

Rural health workforce retention: strengthening the evidence base

Deborah Russell¹, Marita Chisholm¹, John Humphreys¹, John Wakeman²

¹Monash University School of Rural Health, Bendigo, ²Centre for Remote Health, Flinders University & Charles Darwin University

Deborah Russell is a Research Fellow at the Monash University School of Rural Health in Bendigo. She has ten year's experience as a rural general practitioner and is currently completing her Masters in Clinical Epidemiology. Her specific academic interests include rural and remote health services and health workforce research and primary health care research.

Abstract

Context/relevance: The shortage of health care professionals, managers and support workers remains a critical issue in the quest to provide good access to appropriate, sustainable health care in rural and remote areas. To date, surprisingly little use has been made of human resource data routinely collected by rural and remote health services to progress our understanding of patterns of workforce turnover and retention.

Objectives: This paper demonstrates a methodology and analytical framework showing how existing health service human resource records can be used to monitor health workforce turnover and retention, and thereby inform rural health workforce planning strategies.

Method: Individual level de-identified employment data on health care workers from Australian regional, rural and remote health services were collected in two distinct studies, and separately analysed using simple arithmetic calculations of turnover and stability, Kaplan Meier survival analysis and regression modelling. The first study surveyed 100 primary health services from across Australia collecting length of stay data on all nurses, doctors, allied health professionals, Indigenous health workers and managers employed during the period 1/1/2003 to 31/7/2009. The second study surveyed 16 Victorian rural health services, collecting length of stay data on all allied health professionals employed between 1/1/2004 to 31/12/2009.

Results: Thirty three health services provided length of stay data on 1,479 health professionals in the national study, whilst eleven health services provided length of stay data on 901 allied health professionals in the Victorian study. A suite of five workforce measures (annual turnover rates, stability rates, median length of stay in current position, median survival and survival probabilities) collectively provided comprehensive turnover and retention metrics, whilst regression analysis identified significant predictors of turnover. Nationally, allied health professionals were 1.74 (95%CI 1.27, 2.40) times more likely to leave compared with nurses. Age upon commencement of employment was a significant factor affecting the likelihood of leaving in both studies.

Conclusions: The routine recording of employee commencement and separation dates in human resources records, together with basic demographic information and employment data required for payroll function (such as discipline and grade of employment), provides a valuable source of data for calculating both simple and complex measures of workforce turnover and retention in rural Australia. To maximise use of this resource, rural and remote health services, together with regional health authorities, must have sufficient human resource capacity to support the collection, maintenance and analysis of their human resource data as the foundation for ensuring a solid evidence-base to underpin health workforce retention support and incentive strategies.

Introduction

Rural and regional Australia is experiencing a shortage of health professionals¹, resulting in significant problems for rural communities both in recruiting and also in retaining health professionals. As difficulty in recruiting health workers to rural areas increases, the importance of optimising the retention of health professionals already working in these areas and those newly recruited is accentuated. The literature suggests that the difficulties of recruiting and retaining health workers increase with increasing distance from metropolitan areas², and labour force figures support this, indicating, for example, that the supply of health

professionals decreases with increasing remoteness.³ Difficulty maintaining an adequate and appropriately qualified health workforce in rural communities has a flow-on effect, limiting the ability of health services to provide appropriate, accessible, comprehensive and high quality care which in turn contributes to the poorer health status of Australians living in rural and remote areas.⁴⁻⁶ In addition, high staff turnover and associated subsequent recruitment places significant cost burdens on these health services.⁷ Therefore, it is desirable that health services in rural communities reduce the unavoidable turnover of valuable health workers through effective retention strategies.

There have been a range of initiatives to retain health workers in rural and remote areas. These have included programs such as Mentoring Works⁸, Regional Allied Health Works⁹ and General Practice Rural Incentives Program (GPRIP)¹⁰, however insufficient evidence exists to support the success of many retention initiatives.¹¹⁻¹² This is linked to the limited evidence-base as to what constitutes a reasonable level of staff turnover or stability, including, for example, how long a rural or remote health service might reasonably expect a new health professional or support staff member to stay.

