

Towards an inclusive research culture in upcoming Health and Education Precincts in New South Wales, Australia: implications for policy and practice

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Research Article

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Abstract

An inclusive research culture is vital towards the maturity of Health and Education Precincts into an active innovation ecosystem. To date, substantial investments have been made in 13 upcoming Health and Education Precincts in varying stages of development in the Greater Sydney region, New South Wales. The political commitment to create an innovative environment for teaching and a vibrant research culture is noticeable. However, it is unclear to what extent government policy engages the breadth of clinical personnel in teaching and research-related activities and contributes towards improving research culture. Based on a study conducted at the central river district of the Greater Sydney region, we argue that better engagement of clinical personnel in teaching/research-related activities and inclusion of research-related roles within the job description of clinical personnel can substantially drive a positive research culture and thereby contribute towards the overall development of Health and Education Precincts. Opportunities for continued education and training of clinical personnel and involvement in graduate research programs also substantially drives research culture. We argue that future policy and practice solutions for upcoming Health and Education Precincts need to foster an inclusive research culture and should be tailored to meet the needs of an innovative ecosystem. Future solutions will need to contribute towards improving research culture as well as the health and wellbeing of people in the region.

Introduction

The Greater Sydney Commission's (hereon referred to as 'the Commission') vision for the future of Sydney proposes an interconnected metropolis of three cities: western parkland city (Penrith), central river city (Parramatta) and eastern harbour city (Sydney).¹ The Commission's vision brings new thinking to livability, productivity and sustainability so as to radically transform the region into an innovative and high growth economy.^{1,2} Health and education precincts are classified as strategic centres for development by the Commission.

At the basic level, a health and education precinct includes a University collaborating or co-located alongside a major hospital or principal referral hospital.^{1,3} Maturity pathways for such precincts include the development of medical research institutions, commercialisation of research, startup accelerators, venture capital firms, multidisciplinary university settings, residential facilities and enabling an active innovation ecosystem.³ As precincts evolve in nature, the economic productivity of the precinct is also set to increase substantially.⁴ The Commission recognises 13 health and education precincts at various stages of development in the Greater Sydney region.¹ Box 1 provides the list of these precinct names along with their location in the Greater Sydney region and key stakeholders.

The organisational philosophy of a health and education precinct is to build a culture that strengthens collaboration between clinical/health personnel and academic/university personnel.⁵ It is recognised that the roles and responsibilities may vary - the main role of academic personnel is teaching and research, while clinical personnel are more engaged in patient care roles. A few traditional measures for collaboration are already in place through teaching and research programs offered by Universities within

major public hospital settings. For example, the University of Sydney has longstanding clinical teaching and research units based at several public referral hospitals (such as Royal Prince Alfred Hospital, Concord Hospital, Westmead Hospital).⁶ Both academic personnel (employed through the University) and clinical personnel (mainly employed by the public hospital, and holding a University affiliation) have been involved in teaching and research activities. However, for a large majority of clinical personnel, these activities fall outside the purview of their main patient care roles.

While accommodating the Commission's vision for the future of Sydney, it is necessary to encourage collaboration between health and education sectors and strengthen evidence-based care provision in the upcoming precincts. Building an inclusive research culture is the foundation of evidence-based practice and sound decision making.⁷ It is well recognised that health settings that actively engage in research show improved patient and health outcomes.⁸ The ability of all health personnel to engage in research-related activities - such as reviewing, utilising, conducting, evaluating and disseminating research evidence - is vital.⁹ Creating an inclusive research culture also improves skill sets, job satisfaction and career opportunities for health personnel.¹⁰ Undoubtedly, a positive and inclusive research culture is an essential aspect for an innovative ecosystem, strengthening the global reputation and contributing to the economic development of the upcoming health and education precincts.

