

**HOW DOES A PRACTICE-BASED RESEARCH NETWORK FACILITATE
EVIDENCE-INFORMED PRACTICE WITHIN THE CHIROPRACTIC PROFESSION
IN AUSTRALIA? A COMMENTARY**

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ABSTRACT

This commentary summarises the background, rationale, structure and context of Practice-Based Research Networks (PBRNs) with an emphasis on chiropractic within the Australian health care setting. Following an overview of the importance and value of research based within practice-based settings and a summary of international developments in chiropractic PBRN's there is a brief description of the genesis, construction and implementation of the Australian Chiropractic Research Network (ACORN) project. The role of the ACORN PBRN is to help facilitate the development and promotion of a research agenda; improve the uptake of best clinical practice; address issues relevant to chiropractors and their patients; and build research capacity and output for the Australian chiropractic profession. The commentary identifies how the chiropractic profession in Australia is already starting to see the tangible results from the establishment of the ACORN PBRN. (*Chiropr J Australia* 2018;46:172-185)

Key Indexing Terms: *Research; Chiropractic; Complementary and Alternative Medicine; Evidence-Based Practice; Practice-Based Research Network*

INTRODUCTION

Delivering high quality health care in current times is challenging. While the Australian chiropractic profession must meet the same clinical and regulatory requirements as other nationally registered health care professions, it must seek to do so with the limited funding and personnel that characterises the reduced capacity of a smaller health profession. These circumstances therefore require the profession to more optimally utilise all of its constituent parts; academics, researchers, field practitioners and professional organisations working together effectively in order for the profession to be functional within the Australian health care system.

Critical to achieving this goal is the need for chiropractic research findings to lead to better patient health and well-being within society (1). However, a barrier to achieving this outcome is the potential for a disconnect to occur between the findings delivered by researchers and the implementation of those findings by practicing field practitioners (2, 3). Such concerns are magnified in circumstances where research academics dismiss field practitioners as ignorant or resistant to adopting research outcomes designed to improve evidence-based practice (4); or where field practitioners dismiss research academics as living in an 'ivory tower', divorced from understanding the circumstances and logistical challenges associated with real-world practice (3, 5) and become dismissive of research findings at the level of frontline health care delivery as a result. Other factors beyond this lack of acceptance or negative beliefs toward new research findings also include; a lack of provider awareness and knowledge of new research findings; provider motivational factors – both external and internal; new skills needed to adopt changes to routine practice

including those related resources and personnel; as well as factors associated with the external environment, both financial and political (6).

In exploring these issues, Larry Green, the first Director of the US Federal Office of Health Promotion under the Carter Administration, describes this 'research-practice gap' as one where frontline clinicians are too often assumed as passive 'empty vessels' who must suffer the one-way transmission of research information passed down via ever-changing practice guidelines (7). In raising these concerns Green suggests healthcare research findings undergo a greater level of preliminary vetting by field clinicians *prior* to their inclusion into clinical practice guidelines (CPG's) (5) which too often fail to engage field practitioners in daily practice (8). As a result of these challenges, it may be that the key to successfully translating the most effective research into practice is to gather practice-based evidence in the first place, or as Green is often quoted; "*If we want more evidence-based practice, we need more practice-based evidence*" (9).

It is paradoxical then that so much clinical research within health care continues to be embedded largely within institution-based tertiary centres that fail to sufficiently reflect real-world subjects and treatment delivery (10). While these concerns are not unique to healthcare or to chiropractic alone (11,12), such issues have led to a call for more '*translational research*', including by the chiropractic profession, to improve the acceptance and adoption of research findings by chiropractic field clinicians (13-16) in responding to that persistent question of; "*why, with the growing volume and apparent quality of evidence, would practitioners seem to be so resistant to using it?*" (7).

