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The Australian Medical Oncologist Workforce Survey: The profile and challenges of medical oncology

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ABSTRACT

Background: The aim of this study was to understand the current and future challenges for the Australian medical oncologist workforce.
Methods: Utilising an on-line self-administered questionnaire, this cross-sectional study collected data from members of the Medical Oncology Group of Australia on workforce-related issues. Participants consisted of medical oncology specialist advanced trainees, early-career oncologists (ECOs), and medical oncology consultants.
Findings: Of the 633 members, 354 completed the questionnaire, representing a 55.9% response rate. Based on Medical Oncology Group of Australia membership, the number of medical oncologists has increased since the previous workforce study in 2009, with an uncertainty among junior medical oncologists regarding their future career prospects. The majority of participants worked in capital cities and metropolitan areas within the three most populous Australian states. Almost half (45%) of ECOs and consultants are undertaking or have completed a higher degree. A large number of advanced trainees (93%) and half of ECOs in this study were concerned about their future career prospects. For these participants, most were satisfied with the supervision they received (60% trainees and 69% ECOs) but only half of these participants (47% trainees and 52% ECOs) received any mentoring in their current or previous role. Compared to trainees and ECOs, consultants reported spending significantly more hours on administration per week; trainees 5.3 hours, ECOs 5.8 hours, consultants 7.5 hours ($P < .031$) and see a significantly greater number of patients per week; trainees 34 patients, ECOs 34 patients and consultants 49 patients ($P < .001$).
Interpretation: Workforce challenges were unique across different career stages in oncology; trainees, ECOs and consultants. Work intensity, mentorship and career prospects were amongst the emergent issues highlighted in this study.

Introduction

Maintaining a versatile health system to provide quality cancer care, and nurturing a sustainable medical oncology workforce are inter-dependant. In Australia, there has been increasing attention on medical oncology workforce planning to achieve efficient and effective delivery of services - both now and into the future [1]. Two previous medical oncology workforce studies conducted in

☆ This study is original research and results have not yet been presented in any format.

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2001 and 2009 illustrated the potential shortfalls in the workforce which could impact on quality care [1,2]. A major recommendation was the call for strategic approaches to increase the capacity of the medical oncology workforce, imperative in meeting the growth of cancer incidence in Australia [1]. To place this demand within the current context, cancer represents the greatest disease burden in Australia [3], and is now the leading cause of death [4]. It has been estimated that over 130,000 new cancer diagnoses will be made in 2016 [3] and the number of new diagnoses is projected to rise to about 150,000 in 2020 [5]. These cancer incidences and projections illustrate tangible and ongoing needs for cancer services in general, and the importance of fostering a viable and sustainable medical oncology profession more specifically.

The landscape of medical oncology is steadily changing, both in Australia and internationally. In terms of the Australian environment, as previous oncology workforce studies have illustrated, 150–180 new cases per annum was suggested a reasonable workload for a Full Time Equivalent (FTE) medical oncologist [1,6]. In the past few years, the field of medical oncology (and cancer care in general) has been rapidly shifting due to increases in cancer diagnoses and duration of survival, innovative technology platforms, and precision medicine—leading to new complexities of care and higher patient loads for most oncology clinicians [7]. Therapeutic innovation has thus brought with it greater challenges of service demand due to the burgeoning numbers of cancer survivors that do not exit the system [6,8]. This has also been accompanied, in terms of workforce flows and dynamics, by a notable trend toward tumour stream subspecialisation internationally [9]. In addition to *supply* (career entry and exit trends) and *demand* (incident cases, proportion of referred New Patient Consultation/Full Time Equivalents) issues, other quantifiable variables may also contribute to workload intensity and impact on workforce demands [10-13]. The qualitative, preliminary work that led to the development of the Australian medical oncologist workforce survey reported here highlighted on a smaller, and qualitative scale, the current tensions within the workforce as a profession [14] with the following themes emerging: the need for professional re-invention and the pressure to perform, the importance and often absence of mentoring and feed-back loops, the emotional labour of oncology, and the impact of cascading workload volume on practice sustainability. Building substantially on these previous studies, the leading representative body for medical oncologists in Australia—the Medical Oncology Group of Australia (MOGA) in collaboration with University of New South Wales and University of Technology Sydney Australia, undertook the 2016 Australian medical oncologist workforce study to better understand the current workforce profile, workload intensity and challenges, and identify gaps to inform future policy and practice.

Material and methods

This cross-sectional study utilised an online questionnaire to collect data from medical oncologists working in Australia. The study was approved by the University of Tasmania Human Research Ethics Committee (H0015542).

Recruitment and sample

Recruitment for this study was conducted between May and August 2016 and consisted of an invitation pack distributed to all MOGA members via email. The invitation pack included an information sheet and a consent form. All participants were offered the opportunity to complete the questionnaire via online access (SurveyGizmo). Two reminder emails were distributed prior to closing date of the on-line questionnaire.

