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## Characteristics of Doctors Transitioning to a Non-Clinical Role in the MABEL Study

N Vaswani, H Eyre, W C Wang and C Joyce

### Abstract

**Objective:** To investigate the characteristics and satisfaction of medical doctors transitioning from a clinical into an entirely non-clinical role

**Design and setting:** Wave 1 to Wave 5 data from 2008-2012 in the Medicine in Australia: Balancing Employment and Life (MABEL) longitudinal, population-based survey were analysed.

**Participants:** Medical doctors including general practitioners (GPs), specialists, specialists in training (SIT) and hospital non-specialists (HNS). Hospital non-specialists represent doctors working in a hospital who were not enrolled in a specialty training program. The total number of participants surveyed across the 5 waves was 15,195 doctors.

**Main outcome measures:** The number of medical doctors making the transition from a clinical role to a non-clinical role from one wave of data to the subsequent wave of data. Individuals who responded 'Yes' to the question 'Are you currently doing any clinical medical work in Australia?' were defined as working in a clinical role. Individuals who stated that they were 'Doing

medical work in Australia that is non-clinical' were defined as working in a completely non-clinical role. Each doctor's characteristics while partaking in clinical work prior to making the change to a non-clinical role were noted.

**Results:** Over 5 years, there were a total of 498 individuals who made the transition from a clinical role to a completely non-clinical role out of a possible 15,195 doctors. Increasing age was the strongest predictor for transition to a non-clinical role. With regards to doctor type, specialists, hospital non-specialists and specialists-in-training were more likely to make the transition to a totally non-clinical role compared to GPs. There was minimal evidence of a relationship between lower job satisfaction and making a transition, and also between higher life satisfaction and making a transition.

**Conclusions:** Understanding the characteristics of, and reasons for non-clinical career transition are important for workforce training, planning and development.

**Key words:** Non-clinical; workforce; medicine; transition; MABEL; doctors.

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### Introduction

National health workforce modelling indicates that there is currently an oversupply of doctors with a concomitant shortage of advanced training positions, and this trend will continue for the foreseeable future. [1] According to Health Workforce Australia (HWA), in 2025 there will be an oversupply of 2,812 doctors and a shortage of 1,265 vocational medical training positions. [1] Despite the significance of these findings, HWA's workforce projections fail to depict the totality of current market trends in the medical workforce. Indeed, their projections do not consider the non-clinical duties of medical doctors in the workforce. Non-clinical roles fall into two categories with common/traditional roles including teaching, staff appraisal, financial management, continuing professional development and research, [2]

while uncommon/non-traditional roles may involve health economics, business consulting, bioengineering, law, journalism and entrepreneurship. [3] We believe current and future non-clinical roles signify a major factor in the Australian medical workforce and these factors need to be better explored and detailed. Indeed, recent published data indicate that non-clinical activities make up about 16% of the average Australian doctor's work week. [4]

Market pressures may be increasingly compelling doctors to increase their time spent in non-clinical career endeavours and decrease their time in clinical work. Doctors working in completely non-clinical sectors perform duties outside their area of principal clinical expertise. [5] Anecdotally, these types of careers are becoming more common and publicised not only among senior clinicians who commonly adopt teaching and research positions at major institutions, but also among young residents and registrars. [6] Recently, there has been a concerted effort to attract more doctors into non-clinical roles, specifically medical research and innovation, because these fields have been highlighted as a vital component toward the modernisation of healthcare systems. [7] Residents and registrars make up a large part of the medical workforce and deliver a large proportion of patient care, especially in the nation's large public hospitals. These young doctors have the lowest job satisfaction and highest working hours compared to other doctors in a clinical setting, [8] and this may influence a shift toward complete non-clinical duties. This transformation of traditional clinical roles will have significant implications on the Australian healthcare system, specifically when it comes to meeting the clinical needs of the society.