Practice-Based Research Networks

Primary care is described as the essential foundation of effective, efficient, and equitable health care systems (17). As such, the more recent introduction of health research within the real-world primary care frontline settings has been heralded as a significant development in overcoming many of these issues. Most notably, has been the willingness of health care disciplines to foster the establishment of PBRNs as the vehicle needed to better unite the worlds of community-based clinical practice and health research academia. Described as '*laboratories for primary care clinical research*' (10), PBRNs are "*groups of practices committed to improving clinical practice; groups of primary care clinicians and practices working together to answer community-based health care questions and translate research findings into practice*" (18). As such, PBRNs aim to directly engage clinicians as equal partners in quality improvement activities and an evidence-based-informed culture to help improve the health of the community. The significant growth in the number PBRNs over the last 30 years (19) has been attributed to the multiple advantages that PBRN-based research facilities have to offer (20-22), including those associated with the more practical and accessible transfer of knowledge gained from research collected within daily clinical practice and the ability of PBRNs to bring forward practice-relevant topics onto the official research agenda (23).

The National Dental Practice-Based Research Network in the USA is one example. This PBRN has over 6,500 dentists and dental hygienists as members (24). One of the key aims of the US dental PBRN was to "*improve the disconnect between clinical*

practice and published research" (25). The US Dental PBRN has now seen research published in over 39 different peer-reviewed scientific journals covering a wide range of clinical topics important to dental providers and their patients. This includes research examination of issues ranging from public health issues such as patient smoking (26); the use diagnostic procedures (27); clinical information management (28) through to better understanding how dental providers seek online information (29). As such this is an example of how PBRN research designs go far beyond RCT's (30-32) to include the testing theories and concepts and unintended consequences; all of which are necessary to do 'good science' in the real world (1, 33-37).

PBRN Research Opportunities for Chiropractic

Solving complex health problems is a significant challenge due to the many inter-related elements that are associated with the unique circumstances of each presenting patient (38-40). Improving our understanding of these inter-related elements provides a unique opportunity for chiropractic research designs to allow for how various elements impact upon the clinical encounter, and how these elements might be utilised to improve patient outcomes within real world circumstances which must above all be contextual to clinical practice (41-43).

Balancing the importance of internal and external validity i.e. the degree to which trial results are attributable to the treatment under examination (internal validity), while recognising there are outside influences (external validity) that are also associated with patient outcomes in real world settings is an important area for ongoing research enquiry. As Ammerman outlines; *"across the world funding is being tightened, and the traditional reliance on internal validity as being prioritized over external validity (44), is being challenged and further, that pragmatic clinical trials and systems modelling are among the emerging planning and analytic strategies that can help structure and integrate practice-based evidence"*. Ammerman further points out that researchers must recognise both the opportunities and the limitations of these models to draw appropriate conclusions (1). As such, while clinical researchers recognise RCT designs as the gold standard to isolate the singular effects of one intervention alone, emerging concepts, for example of 'Whole Systems Research' (WSR) recognise the wider importance and influence of the entire clinical encounter.

WSR is described as that which *"entails the intention to include all aspects of any internally consistent approach to treatment, including its philosophical basis, patients, practitioners, setting of practice, and methods/materials used" as conceptually part of the investigative framework (45)*. As such, WSR designs recognise unique patient, family, community, and environmental features and viewpoints - factors that are more unique to practice-based clinical settings. Newell et al for example, recently presented a scientific model termed 'Contextually Aided Recovery' (CARE) contending that the circumstantial effects associated with the patient clinical encounter are not only powerful, but can elicit large clinical effects on pain, immune function and motor modulation (46). Newell presents the view that the compartmentalisation of specific and non-specific effects is a false dichotomy, both biologically and scientifically, and contends that the use of these non-specific effects

can be a skilful clinical art worthy of exploring within the multimodal approach to modern chiropractic care.

Broadly speaking, PBRNs provide an opportunity to facilitate wide variations in research designs; quantitative; qualitative; mixed and multi-methods; the possibilities encompass virtually all types of methodologies adapted to suit carefully developed (chiropractic) research agendas to incorporate basic science, clinical, public health and health services domains (47-49).