Studies detailing actual turnover and retention patterns have been relatively infrequent, despite health authorities collecting vast quantities of data which could be used to measure turnover and retention rates. Those studies using quantitative measures have in many instances reported a single measure, for example annual turnover rate¹³⁻¹⁵, and have thus failed to convey the full breadth of underlying workforce patterns.

Health services continue to collect large amounts of employment data to meet requirements for human resource purposes. However, comprehensive measurement of health professional turnover and retention is not routinely undertaken by health services. This paper identifies five workforce measures (annual turnover rate, stability rates, median length of stay in current position, survival probabilities and median survival) which can be calculated using data from human resource records, and demonstrates the utility of regression modelling for assessing factors associated with workforce turnover or retention. Collectively these measures capture critically important aspects of the health workforce and can be used to inform rural health workforce planning strategies.

Method

Individual level de-identified data on selected employees within Australian regional, rural and remote health services were collected retrospectively in two distinct studies. The first study surveyed 100 randomly selected primary health services from across Australia, with replacement of health services that indicated an inability to participate. Data was collected on all nurses, doctors, allied health professionals, Indigenous health workers and managers employed at any time during the period 1/1/2003 to 31/7/2009. The second study surveyed 16 Victorian regional, rural and remote health services, collecting data on all allied health professionals employed at any time between 1/1/2004 to 31/12/2009. Individual level data requested included employment entry and exit dates, year of birth, gender, and EFT (equivalent full-time) status. Data on country of primary qualification were also collected for the national study, whilst employment grade and profession (dietitian, occupational therapist, physiotherapist, podiatrist, psychologist, social worker and speech pathologist) were collected for the Victorian study. Data capturing health service characteristics were also collected, for example, health service location and service catchment population.

Health service participation was voluntary and health services were remunerated for their participation on receipt of the data.

Data from each study were separately analysed using simple arithmetic calculations of annual turnover rates and stability rates after 1 and 2 years, whilst Kaplan Meier survival analysis yielded survival probabilities after 1 and 2 years and median survival. These turnover and retention measures are detailed elsewhere.¹⁶ Cox proportional hazards regression modelling was undertaken to evaluate the significance and magnitude of factors associated with the hazard of employees leaving.

The Statistical Package PASW 18, StataIC, release 10 and Microsoft Office Excel 2007 were utilised for data analyses.

Ethics approval was sought and obtained from the Flinders University Ethics Committee for the national study, and from the Monash University Human Research Ethics Committee for the Victorian study.

Results

Thirty three health services provided length of stay data on 1,479 health professionals in the national study, however thirteen of these services were unable to provide data on *all* employees during the requested timeframe but instead provided only partial data—on some employees such as current or recent employees but not on others. Thus twenty services provided data on 1,295 employees which was of sufficient quality and completeness for calculating all indicators. Eleven health services provided length of stay data on 901 allied health professionals in the Victorian study.

Table 1 Characteristics of employees

Variable	Categories	National study			Victorian study		
		n	(%)	n (exits)	n	(%)	n (exits)
Gender	Female	1052	81.9	487	773	85.8	381
	Male	203	15.8	102	128	14.2	75
	Missing	30	2.3	6	0	0	0
Profession	Nurse	884	68.8	374			
	Doctor	67	5.2	37			
	Allied health professional	270	21.0	160	901	100.0	456
	Indigenous health worker	39	3.0	14			
	Health service manager	22	1.7	9			
	Missing	3	0.2	1			
Geographical location	RRMA 3	0	0	0	655	72.7	316
	RRMA 4	0	0	0	79	8.8	39
	RRMA 5	776	60.4	346	167	18.5	101
	RRMA 6 or 7	509	39.6	249			
Age (years) when started at health service	Under 30	329	25.6	167	511	56.7	284
	30 to under 40	391	30.4	162	225	25.0	94
	40 to under 50	328	25.5	136	103	11.4	44
	50 or older	222	17.3	121	57	6.3	29
	Missing	15	1.2	9	5	0.6	5
Grade on commencement	Grade 1				336	37.3	196
	Grade 2				371	41.2	197
	Grade 3 or higher				63	7.0	26
	Missing				131	14.5	37

RRMA Rural, Remote Metropolitan Areas classification

The distribution of selected employee characteristics is shown in Table 1. In the national study the majority of health professionals were either nurses (69%) or allied health professionals (21%) with relatively small numbers of doctors, Indigenous health workers and health service managers.