Modern medical schools are now encouraging doctors to enhance their skills in non-clinical areas. Recent studies indicated that medical leadership roles do not appeal to a lot of doctors and are sometimes viewed to be in direct competition with their principle interests. [9-11] This has led medical schools to develop leadership programs in conjunction with other faculties such as business schools and engineering schools to enable medical students to excel in a wider range of fields upon graduation. [12] Medical curricula have also expanded to include bio-entrepreneurship classes and have begun to encourage medical graduates to accept internship positions in the field of biotechnology and development. [13] In the United States, the number of medical schools offering combined Doctor of Medicine (MD)/Master of Business Administration (MBA) degrees has increased dramatically over the past 20 years with a majority of these graduates settling into non-clinical roles

as their careers progress. [14] Furthermore, medical schools are also teaching health policy to medical students in order to facilitate their participation in the political process. [15] These leadership and non-clinical skills will serve students well as they attempt to develop a diversified medical career. Medical careers can follow a lateral course and non-clinical activities are part of a framework which enables a doctor to branch out his/her career. Indeed, general practitioners may immerse themselves in policy development, harness their entrepreneurial spirit by creating several practices or adopt a completely non-clinical role when faced with the predictability of exclusively clinical work. [16] These non-clinical activities may enhance a specific general practitioner's job satisfaction [17] and it is worth exploring the reasons why these individuals choose to transition into non-clinical roles. From a population-based perspective, it is currently not known how many medical doctors transition from clinical to outright non-clinical roles and it is worthwhile to identify the factors that drive these doctors to make the transition. Furthermore, in order to meet the clinical demands of the community, we need to ascertain whether these medical doctors are being forced to diversify their work profile due to market pressures or whether it is a transition they select freely.

National medical labour force data shows that, in 2012, 6% of registered medical practitioners work in a primarily non-clinical role. [18] This includes 1.5% of registered doctors who did not identify as belonging to one of the four clinical groups, 2.7% of those in the GP group, 2.4% of hospital non-specialists, 7.5% of specialists and 3.6% of specialists-in-training. [18] Those in the clinician groups are likely to be combining their primary non-clinical role with a small amount of clinical work.

There is currently no information on what drives doctors to participate in non-clinical work or switch careers to adopt a completely non-clinical role. It may be due to higher rates of mental distress associated with clinical work compared to non-clinical work. [19] Another reason could be that once doctors reach the peak of the medical 'corporate ladder', as in they complete their fellowship and become consultants, they would like to pursue interests that are more in line with their personal values. [20] This line of thought is highlighted by a 2005 Productivity Commission report stating that there continues to be serious issues in the recruitment and retention of healthcare professionals as clinical work simply does not allow them to continue to improve and utilise their wide variety of skills. [21] Although market competition among GPs and specialists remains moderate and low

respectively, [22,23] the competition for advanced training positions will rise significantly in the coming years due to a shortage of positions. The competition trends among specialists are artificially suppressed, as medical colleges reduce competition by limiting the number of new registrars allowed to enter into a training program. [24] These market trends may perhaps be paving the way for more and more doctors to transition into non-clinical posts, and there has been a clear rise in interest among medical students to pursue non-clinical careers. [25]

This paper aims to chart the characteristics of doctors transitioning into a completely non-clinical role, study transition trends among doctors from clinical to non-clinical roles across several years, and to determine any specific drivers, which influence doctors to transition into a solely non-clinical position. Utilising data collected in the MABEL longitudinal survey, the paper aims to identify whether overall job and life satisfaction as a clinician, age, gender and/or doctor type affect whether doctors make the transition. At present, there are limited data on the characteristics of doctors that engage strictly in non-clinical work, and what factors have influenced them to pursue this career path. Furthermore, it would be prudent to determine whether dissatisfaction as clinicians is driving these individuals to pursue other career options.

