to undertake research and minimises the barriers that can impede research being carried out.

## 6. Supportive Management

The degree to which an organisation shared a culture of valuing research, or that a clinician's manager supported research was another element that influenced the success of RCB strategies. Supportive managers can help clinicians to access protected time for engaging in research. For example, the positive effects of the DRT were enhanced in teams within organisations that valued research or where team managers actively provided quarantined time for research activity (Cooke et al., 2006; 2008). At a broader level, Borkowski et al. (2016) argue for a 'whole-of-organisation' approach in which senior managers seek to incorporate research into the core business of a workplace. This involves research activity being intrinsic to an organisation's strategic plan, along with its vision, mission, and values. Along with protected time to undertake research, organisations that value research are more likely to implement the infrastructure and support networks required to perform high quality, successful and rigorous research (Borkowski et al., 2016).

## 7. Dedicated Research Positions

Three of the sixteen studies reviewed in this report demonstrated dedicated research positions to be a highly efficacious method for improving research capacity at the individual, team, and organisational levels of allied health services (Wenke et al., 2018; Wenke and Mickan, 2016; Rosewall et al (2009). Embedded research positions were shown to facilitate improved individual, team, and organisation level research skills (including disseminating research findings, writing funding applications and collecting data), increased numbers of staff participating in research activity, increased research outputs, and improved research culture and attitudes towards research. Overall, embedded research positions improve research capacity within primary healthcare settings, and are likely to possess efficacy in improving research capacity within AOD services.

## IMPLICATIONS AND RECOMMENDATIONS

The primary aim of this restricted review was to identify and summarise RCB strategies that could be used to build the research capacity of staff employed by AOD services in NSW. Due to a lack of relevant published literature targeted at AOD services in Australia and elsewhere, the review focused on published studies that evaluated RCB approaches in primary healthcare, allied health and other sectors related to AOD treatment. Forty- six studies were included in the restricted review. Sixteen of the studies were found to test RCB strategies within a primary healthcare service. These studies were summarised and discussed in more depth to identify the most relevant elements of their approaches to RCB for staff from NSW AOD services.

The most effective type of RCB strategy was the provision of protected time for staff to participate in research activities. However, while undoubtedly useful, providing protected time for research activities via clinical backfill and quarantined time for research may not be achievable for AOD services in the short term. These kinds of RCB strategies, in most cases, seem to necessitate funding. In addition, there are reportedly difficulties in recruiting new workers into the AOD workforce (Skinner et al., 2020), which could indicate that providing clinical backfill for experienced staff may not be achievable if an AOD service is in the midst of recruitment for new staff members. Protected time for research activities in AOD services may require a top-down approach that involves staff, managers, an organisation's leaders and funders to implement effectively.

Interestingly, elements of the five remaining themes are already in place in some form within the NSW AOD service sector. For NSW-based NGO services, education focused on building key research skills and competencies and ongoing, supportive mentoring from experienced researchers are provided by the Community Mental Health, Drug and Alcohol Research Network (CMHDARN). CMHDARN delivers free online and in-person training that target research skills and competencies, such as building an evidence base, formulating a research question, and the research ethics process. CMHDARN also facilitates the Community Research Mentoring Project for NGO services, linking interested NGO organisations with university partners.

For public AOD services in NSW, access to key research infrastructure and management that promotes, supports and values research are in place to varying degrees across LHDs. Many LHDs are members of the NSW Drug and Alcohol Clinical Research and Improvement Network (DACRIN). DACRIN is a collaborative network of AOD services engaged in clinical research. DACRIN was formed to enhance research capacity and productivity across the AOD sector; collaboration between AOD services; clinician and consumer engagement in research; and access to research support and resources. Since its inception, DACRIN has led or contributed to research studies integral in accelerating the implementation of depot buprenorphine in the community, and its uptake in corrective services facilities.

In conclusion, the below seven recommendations have been made for NADA, DACRIN and the wider AOD service sector in NSW. The recommendations are based on the findings and conclusions of the restricted review, cutting across the seven themes.

1. Development and repackaging of best-practice resources to enable research at Australian AOD services, with tools that respond to challenges unique to NGO and LHD services
2. Approach universities and propose collaborative arrangements in which NGO and LHD staff can access resources such as the library, mentorship and advice in exchange for promotion as institutions enabling socially impactful research
3. Explore training targeted at building research competencies that facilitate access for AOD service staff
4. Facilitate more opportunities for sharing of resources and networking between NSW-based NGO and LHD services related to building research capacity
5. Target advocacy efforts for RCB initiatives at projects, policies and funding which enable AOD staff to engage in practice-based research

6. Suggest that AOD services involved in funding applications for research, evaluation, or related projects in the AOD service sector to include a) a research position that is embedded in the service and b) protected time for AOD staff involved in projects to undertake research activities.
7. NSW Ministry of Health, Centre for AOD to consider how research could be included in KPIs for LHD/NGOs, whereby research time could be counted towards KPIs.