In the 6 year period of the Victorian study there were 456 exits from employment (51% of allied health professionals) whilst in the 6.6 year period of the national study there were 595 exits (46% of employees). In excess of 80% of employees were female in both studies.

Table 2 Sentinel indicators for health worker length of stay

Indicator	National study		Victorian study	
Mean Annual Turnover (%)		17.2		26.0
Median Length of stay in current position (years)		6.3		3.1
Mean Stability after 1 year (%)		88.0		92.5
Mean Stability after 2 years (%)		na		66.4
Mean Stability after 3 years (%)		na		59.5
Mean Stability after 4 years (%)		na		56.3
Survival Probability after first yr (%) (95%CI) [†]	78.8	(76.4, 80.9)	74.7	(71.7, 77.5)
Survival Probability after 2nd yr (%) (95%CI) [†]	66.2	(63.4, 68.8)	57.5	(54.0, 60.8)
Survival Probability after 3rd yr (%) (95%CI) [†]	58.3	(55.3, 61.1)	49.7	(46.1, 53.2)
Survival Probability after 4th yr (%) (95%CI) [†]	52.9	(49.8, 55.8)	43.7	(40.0, 47.3)
Median Survival (years) (95%CI) [†]	4.8	(4.0, 5.5)	3.0	(2.4, 3.5)

[†]CI confidence interval
na not available

Annual turnover rates were determined for each of the services participating in the respective studies. The mean of the health service annual turnover rates, giving an average of the proportion of each health service's employees who have left employment, are shown in Table 2, at 17.2% in the national study and 26.0% in the Victorian study. Median length of stay in current position, a measure of the retention of current employees, was greater in the national study (6.3 years) compared to the Victorian study (3.1 years). Stability rates are retention measures based on the proportion of a cohort of employees, selected based on being employed at a particular point of calendar time and remaining employed with the health service for the duration of an interval of time, for example one calendar year. Stability rates after 1 year were similar in both studies at around 92%. Survival probabilities and median survival, derived from survival analysis techniques, give an indication of employee retention from a time origin, which in these studies was considered to be the commencement of employment. Health professionals tended to remain in employment for longer in the national study, though the differences only became significant after the first year of employment.

Comparisons between subgroups within each study were facilitated by the use of survival curves, including those shown in Figures 1 to 3, which show that the probability of remaining employed at a health service varies according to employee grade at initial employment, location of the health service and employee profession. Evident in each of the survival curves shown is that differences are not immediately apparent, only beginning to emerge after the first six month's employment.

