Efficiency of clinical training at the Northern Territory Clinical School: placement length and rate of return for internship

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ABSTRACT

Objective: To investigate the effect of duration of clinical training placements in the Northern Territory on rate of return of medical students for an internship in the NT.

Design, setting and participants: Retrospective analysis of medical school and hospital data on all medical students who completed a placement with the Northern Territory Clinical School (NTCS) between 1998 and 2007.

Main outcome measures: Logistic regression analysis of weeks spent training in the NT against the binary category of return or non-return for an internship in the NT; number of weeks of placement in the NT required for one returning intern for training models with different placement duration and timing.

Results: 683 students completed an NTCS placement: short-term Year 4 placements only, 538 (duration, 1–19 weeks, 534; and ⩾ 20 weeks, 4); Year 3 40-week placements only, 16; and both Year 3 and Year 4 placements,129 (Year 4 duration, 1–19 weeks, 82; and ⩾ 20 weeks, 47). For each student who returned for an NT internship, 122 weeks of placement were required. Placement length was a significant predictor of an NT internship ($P < 0.05$; odds ratio, 1.08; 95% CI, 1.07–1.09). The most efficient training models (fewest weeks per returning intern) were longer placements (⩾ 20 weeks) in Year 4, both for students who also undertook a 40-week Year 3 placement and those who did not (90 and 47 weeks of training per intern, respectively). Students who spent only brief periods in the NT in Year 4 were less likely to return for an internship ($P < 0.05$).

Conclusions: The rate of return increased with the total length of time spent training in the NT. Short-term Year 4 placements offered the least return for the total number of weeks of placement provided.

MJA 2008; 189: 166–168

The Northern Territory has been designated a "district of workforce shortage" by the Australian Department of Health and Ageing annually since 1996, when the classification system was first implemented.[1] Factors contributing to its extreme health workforce shortages include a geographically remote population, high prevalence of infective and chronic disease, and the socioeconomic challenges of Indigenous health. Strategies aimed at improving workforce issues are likewise complex; an approach that has had demonstrable success in the NT is the implementation of a local training program for health professional students, the Northern Territory Clinical School (NTCS).[2]

The NTCS is a collaborative venture between Flinders University (Adelaide, South Australia) and the NT Government, and was established in Darwin (the capital city) in 1997. Students may elect to train for an entire academic year with the NTCS (Year 3 of a 4-year graduate-entry program) or to undertake one or more short placements (2–6 weeks) in the NT during Year 4, or both. Since its inception, the NTCS has matriculated over 140 students and provided nearly 2000 short placements for other Australian and international medical students. Our previous studies reported that a significant proportion (54%) of NTCS alumni went on to complete their internship in the NT, and that NTCS students were 10 times more likely to elect an internship in the NT than their non-NTCS peers at Flinders University.[2] These results support the concept that "training locals locally" has had positive outcomes for the NT health workforce.

Other clinical training programs with a similar focus in Australia and other countries have similarly reported increases in the recruitment and retention of graduates to rural and remote areas.[3-7] Many of the Australian programs are relatively new, having commenced under the federal government's Rural Health Strategy of 1994.[8] Nonetheless, a study by the University of Queensland recently described a rising trend among their graduates to opt for non-urban internships since the implementation of a rural clinical division in 2002.[9] The School of Medicine at James Cook University (Townsville, Qld; established in 2000) has also had significant success in the rate of retention of its first graduating class to internships in northern and non-metropolitan Queensland.[10]

As would be expected, the identification of factors that influence medical student career choices is a high priority for medical schools and health workforce agencies. For example, rural background and an early established career goal of rural medicine have been linked to a higher likelihood of rural or remote practice.[6,11,12] The effects of sex, personality traits, learning style, and early rural exposure during clinical training have also been thoroughly investigated.[13-15] A factor that has received less attention is the length of time students spend in a rural training environment.

Our objective was to investigate the relationship between duration of placement with the NTCS and rate of return for internship among students who attended the NTCS between 1998 and 2007.

METHODS

The study included all medical students who completed a placement with the NTCS between 1998 and 2007; those with incomplete records were excluded from the analysis. Records were de-identified using random number assignment. The total number of weeks spent training in the NT was calculated from student and administrative records. Internships in the NT were identified from the Royal Darwin Hospital and Alice Springs Hospital intern records, the NTCS student database, and the Flinders University Department of Medical Education.

A logistic regression analysis was performed using "weeks trained in the NT" as a continuous variable against the binary category "NT internship" (non-NT = 0; and NT = 1). To further characterise the relationship, we classified students into five groups based on the duration and timing of their placement in the NT:

- Short-term Year 4 — students who undertook short placements in Year 4, totalling < 20 weeks;
- Long-term Year 4 — students who undertook short placements in Year 4, totalling ⩾ 20 weeks;

Categorical logistic regression and efficiency analysis of Northern Territory training model, 1998–2007