Lessons From A Western Sydney Study

We conducted a study on research culture and capacity of all health personnel (medical, nursing and allied health) located at the central river city district^[1] of the Commission's region.¹¹ The study area included two upcoming health and education innovation precincts at Westmead and Blacktown¹², along with Auburn, Mt Druitt and Cumberland hospitals and community health centres. Together, they formed part of the Western Sydney Local Health District, which is one of the 15 health administrative districts of NSW Health.¹³ Geographically, it also includes four local government areas of Parramatta Council, Blacktown Council, Cumberland Council and the Hills Shire. Figure 1 provides an illustration of the study area; locating the study area within the Greater Sydney Region and identifying the upcoming health and education innovation precincts.

The Universities of Sydney and Western Sydney are the main higher education universities in the study area and have established bases in the region. Both Universities have made considerable investments and envision the upcoming health and education precincts at Westmead and Blacktown as global centres for excellence and multidisciplinary innovation¹⁴.

Approximately 7150 clinical personnel (2079 medical; 4100 nursing and 968 allied health) were employed in the public health sector (i.e. Western Sydney Local Health District) at the time of the study. Overall, the public health sector serves over one million people in the region. Over 43 percent of the population in the region were born overseas, and about 45 percent speak a language other than English at home.¹⁵ The

region is also the home to the highest urban aboriginal population in NSW (about 13,400 aboriginal people based on 2016 census).¹⁵

All health personnel (medical, nursing and allied health) employed at the study area were invited to participate in a survey through an online questionnaire *via* a Research Electronic Data Capture (REDCap) system[2]. The survey was administered between November 2016 to January 2017. A range of data items, including demographic, work status and research biodata were collected. Research culture (outcome variable) was assessed using a battery of 51 items, classified across three domains: individual level (14 items); team level (19 items) and organisational level (18 items). Health professionals (medical, nursing and allied health); gender (male, female); age groups (less than 35 yrs, 35-45 yrs and 55+ yrs); educational qualification (undergraduate, graduate, higher degree research); team role (clinician, management, teaching/research); experience years (5 yrs or less, 6 to 15 yrs, and 15+ yrs); enrolled in a research program and having research in role description - were used as covariates.

Respondents were asked to rank their level of skill/ confidence to each item/statement of the research culture domains ranging from 1 to 10, with 1 being in least agreement and 10 being in strong agreement to that item/statement. Responses were later dichotomised into two groups using mean scores of < 6 as cut-off point (scores < 6 were considered to be a lower level of skill/confidence in the concerned scale/domain and coded as 0; scores of ≥ 6 were considered have a higher level of skill/confidence with the concerned scale/domain, and were coded as 1). These dichotomised scales were first examined by sample characteristics using chi-square tests, and a level of significance set at $p < 0.05$. Characteristics found significant at any research culture domain were included as covariates in the multivariate log-binomial regression models. Adjusted odds ratios were generated. Ethics approval for the study was obtained from an approved Human Research Ethics Committee in Australia. In this viewpoint, we have presented results of the logistic regression analysis; a prior publication has examined the descriptive nature of the findings from the study.¹¹

Table 1 presents the findings from the regression analysis of the dichotomised research culture domains with selected sample characteristics. Adjusted log-binomial models are presented for each domain. Respondents with a higher degree by research qualification had a consistently higher odds ratio of having a higher level of skill/confidence the three research culture domains compared with respondents with an undergraduate or graduate qualification. Respondents engaged in teaching and research, also had a higher odds ratio of identifying higher skill level / confidence for the team and organisational research culture domains, compared with respondents mainly involved in clinical and management/executive tasks. A further finding was respondents not having research within their role description were less likely to identify higher skills / confidence for each of the research culture domains, and this was significant at the individual and team domains.

Only health personnel employed by the public health system (Western Sydney Local Health District) were surveyed. Private hospitals in the region were not included. However, the public sector is the largest employer of health personnel in the region. Further, the study did not evaluate the research culture of the

health and education precincts *per se*, but chose to examine only an aspect of the precincts - the health sector. This decision was conscious as the purpose of the study was to build an inclusive research culture for evidence-based practice among the health professionals.

[1] The Greater Sydney Commissions plan document classifies the region into five districts: eastern harbour city district, central river city district, western parkland city district, north district and south district.

[2] REDCap is being widely deployed in NSW Health, and used by researchers across the local health districts. The functionality is similar to other online surveys such as Qualtrics/Survey Monkey but provides secure storage functions.