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# APPENDIX 1

**Table 1.**

Characteristics of studies reviewed

| Author(s) | Publication Date | - RC Assessment (A)<br>- RC Strategy (S)<br>- Other (O) | Location | Participants | Design | Survey Tool |
|---|---|---|---|---|---|---|
| Alison, Zafiropoulos, Heard | 2017 | A | Sydney Local Health District (SLHD) | 276 AHP's | Cross-sectional study | RCC tool |
| Barnett, Holden, Donoghue, Passey, Birden | 2005 | A | Rural NSW | 134 individuals across 11 different sectors of rural health. | Cross-sectional study | Two customised surveys |
| Borkowski, McKinstry, Cotchett | 2017 | A | Rural Victoria | 136 AHP's, physiotherapists, occupational therapists, and social workers. | Cross-sectional study | RCC tool |
| Elphinston & Pager | 2015 | A | Queensland | 60 psychologists - 46 female / 14 male. | Cross-sectional study | RCC tool |
| Friesen & Comino | 2017 | A | South West Sydney Local Health District | 109 Division of Community Health (DCH) staff - various AHP's. | Cross-sectional study | RCC tool |
| Gill, Gwini, Otmar et al. | 2019 | A | South-West Victoria | 776 nurses, AHP's and doctors completed survey. | Cross-sectional study | RCC tool |
| Harvey, Plummer, Nielsen, Adams, Pain | 2016 | A | Northern Queensland | 15 research active AHP's in regional health services. Included medical scientists, psychologists, physiotherapists, occupational therapists, radiotherapists, nutritionists, dieticians. | Semi-structured recursive interviews | RCC tool |
| Harvey, Plummer, Pighills, Tilley, Pain | 2013 | A | Northern Queensland | 103 social workers | Cross-sectional study | Customised survey |
| Howard, Ferguson, Wilkinson, Campbell | 2013 | A | Queensland | 130 dieticians | Cross-sectional study | RCC tool |
| Ilott & Bury | 2002 | A | United Kingdom | | Cross-sectional study | |
| Lazzarini, Geraghty, Kinnear, Butterworth, Ward | 2013 | A | Queensland | 37 podiatrists completed the 2011 survey.<br>33 podiatrists completed the 2012 survey. | Repeated cross-sectional study (2011 and 2012) | RCC tool |
| Lee, Byth, Gifford et al. | 2020 | A | Western Sydney, NSW | 393 health staff met eligibility<br>- 182 AHP's<br>- 139 nursing staff<br>- 72 medical practitioners | Cross-sectional study | RCC tool |

| Author(s) | Publication Date | - RC Assessment (A)<br>- RC Strategy (S)<br>- Other (O) | Location | Participants | Design | Survey Tool |
|---|---|---|---|---|---|---|
| Matus, Tearne, Blyth et al. | 2021 | A | Western Australia | 870 AHP invited to survey<br>331 AHP (38%) accessed the survey<br>257 completed the entire survey + 63 incomplete responses<br><br>TOTAL data from 320 AHP available for analysis | Cross-sectional study | RCC tool |
| Matus, Wenke, Hughes, Mickan | 2019 | A | Gold Coast, Queensland | 302 AHP's | Cross-sectional study | RCC tool |
| Webster, Thomas, Ong & Cutler | 2011 | A | Rural NSW | 25 interviews with managers and mentors. | Pre-post | Research Spider |
| Wenke et al | 2017 | A | Queensland | 44 AHP's | Cross-sectional, qualitative study | N/A |
| Wenke, Mickan & Bisset | 2017 | A | Gold Coast, Queensland | 95 AHP's | Prospective cross-sectional study. | RCC + Audit of research activity. Audit included the following:<br>- Number of research pubs<br>- Amount of research funding secured<br>- Number of conference presentations<br>- Number of active ethically approved research projects |
| Williams et al | 2015 | A | Victorian Public Health Sector | 520 AHP's | Cross-sectional study | General demographic questionnaire + RCC tool |
| Marshall, Roberts, Baker, Keijzers, Young, Stapelberg, Crilly | 2016 | A, S | South-East Queensland | 151 participants responded to the survey.<br>22 participants participated in the interviews. | Cross-sectional study | N/A |
| Pager, Holden & Golenko | 2012 | A, S | Queensland | 85 AHP's | Cross-sectional study | RCC tool |
| Cooke, Green | 2000 | O | N/A | N/A | Review | N/A |
| Grundy & Johnston | 2003 | O | Alice Springs, Northern Territory | N/A | Literature review | N/A |