## Methods

This study analysed data from Wave 1 (2008) to Wave 5 (2012) of the Medicine in Australia: Balancing Employment and Life (MABEL) longitudinal survey of doctors. These doctors included GPs, specialists-in-training, hospital non-specialists and specialists registered with the Medical Board of Australia and participating in the Australian medical workforce who received the survey via mail. The Faculty of Economics and Commerce Human Ethics Advisory Group, University of Melbourne and the Monash University Standing Committee on Ethics in Research Involving Humans approved the data collection method of the study. These methods were discussed and published in several earlier papers. [26,27] Each wave generated a similar number of respondents with wave 1 data including 10,498 doctors, wave 2 (n = 10,381 doctors), wave 3 (n = 10,078 doctors), wave 4 (n = 9973 doctors), and wave 5 (n = 10,916 doctors). The study has a longitudinal design which includes a panel of doctors responding at each wave, combined with 'top-up' samples of new doctors added at each wave. [27] The total number of doctors surveyed across waves 1 to 5 equalled 15,195 individuals.

## Measures

The outcome of a transition to non-clinical work was measured from one wave to the subsequent wave, with four potential transition points across the five waves of data. By design, all doctors in wave 1 of the MABEL survey were in clinical practice at that time. In waves 2 to 5, clinical practice status was indicated by a positive response to the following question: Are you currently doing clinical work within Australia? Those responding in the negative to this question were directed to further options to describe their current working status, and the outcome variable of transition to non-clinical work was measured with a positive response to the question: Current situation: Doing medical work in Australia that is non-clinical. A doctor who responded that their current situation was: Doing medical work in Australia that is non-clinical and had reported being in clinical practice the previous wave was recorded as making a transition to a non-clinical role.

Variables included to investigate their association with doctors' career change were: age, gender (male=0, female=1), co-habitation status (Are you currently living with a partner or spouse? no=0, yes=1), overall job satisfaction, with a 5-point Likert scale (from very dissatisfied=0, to moderately dissatisfied=1, not sure=2, moderately satisfied=3, very satisfied=4), life satisfaction, with a 10-point response options (from completely dissatisfied=1 to completely satisfied=10), and doctor type (GP=1, specialist=2, specialist in training=3, hospital non specialist=4), which was dummy coded for the current analysis. All covariates were measured at wave 1, or at the entry-point to the survey for those in top-up samples.

## Analysis

In order to investigate whether career transition occurs, when it is most likely to occur, and how transition occurrences vary over time, discrete time survival analysis was used. The data were prepared as outlined by Muthén and Masyn. [28] A score of 0 reflected no transition (ie, continued clinical practice) and a score of 1 designated a transition occurrence (to a non-clinical role), with the subsequent years being treated as missing due to having experienced the event. In the discrete time survival analysis model, the four binary time-specific event indicators (ie, each pair of consecutive waves) were regressed on the set of covariates.

Discrete time survival analysis was carried out with Mplus version 7.2, [29] using the MLR (Robust Maximum Likelihood) estimation method, with results reported as Odds Ratios.

**Results**

Respondent characteristics are summarised in Table 1. The data included over one third (34%) of specialists and 30.9% of GPs, followed by 23.7% of hospital non-specialists and 10.8% of specialists in training. Over 30% of the doctors are aged younger than 35 years, 10%-14% aged between 35 to 54 years and 3%-8% aged between 55 to 70+ years. The majority were male doctors (55%) and 74% of doctors lived with a partner or spouse. Nearly 84% of doctors reported overall job satisfaction as moderately or very satisfied. Lastly, the mean score of life satisfaction was 7.36 with a standard deviation of 1.65.