PBRNs in Action

In Australia before there were formal research institutes or networks of practices, there were individual practitioners who studied their patients' problems with scientific rigour. For example; the 1962-63 Australian National Morbidity Survey was conducted with 85 volunteer Australian general practitioners, and another over 6-years involved 50 full-time general practitioners and over one million patient contacts (50). In Australia while progress in PBRN development has been quite modest, the number of PBRN's is now growing quickly. An audit in 2010 documented six geographically defined PBRN's (51). By 2013 when The Australian Primary Care Research Network (APCRen) had superseded the Australian Primary Health Care Research Institute (APHCRI) (52) to provide a national support service for PBRNs across Australia, there were 19 registered PBRNs; SA (2), QLD (5), NSW (8), VIC (2), TAS (1) and 1 national, with others under construction.

International Chiropractic PBRN's

The Nordic chiropractors have established a relatively mature PBRN culture (including some non-voluntary) collecting data and reporting on outcomes from practitioners and patients for over 20 years (53). Quite a number of practice-based research projects have been performed among chiropractors in the Nordic countries in which data on patients have been collected mainly using questionnaires and mobile phones (54-61). Some of these studies were summarised by Axen (62) while presenting a manual of how to conduct chiropractic PBRN studies.

A proposed, but yet to be implemented project is a Canadian chiropractic PBRN. The model will draw on the work of Peterson et al. who described a model for the development of an electronic medical record, or EMR system, to support clinical research activities (63). The Canadian Memorial Chiropractic College (CMCC) has already successfully pilot-tested an EMR system which may be implemented across participating PBRN practices to facilitate data collection under this PBRN model (64). As yet, attempts to establish viable chiropractic PBRNs in the USA have not proven sustainable. The Integrated Chiropractic Outcomes Network (ICON) was an inter-institutional collaboration combining the expertise of experienced investigators who had conducted a number of practice-based research studies in other venues. The project was initiated in 2011 with a national coverage goal, however unfortunately languished due to a lack of funding (65).

The International Chiropractic Pediatric Association (ICPA) Practiced Based Research Network lays claim to being the largest PBRN in the chiropractic profession with more than 5,000 chiropractors and chiropractic students contributing to the ICPA mission with output of over 100 listed articles on its website research page dating back to 2004 (66). The ICPA was established in 1986 with a focus on; *“how chiropractic care positively impacts generations of families in areas related to general health, quality of life and the body's ability to express optimal human potential, particularly throughout pregnancy and childhood”*. The ICPA research division is grounded in a salutogenic model (67).

The Australian Chiropractic PBRN

Consequent to a 2010 summit at Macquarie University which discussed initiating an Australian research agenda (68), the Chiropractors Association of Australia-National (CAA-N) set out to maintain a robust commitment to supporting research including evidence-based practice and university led education programs for the profession. To this end CAA-N subsequently seed-funded a world leading independently-designed and conducted PBRN which has recently been established in Australia initially collecting data from over 2000 chiropractors about many aspects of chiropractic practice, being the Australian Chiropractic Research Network (ACORN) (69). The ACORN project was designed and established over three years by the Australian Research Centre in Complementary and Integrative Medicine (ARCCIM) based at the University of Technology Sydney (UTS) via a steering committee which included senior members of the profession. The ACORN PBRN now provides a platform for research with both chiropractors and their patients on issues such as effectiveness, safety and affordability. It is critical to note that the ACORN project has been designed to be administered independently from the chiropractic professional organisations. Although CAA-N provided seed funding, the project is administered and the data held and managed by ARCCIM, thus providing a robust, transparent, scientifically mature scaffold for future research headed by world-renowned independent scientists and researchers.

The ACORN PBRN offers the framework to further explore basic science and mechanistic research such as normal and abnormal spine biomechanics, biomechanical changes associated with the chiropractic adjustment and the related neurophysiological effects of chiropractic interventions on musculoskeletal pain, disability, function and neurological processes. For clinical research, topics for PBRN investigation can include examination of a range of management approaches toward a variety of clinical conditions including; those associated with particular patient groups such as children; older people; minority groups; pregnancy; athletes and sports people/injuries; trauma from traffic and work-related injuries and post-surgical rehabilitation. For public health and health services there is an opportunity to examine the epidemiology of musculoskeletal spinal disorders/conditions (patterns, causes and effects); access/barriers to chiropractic health services; cost-benefit analysis of chiropractic health services; chiropractic education and training; workforce and career pathways and societal impact of chiropractic care (both short and long-term).