On Reflection: Policy And Practice Implications

An inclusive research culture is vital towards the maturity of health and education precincts into an active innovation ecosystem. It is preferable to engage a wide variety of clinical personnel as part of the process of establishing a vibrant research culture. To date, substantial investments have been made in Health and Education Precincts in the Greater Sydney region. In the Westmead precinct alone, over 3 billion has been committed by the government, University and private sector for infrastructure and development projects.¹⁶ Amongst a new central acute services building and a new pediatric services building, the university infrastructure has also been strengthened via conference facilities and dedicated university spaces (for teaching and research) alongside the clinical facilities.¹⁶ While, the political intent to enable a collaborative environment for teaching and research is visible, it is unclear to what extent these changes will contribute to improving the research culture for a large majority of clinical personnel.

In this paper, we have provided insights into enabling factors for improving research culture to drive an innovative ecosystem in the Health and Education Precincts. Our viewpoint, however, is based on findings from two Health and Education Precincts. We recognize that the underlying social determinants, geographic location, population needs, health professionals and universities will determine the inherent nature of upcoming Health and Education Precincts. While our findings are suggestive and should be viewed with some caution, there are considerable implications across all the 13 Health and Education Precincts in NSW. We argue that policy and practice solutions will need to be tailored to meet the emerging population needs in each region. To this end, improving research culture and involving clinical staff in research and teaching related activities will undoubtedly create a vibrant innovative ecosystem.

Declarations

Competing Interests:

The authors declare no conflict of interest.

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Box And Table

Box 1: Health and Education Innovation Precincts in Greater Sydney Region, NSW

No.	Precinct Name	Greater Sydney Commission Region	Main Innovation Partners [†]
1	Camperdown-Ultimo	Eastern Harbour City District	Sydney LHD; Royal Prince Alfred Hospital; Sydney Health Partners; TAFE NSW; University of Sydney; University of Technology Sydney; University of Notre Dame; George Institute of Global Health; Woolcock Institute of Medical Research; Sydney City Council
2	Randwick	Eastern Harbour City District	South Eastern Sydney LHD; Prince of Wales Hospital; Sydney Children's Hospital; Royal Hospital for Women, University of New South Wales; TAFE NSW Randwick; Randwick City Council
3	Rhodes East	Eastern Harbour City District	Sydney LHD; Concord Repatriation General Hospital; TAFE NSW; University of Sydney; Canada Bay City Council
4	Westmead	Central River City District	Western Sydney LHD; Westmead Public Hospital; Westmead Private Hospital; Sydney Children's Hospital Network; The Westmead Institute of Medical Research; Children's Medical Research Institute; City of Parramatta Council; Cumberland Council; Sydney Business Chamber
5	Blacktown	Central River City District	Western Sydney LHD; Blacktown Public Hospital; Western Sydney University; TAFE NSW Blacktown; Blacktown City Council
6	Greater Penrith	Western Garden City District	Nepean Blue Mountains LHD; Nepean Public Hospital; Nepean Private Hospital; Nepean Blue Mountains Primary Health Network; Wentworth Healthcare; Nepean Blue Mountains Education and Medical Research Council; Western Sydney University; University of Sydney; TAFE NSW; Celestin; Penrith City Council
7	Liverpool	Western Garden City District	South Western Sydney LHD; Liverpool Hospital; South West Sydney Primary Health Network; Western Sydney University; University of Wollongong; University of New South Wales; TAFE NSW; Ingham Institute of Applied Medical Research; Liverpool City Council
8	Campbelltown-Macarthur	Western Garden City District	South Western Sydney LHD; Western Sydney University; Ingham Institute of Applied Medical Research; South West Sydney Primary Health Network; University of Wollongong; University of New South Wales; TAFE NSW; Campbelltown-Macarthur City Council
9	St Leonards	North District	Northern Sydney LHD; Sydney Royal North Shore Hospital; North Shore Private Hospital; Ramsay Health Care; North Shore Radiology; Genesis Care; TAFE NSW North Shore; North Sydney, Willoughby and Lane Cove City Councils; NSW Health; Genesis Care
10	Frenchs Forest	North District	Northern Sydney LHD; Northern Beaches Hospital; NSW Health; Northern Beaches Council
11	Macquarie	North	Northern Sydney LHD; Macquarie University; Abbott; AMP