**Table 1: Respondent profile across all waves**

CATEGORY		n (%)
<b>Doctor type</b>	GP	5099 (30.9)
	Specialist	5605 (34)
	Hospital non-specialist	3906 (23.7)
	Specialist in training	1780 (10.8)
<b>Age (yrs)</b>	Under 35	5058 (30.7)
	35-39	2281 (13.8)
	40-44	1986 (12)
	45-49	1872 (11.4)
	50-54	1727 (10.5)
	55-59	1317 (8)
	60-64	942 (5.7)
	65-69	556 (3.4)
70+	481 (2.9)	
<b>Gender</b>	Male	9062 (55)
	Female	7417 (45)
Living with partner/spouse	No	3685 (22.4)
	Yes	12151 (73.7)
Overall job satisfaction	Very dissatisfied	199 (1.2)
	Moderately dissatisfied	1022 (6.2)
	Not sure	768 (4.7)
	Moderately satisfied	8583 (52.1)
	Very satisfied	5236 (31.8)
<b>Life satisfaction</b>		<i>Mean (sd)</i>
	Scaled 1-10	7.36 (1.65)

NOTE: sd = standard deviation

The number of transitions from a clinical role to a non-clinical role in consecutive waves is tabulated in addition to the proportion of transitions. The bulk of these transitions occurred between wave 1 to wave 2 and wave 2 to wave 3 as depicted in Table 2. Descriptive information for the 498 individuals that made the transition to a completely non-clinical role is provided in Table 3.

**Table 2 : Transitions from clinical to non-clinical roles**

WAVE	n	RATE
1 to 2	138	1.3%
2 to 3	180	1.8%
3 to 4	87	0.9%
4 to 5	93	1.0%
Cumulative 1-5		3.3%

NOTE: The cumulative rate reflects the total percentage of transitions among all respondents, whereas the rate within each wave transition only takes into account the respondents within that specific wave.

**Table 3: Characteristics of doctors who made the transition**

CATEGORY		n (%)
<b>Doctor type</b>	GP	119 (2.3)
	Specialist	301 (5.4)
	Hospital non-specialist	36 (0.9)
	Specialist in training	42 (2.4)
<b>Age (yrs)</b>	Under 50	190 (1.7)
	50 and above	306 (6.1)
<b>Gender</b>	Male	320 (3.5)
	Female	178 (2.4)

The association between doctors' background characteristics and career transition at each year is shown in Table 4. Table 4 suggests that age was significantly related to career transition in all the waves. As age increased, doctors were 33%, 18%, 25%, and 36% more likely to make a career change in 2009 (OR=1.33), 2010 (OR=1.18), 2011 (OR=1.25), and (OR=1.36), respectively.

Job satisfaction was negatively associated with career transition in 2010. Doctors who reported higher job satisfaction were 17% (OR= .83) less likely than doctors who reported lower job satisfaction to make a career change. However, findings also suggest that doctors who reported higher life satisfaction were more likely to make career changes in 2012 (OR=1.26).

**Table 4 : Associations of non-clinical transitions across all waves with personal and professional factors**

	OR (95% CI)			
	2009	2010	2011	2012
Age	1.33** (1.20, 1.48)	1.18** (1.09, 1.28)	1.25** (1.08, 1.46)	1.36** (1.19, 1.54)
Gender	1.07 (.69, 1.67)	1.12 (.81, 1.55)	.78 (.43, 1.41)	1.61 (.96, 2.70)
Currently living with a partner	1.20 (0.63, 2.25)	.90 (.59, 1.38)	1.11 (.50, 2.46)	.98 (.49, 1.96)
Overall job satisfaction	1.04 (.77, 1.42)	.83* (.70, .97)	.93 (.67, 1.29)	.75 (.56, 1.00)
Life satisfaction	1.15 (.97, 1.37)	1.01 (.91, 1.12)	.99 (0.81, 1.20)	1.26* (1.03, 1.54)
GP vs HNS	.21** (0.08, .54)	1.01 (.53, 1.95)	.44 (.15, 1.31)	.37* (.15, .89)
Specialist vs HNS	.86 (.39, 1.89)	1.33 (.71, 2.51)	.64 (.25, 1.66)	.79 (.36, 1.70)
SIT vs HNS	2.07 (.86, 5.03)	1.27 (.60, 2.73)	1.28 (.40, 4.11)	1.17 (.39, 3.49)
GP vs SIT	.10** (.04, .24)	.80 (.40, 1.57)	.34 (.11, 1.12)	.32* (.11, .95)
Specialist vs SIT	.41* (.21, .83)	1.05 (.54, 2.02)	.50 (.18, 1.38)	.67 (.25, 1.79)
GP vs Specialist	.24** (.13, .44)	.76 (.55, 1.06)	.69 (.35, 1.33)	.47* (.26, .86)