Student training category	Training duration (weeks) and timing	Odds ratio (95% CI)*	No. of NT interns	Weeks of training	
				Total for group	Per NT intern
Short-term Year 4 ($n = 534$)	1–19 (Year 4)	1.00	14	3223	230
Long-term Year 4 ($n = 4$)	⩾ 20 (Year 4)	37.14 (4.88–282.97)	2	93	47
Year 3 only ($n = 16$)	40 (Year 3)	16.88 (5.17–55.10)	5	640	128
Year 3 + short-term Year 4 ($n = 82$)	40 (Year 3) + 1–19 (Year 4)	32.08 (16.16–63.68)	38	4333	114
Year 3 + long-term Year 4 ($n = 47$)	40 (Year 3) + ⩾ 20 (Year 4)	97.14 (42.32–222.96)	34	3061	90
Total ($n = 683$)	—	—	**93**	**11350**	**122**

– = not relevant. * Odds ratio for returning to the NT as an intern. All odds ratios were significant ($P < 0.05$). ◆

- Year 3 only — students who spent all Year 3 in the NT (40 weeks) but undertook no short Year 4 placements;
- Year 3 + short-term Year 4 — students who spent all Year 3 in the NT (40 weeks) and undertook short Year 4 placements totalling < 20 weeks; and
- Year 3 + long-term Year 4 — students who spent all Year 3 in the NT (40 weeks) and undertook short Year 4 placements totalling ⩾ 20 weeks.

The logistic regression analysis was repeated with the placement groups as categorical covariates referenced against the short-term Year 4 group. A return ratio was then calculated for each group by dividing the total number of training weeks per group by the number of students who returned as interns.

The study was approved by the Human Research Ethics Committee of the NT Department of Health and Community and Menzies School of Health Research.

RESULTS

Between 1998 and 2007, 734 medical students undertook placements with the NTCS, and 683 of these had complete records and were included in the analysis. Numbers in each training category are shown in the Box.

Logistic regression analysis showed that students returned for an internship in the NT at the rate of one intern for every 122 weeks of placement, and that the longer a student spent training in the NT, the greater the likelihood of return for an internship (odds ratio [OR], 1.08; 95% CI, 1.07–1.09; $P < 0.05$).

Categorical logistic regression substantiated this finding, showing an increasing OR of return to the NT with longer placements (Box). Training efficiency was measured in terms of the number of weeks of training invested by the NTCS relative to the number of students who returned as interns. Students who spent all of Year 3 in the NT yielded greater returns for lower investment (105 weeks per intern) than students who came to the NT only for short placements in Year 4 (207 weeks per intern).

Within the groups with placements in both Year 3 and Year 4, the number of training weeks per returning intern decreased with longer duration of placement (Box). Similarly, long-term Year 4 students (placements ⩾ 20 weeks) were much more likely to return for internship than short-term Year 4 students (relative OR, 37.14; 95% CI, 4.88–282.97). Thus, the most efficient training models (ie, lowest ratio of training weeks to interns) were those with longer Year 4 placements — for students who spent Year 3 in the NT, as well as for those who did not.

The least efficient training model with respect to intern return was short-term placements (< 20 weeks) in Year 4 alone: the NTCS invested 3223 weeks of training for 534 short-term Year 4 students, with 14 (2.6%) returning for an internship in the NT.

DISCUSSION

We found an association between longer periods of placement in the NT (particularly in the final year of medical school) and return of graduates to take up internships in the NT.

The placements considered in this study took place in the Royal Darwin Hospital, the major teaching hospital in the NT. Although this hospital is based in a city, it shares many of the features common in medical practice in rural and remote Australia, including a serious medical workforce shortage, a high proportion of Indigenous patients, a predominantly generalist staff, and extremely high rates of staff turnover. Thus, our studies exploring the effects of local training on junior medical staff retention have wide relevance.

Rural training is known to be linked to subsequent rural practice,[16-19] and it is often assumed that longer exposure has greater impact.[20] However, evidence for the impact of duration of placement is sporadic and inconsistent. A previous Australian study of rural and urban general practitioners found that postgraduates who undertake more than 50% of their training in rural locations are 10 times more likely to practise in a rural location than those who spent shorter periods in rural locations.[12] However, shorter placements (less than 4 weeks) have been associated with higher return in nursing and allied health.[21] Our study is, to our knowledge, the first to link placement duration to the return rate of medical students for internship.

The relationship is not necessarily causative, and we did not investigate the underlying dynamics. Questions remain about what elements of longer placements encourage students to return, and what characteristics are shared by students who choose to study at the NTCS or elect longer placements. Do these students already have NT career plans, feel more satisfied with the teaching or have more meaningful experiences that lead them to extend their time in the NT? In particular, the reasons underlying the high rate of return of the long-term Year 4 group (albeit a very small group) are intriguing.

We believe there are significant benefits to longer placements. For students, these include the opportunity to build relationships, develop social and professional networks, and experience continuity of care. Longer rotations provide superior clinical experiences,[22] and allow educators to teach skills specific to the population, such as the NT Aboriginal population.[23,24]

Benefits of longer placements for the program include the creation of alumni specifically trained in the environment in which they will work, who provide an experienced

addition to the health workforce and a valuable teaching resource. Financial benefits of longer placements have also been suggested.[25]

Many rural clinical schools across Australia discourage or do not allow students to continue their training locally as interns. Our experience suggests that, given the opportunity, students who spend significant parts of their final years at a site are likely to return there.

ACKNOWLEDGEMENTS

We thank the Flinders University Department of Medical Education and Dr Vino Sathianathan (Deputy Medical Superintendent, Royal Darwin Hospital, NT) for providing data for this analysis.

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

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(Received 2 Jan 2008, accepted 8 Apr 2008) ❑