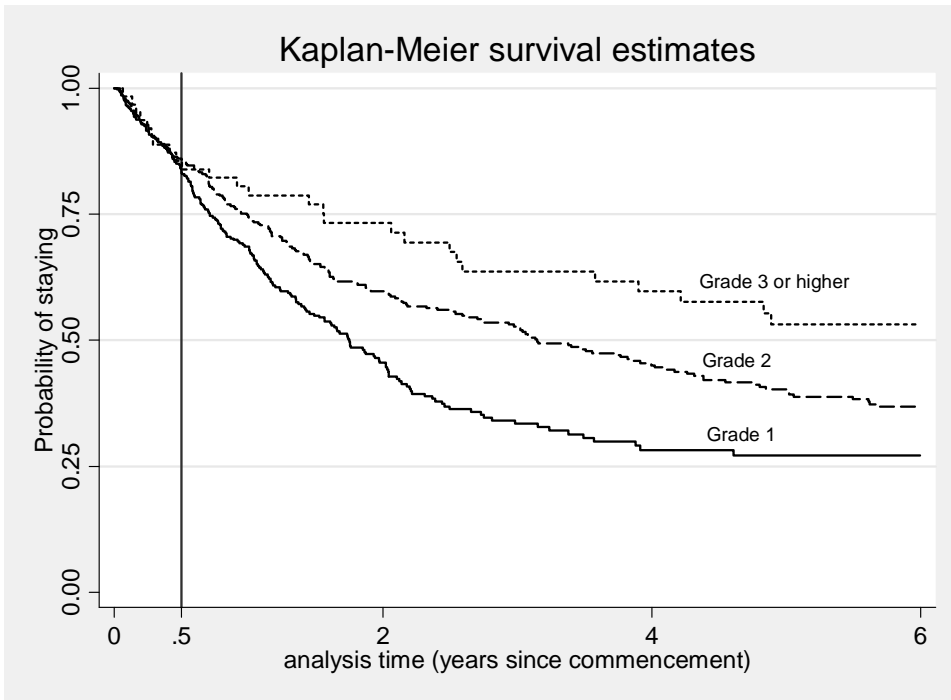


Figure 1 Survival of employees according to Grade on commencement of employment (Victorian study)

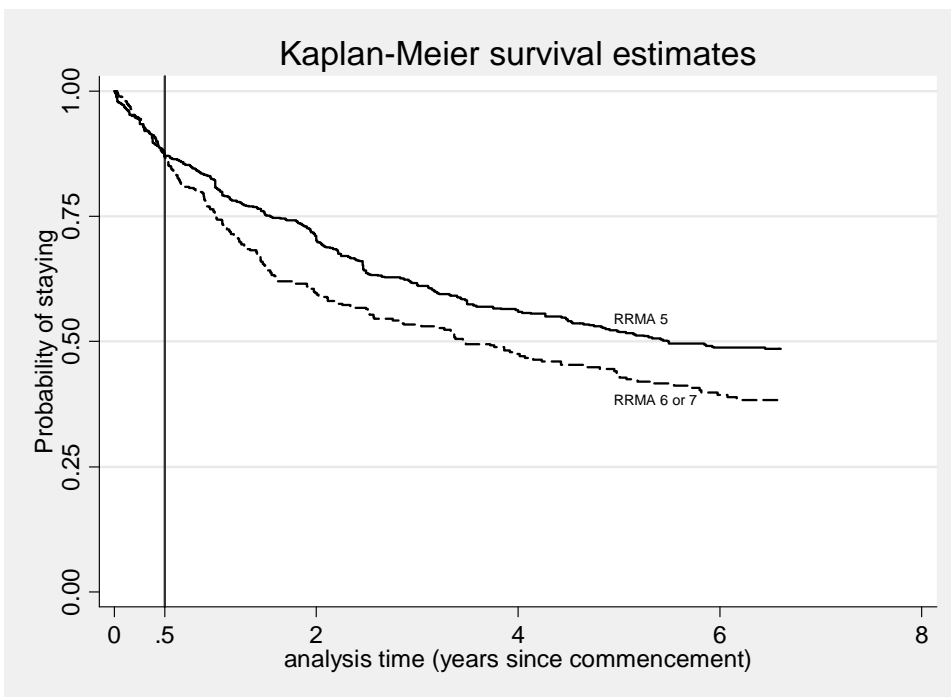


Figure 2 Survival of employees according to rurality (National study)