Although PBRNs often share some core features, they nevertheless manifest in many different ways (70, 71). The ACORN (69, 72) project is built around a particular

PBRN approach and design—a ‘sub-study model’. The vast majority of PBRNs have typically adopted what is referred to as a ‘registry model’, whereby initial data collection is focused on establishing a centralised, coordinated patient record management system (73, 74). This approach tends to lend itself well to patient-focused data collection, allowing direct access to patient care and outcomes through time and consistently across PBRN practice sites. However, one limitation of an initial PBRN registry is that subsequent, related or new research interests are not easily accommodated once the patient record management system is operationalised, and it is often undesirable and inconvenient to introduce revisions to the established data collection management system (74). In contrast, the ACORN project initially employs a sub-study model to PBRN design whereby initial data collection was focused exclusively on practitioner-relevant information collected via self-report aimed at establishing a practitioner PBRN database (72). The model is designed to allow future researchers to utilise the database for various study designs. This approach recognises the dynamics of the Australian chiropractic profession where there are multiple initial patient data collection methods and combinations of paper-based and e-health record keeping (75, 76).

Researchers wishing to utilise the ACORN platform are invited to lodge applications via an Expression of Interest (EOI) process that is designed to help manage sub-study proposals. EOI submissions are encouraged from clinicians, researchers, potential funders and others with an interest. Both Australian and international investigators are welcomed. EOI submissions are then subject to scientific review by the ACORN Project Steering Committee to ensure quality, rigour, fit and other important criteria (77).

The ACORN project in Australia has already produced tangible results in terms of research and publication output. At the time of writing (Feb 2017), 6 ACORN based research papers have been published, all in different peer-reviewed journals (69, 72, 75, 76, 78, 79); 7 additional papers are currently in late draft preparation for submission; and 8 future follow-up sub-studies have been approved or currently under early implementation. These sub-studies examine topics as diverse as chiropractic management of workplace injuries, sports injuries, older patients, sciatica, neck pain, headaches, the use of nutritional advice, and the psychological profiles of chiropractors. These sub-studies include collaboration between researchers at all the current Australian universities with a chiropractic programme in concert with practitioners and researchers across Australia and overseas (Sweden, USA and Canada). In addition to research output, an important focus for the ACORN project has been to provide infrastructure that can help to advance research capacity building both for senior and emerging researchers. For example, the first PhD nested within the project is already collecting data and publications have commenced (78, 80).

Over a decade ago, Mold observed PBRNs had evolved from clinical laboratories into entire ‘*learning communities*’, proving grounds for more generalisable solutions to clinical problems, and engines for improvement of primary care delivery systems including quality improvement (QI) in patient diagnosis, treatment and disease prevention. Research within PBRNs focus on “*improvement of health outcomes of individuals and populations since the focus of clinicians, as opposed to academics, is on clinical outcomes, not research for its own sake*” (20). As such, successful

PBRNs have recognised that for researchers and clinicians to work together they must focus on outcomes that are relevant to clinical practice, that is, emphasis on solutions to the challenges that clinicians and their patients face on a frequent basis (20). As it matures as a PBRN, it is envisaged ACORN will fulfil this role as a learning community within Australian chiropractic.

CONCLUSION

There is increasing recognition of the need for a shift in the production of health care research that is more relevant to the needs of patients and the experiences of practitioners, payers, and policymakers. In other words, research that is more germane to the 'real world' of health care delivery. As a result, the establishment of PBRNs can mobilise both researchers and practitioners to facilitate clinical research on issues most relevant to chiropractors and their patients that are typical of daily practice settings. The flexibility of PBRN based chiropractic research can range from improving best practice through to exploring contextual factors associated with the entire chiropractic clinical encounter, including the significance of non-specific effects associated with the clinical encounter that influence patient outcomes. PBRNs can link chiropractors via databases to facilitate research and outcome measurement and build capacity of the chiropractic profession to participate in, conduct and implement research. The Australian chiropractic profession is already starting to see the results of the establishment of a world leading PBRN.

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