\*p < .05; \*\* p < .01

Doctor type was a predictor of career changes in 2009 and 2012. GPs were 79% and 63% less likely to change their careers in 2009 (OR= .21) and 2012 (OR= .37), respectively compared to hospital non-specialists. Moreover, GPs were 90% and 68% less likely to change careers in 2009 (OR= .10) and in 2012 (OR= .32), respectively compared to specialists in training. However, specialists were 59% less likely to change careers in 2009 (OR= .41) compared to specialists in training. Finally, GPs were 76% and 53% less likely to change careers in 2009 (OR= .24) and in 2012 (OR= .47), respectively compared to specialists.

No differences were found between specialists and hospital non-specialists, or between specialists in training and hospital non-specialists in likelihood of transition across the study periods. Career transition was also not associated with gender or co-habitation.

## Discussion

### Principal Findings

This is a novel study in that there has not been any previous empirical data to determine what drives medical doctors to transition to non-clinical work. It is vital to document non-clinical transition data as it helps determine whether medical workforce participation rates will meet the clinical needs of a community. Non-clinical work isn't currently factored into national workforce supply and demand projections. There already is a significant shortage of doctors globally and more doctors continue to devote a large proportion of their time to non-clinical duties. [30-34] The findings illustrate that, as doctors continued to age, they were more likely to transition to a non-clinical role,

and the impact of seasoned clinicians leaving clinical work will be significant to the community. GPs were less likely to transition to non-clinical roles compared to specialists, hospital non-specialists and specialists in training. The study also found that job satisfaction and life satisfaction are not key drivers for doctors to transition into exclusively non-clinical roles. Previous studies emphasised that job dissatisfaction is a driver for doctors to leave clinical work [35,36] and this finding was seen in one out of the four wave transitions. Our study also showed that there was a minimal association between life satisfaction and moving to a non-clinical role, with higher life satisfaction associated with transitions in one out of the four waves. Although medicine is increasingly becoming feminised especially in the fields of general practice and paediatrics [37] and female physicians have been shown to work fewer clinical hours than their male counterparts, [38,39] our study shows no gender bias when it comes to making the transition into a non-clinical role. This is a surprising finding given we might assume female doctors are more likely to engage non-clinical roles which are more adaptable to raising a family. However, it may be that working conditions in clinical medicine are becoming increasingly favourable to flexible rostering and we are also aware of vocational training becoming more amenable to part-time completion. [40,41]

### Early Career Doctors (Hospital Non-Specialists and Specialists in Training)

The results from the paper show Specialists in Training and Hospital Non-Specialists are more likely to transition to perform only non-clinical work compared to GPs. Given that

the personal and attitudinal characteristics investigated in this study did not show strong associations, we therefore need to consider other contributing factors for this finding. The key drivers for these groups may be related to the different labour market conditions they are experiencing compared to their older colleagues, or may be due to different interests, aptitudes and expectations associated with more heterogeneous pathways into medicine, and a broader range of training experiences. Young medical graduates have more opportunity now to transition to non-clinical occupations than in the past. [3] Graduate entry into medical school is the standard model in the United States while it is steadily becoming the norm in Australia. [42] The skillset that these students possess prior to entry into medicine will serve them well in their attempt to diversify their careers. For example, a recent study in Ireland revealed that graduate entry medical students outperformed their counterparts in research development and execution. [43] Major firms outside of medical practice including McKinsey & Co, Boston Consulting Group and Bain & Co have realised this demographic dividend and hold wide-ranging recruitment drives to attract doctors to their companies. [44]