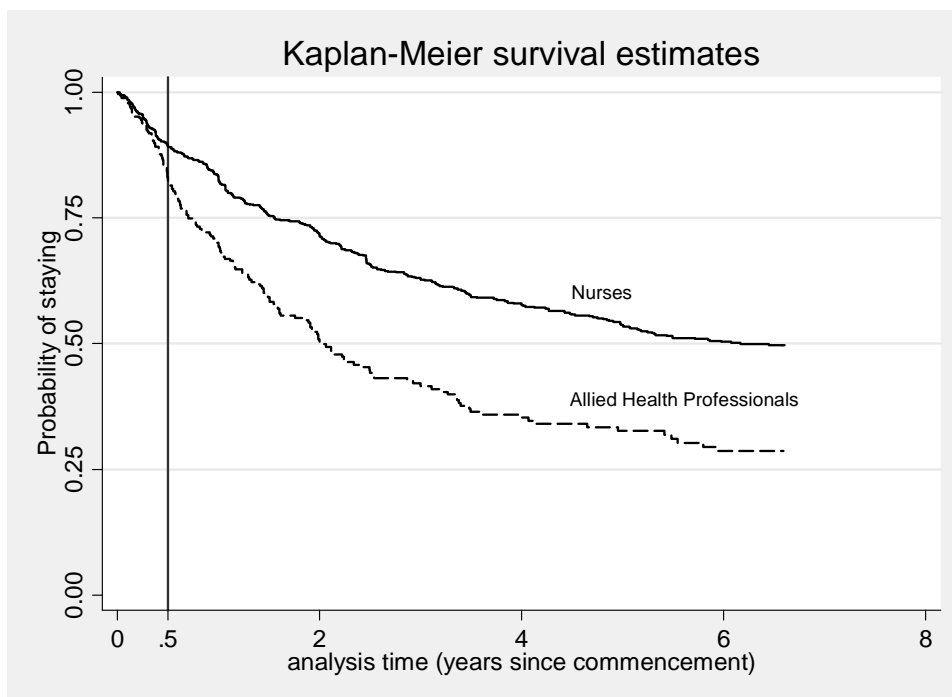


Figure 3 Survival of employees according to profession (National study)

In addition to estimating unadjusted employment survival probabilities for health professionals, Cox proportional hazards regression modelling was undertaken, which allowed adjustment of the probability of employees leaving employment for multiple factors, and estimation of the statistical significance and magnitude of the effect of each factor, given as confidence intervals and Turnover Hazard Ratios in Tables 3 and 4.

Table 3 Model indicating hazard of employees leaving a health service (National study)

Reference	Variable	Turnover hazard ratio	p value	Lower limit 95%CI [†]	Upper limit 95%CI [†]	p value
Nurse	Doctor	1.66	0.390	0.50	5.51	0.007
	Allied health professional	1.74	0.002	1.27	2.40	
	Indigenous health worker	0.80	0.671	0.27	2.36	
	Health service manager	0.66	0.133	0.38	1.15	
Rural	Remote	1.22	0.360	0.79	1.88	0.360
Age <30 when commenced	Age 30 – <40	0.78	0.061	0.60	1.01	<0.001
	Age 40 – <50	0.79	0.150	0.57	1.10	
	Age 50+	1.38	0.124	0.91	2.09	

Table 4 Model indicating hazard of employees leaving a health service (Victorian study)

Reference	Variable	Turnover hazard ratio	p value	Lower limit 95%CI [†]	Upper limit 95%CI [†]	p value
Physiotherapist	Dietitian	1.17	0.270	0.86	1.59	0.005
	Occupational therapist	0.84	0.133	0.66	1.07	
	Podiatrist	1.79	0.054	0.99	3.23	
	Psychologist	1.24	0.321	0.78	1.98	
	Social worker	1.09	0.429	0.86	1.40	
	Speech pathologist	0.94	0.722	0.64	1.37	
<=30 years of age at employment commencement	>30 to 35 years of age	0.79	0.306	0.48	1.29	0.032
	> 35 years of age	0.64	0.012	0.46	0.88	
Female	Male	1.25	0.188	0.88	1.79	0.188
Grade 1 on employment commencement	Grade 2	0.75	0.038	0.58	0.98	0.087
	Grade 3 or higher	0.57	0.025	0.36	0.92	
RRMA 3 [‡]	RRMA 4 [‡]	0.89	0.528	0.59	1.33	0.51
	RRMA 5-7 [‡]	1.14	0.318	0.86	1.52	