	Park	District	
			Capital; Australian Learning Hub, Cochlear; Johnson and Johnson; 3M Fujitsu; Schneider Electric; Konica Minolta; National Bank of Australia; NSW Government; Optus & Orix Australia; CSIRO; City of Ryde Council
12	Bankstown	South District	South Western Sydney LHD; Bankstown-Lidcombe Hospital, Western Sydney University; TAFE NSW Bankstown; Bankstown-Cantebury Council;
13	Kogarah	South District	South Eastern Sydney LHD; St Georges Hospital; St Georges Private Hospital; Western Sydney University; University of New South Wales; St George & Sutherland Medical Research Foundation; Georges River Council

Note: †List of main innovation partners is not exhaustive. LHD is a Health Local Health District – administrative zones of NSW Health.

Table 1: Logistic regression analysis | western Sydney study

Variable	Individual level			Team level			Organisational level	
	OR		95% CIs	OR		95% CIs	OR	95% CIs
Profession								
Medical	Ref.			Ref.			Ref.	
Nursing	0.29	**	(0.13, 0.62)	0.4	*	(0.17, 0.91)	0.87	(0.4, 1.91)
Allied health	0.57		(0.27, 1.18)	0.39	*	(0.17, 0.86)	0.69	(0.4, 1.47)
Gender								
Male	Ref.			Ref.			Ref.	
Female	1.03		(0.55, 1.95)	1.21		(0.58, 2.52)	0.99	(0.52, 1.9)
Age group								
Less than 35 yrs	Ref.			Ref.			Ref.	
35 to 54 yrs	0.99		(0.45, 2.21)	1.07		(0.38, 3.02)	1.25	(0.51, 3.06)
55+ yrs	1.17		(0.44, 3.14)	0.65		(0.19, 2.21)	1.11	(0.38, 3.23)
Educational Qualification								
Undergraduate level	Ref.			Ref.			Ref.	
Graduate level	1.59		(0.87, 2.93)	1.23		(0.61, 2.48)	1.57	(0.82, 3.03)
HDR level	8.64	**	(3.79, 19.72)	2.37	*	(1.01, 5.58)	2.56	* (1.12, 5.85)
Enrolled in a study/research program								
Yes	Ref.			Ref.			Ref.	
No	0.22	**	(0.12, 0.42)	0.63		(0.31, 1.27)	0.81	(0.42, 1.58)
Team role								
Clinician	Ref.			Ref.			Ref.	
Management/Executive	1.32		(0.66, 2.64)	1.1		(0.49, 2.47)	1.95	(0.97, 3.9)

Teaching/Research	1.45	(0.77,2.71)	2.96	**	(1.53, 5.73)	1.99	*	(1.05, 3.75)
Years of experience								
5 yrs or less	Ref.		Ref.			Ref.		
6 to 15 yrs	0.8	(0.35,1.84)	0.36	*	(0.13, 0.98)	0.18	**	(0.07, 0.44)
16+ yrs	1.33	(0.51,3.48)	1.18		(0.37, 3.74)	0.23	**	(0.08, 0.7)
Research in role description								
Yes	Ref.		Ref.			Ref.		
No	0.49	** (0.30,0.81)	0.38	**	(0.22, 0.67)	0.88		(0.53, 1.47)

*p<0.05. **p<0.01.

Ref is Reference Category; OR is Odds Ratio; CI is 95% Confidence Interval.

Multivariate log-binomial regression models; Adjusted odds ratios were generated; Models accommodated selected variables and simultaneously adjusted for the outcome variable.

Figures



Figure 1

A map of Greater Sydney region, with the study area marked in blue. Note: This map has been modified using sources from the Greater Sydney Commission and Western Sydney Local Health District maps. The yellow dots are the health and education precincts. Map not to scale.