There is clear growth among junior doctors intending to pursue non-clinical work. Medical graduates desire more control over their career. As a recent survey indicated, they highlighted the importance of work schedule flexibility and time away from clinical work as a determining factor in specialty selection. [45] This desire for control over one's career progression has led to more medical graduates selecting non-clinical careers and roles as they advance in their careers. [25] More importantly, this trend of planning a career including non-clinical work begins when these individuals are in medical school. A recent United States study of 108,408 medical graduates indicated a reduction in students gearing towards full-time clinical practice, [46] and an Australian study discovered that a large proportion of young hospital doctors continue to call for a reduction in clinical hours. [47] Despite young doctors expressing an interest in fewer clinical hours, it is also important to consider that these young doctors may only transition into complete non-clinical work temporarily, as research, teaching and management experience boost their chances of securing a spot in a more competitive specialty training program. [48]

The current apprenticeship system within Australian hospitals cannot keep up with the demand, creating a void which could be filled by innovative non-clinical positions offered by both public and private institutions. These institutions have to incorporate flexible work hours, self-

determined career paths, and a rich learning environment to attract these young doctors and medical graduates to their workplaces. The recruitment of doctors into non-clinical professions may become more substantial given the increasing number of medical students in Australia. [49] As the likelihood of early career doctors transitioning to non-clinical roles becomes more commonplace, it is important to consider the impact on the clinical demands of the community.

#### **Middle to Late Career Doctors (Specialists and GPs)**

Specialists and older doctors are overwhelmingly making the transition to strictly non-clinical work compared to other doctors in this study. This finding reflects previous trends in Germany where a very small number of young doctors considered changing their careers while over half of doctors in the middle to late stages of their career who have qualified as a certain type of specialist considered switching their careers to non-clinical work. [50,51] Previous research has only assessed a particular specialist's intentions to shift into non-clinical work, while this study has actually tracked the number of doctors who have followed through with their intentions. The tracking of these transitions has enabled us to determine if there are any specific drivers influencing transitions to solely non-clinical roles among middle to late career doctors.

In a traditional sense, young doctors undergo rigorous training as a student, a resident and finally as a registrar before enjoying the benefits of working as a consultant. These benefits generally include increased income, more control over working hours and improved clinical independence. Recent data indicates that specialists earn an average of \$316,750 per year and work an average of 45 hours a week. [52] Au contraire, the average doctor's income is about \$148,000, which is much lower than what a specialist could potentially earn. [53] We hypothesise then that income and clinical independence are not the sole drivers of specialist retention in clinical practice, as specialists and older doctors are more likely to make the transition to strictly non-clinical work compared to other doctors in this study. When the results for age, doctor type and the satisfaction variables are considered together, they suggest that changing to a non-clinical role in the mid-career stage represents a chosen strategy to develop and diversify one's career, rather than being driven by 'push' factors such as dissatisfaction with clinical work or unfavourable labour market conditions.

The concept of a predictable structural career, where employees advance through specific stages within an organisation is gradually being replaced by a more dynamic

self-directed career path enhanced by ongoing learning and fresh challenges. [54] Medical careers are no exception to this change, and the customary model of completing medical training at a specific institution before assuming duties as a senior clinician at the same institution is diminishing. [55] Specifically, this self-directed career path in medicine may involve working in a non-clinical setting (ie, research, administration, teaching, finance, etc) to create a break from normal routine and acquire new skills.

Compared to other doctors, the results highlight that GPs are the least likely to move into strictly non-clinical work. GPs attempt to diversify their careers by teaching, adopting management roles in various practices and participating in health policy discussion on a national level, [16] but most of them perform these activities on a part-time basis. GPs only enjoy limited support for their research, teaching and private endeavours compared to specialists, [56] and GPs are more isolated from well-funded research hospitals and academic institutions as they tend to practise in small clinical settings within the community. Since GPs work in smaller practices, they may be less inclined to take a management position as they might choose to outsource management within their practice to non-clinical non-medical individuals. Perhaps GPs do not tend to drop out of clinical work totally, as the culture within their professional organisation encourages them to continue to meet the clinical needs of the community they serve.