| Author(s) | Publication Date | - RC Assessment (A)<br>- RC Strategy (S)<br>- Other (O) | Location | Participants | Design | Survey Tool |
|---|---|---|---|---|---|---|
| Pickstone & Nancarrow | 2008 | O | N/A | N/A | N/A | N/A |
| Scherrer & Secrest | 2019 | O | N/A | N/A | N/A | N/A |
| Skinner, Williams, Haines | 2015 | O | N/A | N/A | N/A | N/A |
| Borkowski, McKinstry, Cotchett, Williams, Haines | 2016 | O, S | Worldwide | N/A | Systematic Review | N/A |
| Golenko, Pager, Holden | 2012 | O, S | Not clear - study based in Australia though. | 9 participants<br>- 3 district executives<br>- 3 division chairs<br>- 1 director<br>- 1 executive director<br>- 1 team leader | Cross-sectional study | 8 question interview |
| Wenke & Mickan | 2016 | O, S | Included studies came from: Australia (3), UK (3), New Zealand (1), USA (1). | N/A | Systematic review | N/A |
| Bamberg et al | 2010 | S | Western Region Health Centre, Victoria | N/A | Cross-sectional study | N/A |
| Chughtai & Tanweer | 2020 | S | Lahore, Pakistan | 34 clinical dietitians | Pre-post | Customised survey |
| Cooke, Nancarrow, Dyas, Williams | 2008 | S | United Kingdom East Midlands/South Yorkshire | 6 teams<br>- teams included at least one novice researcher, and at least one who was linked to an academic research department.<br>- teams composed of primary care workers - GP's, AHP's, community nurses, social workers, and pharmacists. | Cross-sectional study | N/A |
| Cooke, Nancarrow, Hammersley, Farndon, Vernon | 2006 | S | United Kingdom | 1 team of podiatrists. | N/A | N/A |
| Donley & Moon | 2021 | S | St. Vincent's Hospital Melbourne | 17 participants responded to first questionnaire. | Pre-post | Customised questionnaire |

| Author(s) | Publication Date | - RC Assessment (A)<br>- RC Strategy (S)<br>- Other (O) | Location | Participants | Design | Survey Tool |
|---|---|---|---|---|---|---|
| | | | | 12 participants responded to the second. | | |
| Harding, Shields, Whiteside, Taylor | 2016 | S | Melbourne (Eastern suburbs) | 55 primary healthcare workers | Pre-post evaluation | Interviews<br>Research outputs |
| Harding, Stephens, Taylor Chu, Wilby | 2010 | S | Melbourne | 6 AHP's | Pre-post | Research Spider |
| Hilder, Mickan, Noble, Weir, Wenke | 2020 | S | Queensland | 34 AHP's were awarded funding.<br>10 AHP's participated in the interview. | Cross-sectional study | Face-to-face semi-structured interview |
| Holden, Pager, Golenko, Ware & Weare | 2012 | S | Queensland | 69 primary health care professionals.<br>- 4 intervention teams. 4 control teams.<br>- Matched on service role and size. | Non-randomised matched-pair trial design | RCC tool |
| Matus, Walker & Mickan | 2018 | S | N/A | N/A | Systematic review | N/A |
| McIntrye, Brun, Cameron | 2011 | S | All across Australia | 105 participants | Cross-sectional study | Customised survey |
| Naidoo, Bowen, Arden, Redmond | 2013 | S | UK (universities of Southampton and Leeds) | 9 podiatrists | Cross-sectional study | Research outputs measured<br>Semi-structured interview |
| Ried, Farmer, Weston | 2007 | S | Adelaide, South Australia | 38 primary healthcare workers<br>- 24 received bursaries.<br>- 11 received writing grants.<br>- 3 received a research fellowship. | Pre-post | Semi-structured interview |
| Ried, Fuller | 2005 | S | South Australia | N/A | N/A | N/A |
| Rosewall et al | 2009 | S | Canada | Entire Radiotherapy department | Single-centre retrospective case study | Research outputs |
| Schmidt, Webster & Duncanson | 2018 | S | Rural NSW | 130 participants | Repeated cross-sectional study (2006 and 2013). | Research Spider |

| Author(s) | Publication Date | - RC Assessment (A)<br>- RC Strategy (S)<br>- Other (O) | Location | Participants | Design | Survey Tool |
|---|---|---|---|---|---|---|
| Wenke, Tynan, Scott & Mickan | 2018 | S | Darling Downs Hospital and Health Service Toowoomba QLD | N/A | Cross-sectional study | N/A |
| Wenke, Weir, Noble et al. | 2018 | S | Gold Coast, Queensland | 16 Allied Health clinicians | Pre-post | RCC tool |