[†] = CI confidence interval

[‡] = RRMA—Remote, Remote and Metropolitan Areas Classification

From Table 3 it can be seen that in the national study, after adjusting for effects of rurality and age upon employee commencement, allied health professionals were, on average, 1.74 times (95% confidence interval 1.27, 2.40) more likely to leave employment compared to nurses. In both studies the age of commencement of employees was a significant predictor of the risk of employees leaving. In the Victorian study podiatrists had the highest risk of leaving of any of the allied health professions, being on average 1.79 times (95% confidence interval 0.00, 3.23) more likely to leave employment compared to physiotherapists. No statistically significant difference in the turnover hazard of male compared to female allied health professionals was evident, nor were there any significant differences associated with geographical location. Grade at which allied health professionals commenced employment has a weak association with their hazard of leaving employment (p=0.09).

Conclusions

Despite the collection of copious quantities of employment data by health services and health authorities, often through routine human resource processes, there remains important under-utilisation of such data, with a consequent limited evidence-base as to what might constitute a reasonable level of turnover or stability for rural and remote health professionals and their support staff. This paper illustrates that rural and remote health workforce retention and turnover patterns can be evaluated by analysing health service human resource records using selected workforce measures. Useful metrics include annual turnover rates, median length of stay in current position, stability rates, survival probabilities and median survival. Regression models were also demonstrated to further our understanding of the patterns of workforce mobility in the rural health workforce, by identifying important factors associated with the likelihood of health professionals leaving their employment.

Preliminary quantitative evidence around annual turnover rates, stability rates and the probability of remaining employed for rural health workers has been reported. Specific factors (including profession and age upon employment commencement) which are closely associated with an increased risk of health workers leaving were also identified. Whilst these are important additions to what is already known about rural health workforce turnover and retention, the specifics of, for example, turnover and stability rates, are perhaps of lesser importance than the implications that emerge for employment data management practices in rural and remote health. For example, essential for the methodology used in these studies is the collection and maintenance of high quality human resource data by health services, which in turn requires sufficient human and information technology capacity and infrastructure. In the national study there were a number of indications that these essentials may be lacking: some primary health services initially indicated an inability to

participate for reasons including lack of capacity, whilst others indicated an initial interest and willingness to participate, but were subsequently unable to return the survey tool, and lastly, those health services that responded provided varying quality of data. What follows, therefore, is an urgent recommendation for the adequate resourcing of human resource and information technology capacity across Australia's rural and remote health services.

However, whilst enhancing data collection and maintenance capacity is a necessary foundation for the development of an adequate evidence-base, it is not sufficient. It is recommended that the routine compilation of employment data occurs at an area health service level, where simple analysis such as the calculation of annual turnover and stability rates can occur, and where comparisons with like services can be made, with feedback to health service managers. Our experience, yielded through health service validation visits utilised in both studies, was that health service managers find feedback, even on simple workforce metrics, invaluable. Further compilation and analysis at a higher level of sophistication, could best be undertaken at a centralised level, for example, at the State health department levels, perhaps in conjunction with university researchers, facilitating timely publication and sharing of new knowledge.

Limitations of these studies include a low response rate in the national study and variability in the quality of the data received. A higher response rate was attained in the Victorian study (with 11 out of 16 health services participating), however this study was small and utilised a purposive sample, and thus had limited generalisability. The higher response rate of the Victorian study may be due to factors including facilitation by the Department of Health (funders of the study), greater reimbursement for health services participating (\$500 or \$1000 compared to \$100 for the national study) and visits in-person to each health service rather than initial contact being over the phone.

Notwithstanding these limitations, both studies have successfully demonstrated that great potential remains to better use existing human resource data for regular and rigorous evaluation and monitoring of health workforce turnover and retention. This would enable health workforce planners at all levels to better understand how their workforce is performing.

Acknowledgments

The national study reported in this paper was supported by a grant from the Australian Government Department of Health and Ageing as a project of the Australian Primary Health Care Research Institute, whilst the Victorian study was supported by a grant from the Victorian Department of Human Services under the Workforce Innovation Grants Program. Particular thanks go to Shari Sieglhoff, Kerry Homer and Pim Kuipers for their help in the planning and execution of the national study.

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