There was only marginal evidence in this study linking job and life satisfaction to increased likelihood of making the transition to sole non-clinical work. It is important to consider that non-clinical transitions may be achieved unintentionally by individuals with limited non-clinical skills, and may not be sought after positions in terms of career development. This finding reflects a previous study in the United Kingdom, where doctors who graduated from medical school in the 1980s and were currently working for the NHS indicated that their clinical jobs provided them a high degree of satisfaction, but decreased leisure time was a major factor in influencing them to consider other non-clinical careers. [57] This could mean non-clinical transitions could be associated with no change or negative changes in life and job satisfaction. For example, non-clinical transitions into management and leadership may occur due to position availability, may be forced roles and may be offered to individuals without specialist management and leadership skills. [9,10] Concerns include stigmatisation by clinical medical colleagues who feel medical managers implement the intentions of non-clinical management

staff, and management staff who feel medical managers implement the intentions of clinical medical colleagues. [11] One possible solution to the undesirability of management and leadership positions is to enhance the skill capacity of doctors for such positions.

We have analysed transitions to medical non-clinical roles, and it is possible that low job satisfaction is more closely related to leaving the medical profession altogether than to this type of transition. [58] In our sample, 83 doctors reported moving to a non-medical role across the five-year period, representing less than one per cent of the respondents.

#### **Study strengths and weaknesses**

This study's strengths come from the large number of Australian doctors that participated in the MABEL survey. Since the MABEL survey is a longitudinal survey, it was able to document the yearly transitions doctors made from a clinical role to a non-clinical role. This is the first study to chart doctor transitions to non-clinical work from clinical work and the findings are illustrative of the Australian doctor population. Unfortunately doctors performing completely non-clinical work may have been less likely to continue to respond to the longitudinal survey, as they might assume that the survey no longer pertains to them once they stop performing any type of clinical work. In this case, the results underestimate the true rate of transitions. The questionnaire does not collect data about the reasons for opting out of clinical work, or about the type of non-clinical work doctors are transitioning into and whether it is a mixture of activities or primarily a single activity.

Finally, this study explored career transition as a categorical variable (clinical or non-clinical), whereas it is necessary in the future to explore this topic as a continuous variable (ie, the ratio of clinical to non-clinical work). We suspect more doctors will be making a fractional increase in non-clinical work as opposed to a large transition to pure non-clinical work. This is therefore important as a future research question.

#### **Future directions**

Workforce planners need to begin quantifying non-clinical engagement within the workforce in numerous ways. It is important for workforce planners in the future to take into account non-clinical work in a more comprehensive fashion. This could entail inclusion in projection models of attrition rates from clinical to non-clinical work, which our study suggests are in the order of 1%-1.5% on an annual basis, with higher rates for older age groups. Furthermore, it would be prudent to identify what kind of non-clinical engagement

is actually happening (ie, academic roles, business ventures, pharmaceutical development, etc). This will then allow governments and professional medical colleges to allocate resources more judiciously within the workforce. For example, if doctors are calling for more non-clinical opportunities within their profession, the formalisation of non-clinical work in medical careers may be necessary. This study was not able to clearly identify particular personal characteristics that drive doctors to transition into non-clinical work, suggesting that, in the case of doctors in the early stages of their career in particular, systematic shortages of clinical opportunity (ie, lack of specialist training places, increased competition in the marketplace for clinical jobs, etc) may be key driving factors. This further highlights the need to consider formalising a wider range of training and career pathways.

### Conclusion

The comprehension of characteristics of doctors transitioning into a non-clinical role aids in health workforce planning. Further studies are required to determine the main drivers for doctors making the transition to non-clinical work, and the fraction of clinical to non-clinical work.

### Competing interests

The authors declare that they have no competing interests.

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