At the time of recruitment, there were 620 registered medical oncologists in Australia (Australian Health Practitioner Regulation Agency [AHPRA], 2016) and 633 MOGA members. Of note, MOGA membership is optional and inclusive of “Advanced Trainees” who are undergoing 3 years specialist medical oncology training, and not yet registered with AHPRA as medical oncologists.

Questionnaire

The instrument used for this study consisted of an online questionnaire. The questionnaire was developed by an interdisciplinary team and subsequently pilot tested amongst a sample of medical oncologists to ensure content validity and clarity, and appropriate brevity. The questionnaire encompassed the areas of medical oncologists' demographic characteristics, their work situations, their career, and for Directors of Medical Oncology Departments, descriptors for their department. Some parts of the questionnaire were stratified by position: Trainee; Early-Career Oncologists (ECOs) defined as within 5 years of completing specialist medical oncology training and Consultant. All data were de-identified. The questionnaire is provided in the Appendix.

Statistical analyses

Data were checked for plausibility and cleaned for outliers. Data are presented in absolute and relative frequencies for dichotomous or categorical variables, as well as means and standard deviations for continuous variables. Tests of association between categorical variables were conducted using chi-square test and Fisher's Exact test, where appropriate. Comparisons between means of two groups were conducted using Student's t test. Comparisons between means of three or more groups were conducted using analysis of variance, with post-hoc Bonferroni pairwise comparisons. All analyses were conducted using the statistical software Stata 14.1.

Results

Of the 633 MOGA members, 354 completed questionnaires representing a response rate of 55.9%.

Demographics

Demographics of the study sample are presented in Table 1, along with a comparison between the study sample and the Australian medical oncologist population. The majority of the sample is aged 35–64 years (73%), male (51.1%), and from the most populous states in Australia, which have the largest number of oncologists. The distribution of the study sample across the demographic characteristics is similar to the population of Australian medical oncologists for age ($P = .237$), gender ($P = .147$), and state ($P = .454$). Hence, the study sample appears to be generally representative of the Australian medical oncology profession.

In terms of position amongst survey participants, there were 73 (20.6%) trainees, 97 (27.4%) ECOs, and 171 (48.3%) consultants. Thirteen (3.7%) participants did not indicate their position. The distribution of the demographic characteristics across position is similar for gender ($P = .107$) and state ($P = .144$), while trainees tended to be younger than the ECOs and consultants ($P < .001$) (data not shown).

Work situation

Table 2 shows the distribution of work situation characteristics across position. A greater percentage of ECOs have a primary work location in a major metropolitan area or regional and/or remote centre ($P < .001$) as opposed to consultants and trainees who

Table 1
Comparison of the Medical Oncologist Workforce Survey sample and the medical oncologist population using demographic characteristics.

Demographics	Workforce survey		Population		*P* value
	Frequency	Percent	Frequency	Percent	
State (work in)	**(*n* = 354)**		**(*n* = 620)**[a]		
NSW	94	26.6	179	28.9	.454
VIC	131	37.0	224	36.1	
QLD	77	21.8	104	16.8	
WA	14	3.9	37	6.0	
SA or NT	25	7.0	50	8.1	
TAS	6	1.7	9	1.5	
ACT	7	2.0	10	1.6	
Age	**(*n* = 354)**		**(*n* = 554)**[b]		
<35	81	22.9	119	21.5	.237
35-44	138	39.0	236	42.6	
45-64	120	33.9	163	29.4	
65+	15	4.2	36	6.5	
Gender	**(*n* = 354)**		**(*n* = 633)**[c]		
Male	181	51.1	354	55.9	.147
Female	173	48.9	279	44.1	

NSW= New South Wales; VIC= Victoria; QLD= Queensland; WA= Western Australia; SA= South Australia; NT= Northern Territory; ACT= Australian Capital Territory.

[a] Source: AHPRA Medical Board of Australia (MBA). Registrant Data January 2016–March 2016. [28] (note that 7 practitioners registered with AHPRA "no PPP")

[b] Source: Medical Oncology Group of Australia (MOGA), includes trainees and registered consultants (note that 79 consultants did not provide their age range). Note that we could not use AHPRA as a source because no AHPRA data on age distribution is available.

[c] Source: Medical Oncology Group of Australia (MOGA) includes trainees and registered consultant. Note that we could not use AHPRA as a source because no AHPRA data on gender distribution is available.

Table 2
The distribution of the medical oncologist workforce survey sample across work situations, by position.

Work Situation	Trainee (*n* = 73) %	ECO (*n* = 97) %	Consultant (*n* = 171) %	*P* value
Primary work location				
Capital city	79	49	72	<.001
Major metropolitan area	15	28	17	
Regional / Remote centre	6	23	11	
Secondary work location				
Capital city	7	24	21	.004
Major metropolitan area	12	7	4	
Regional / Remote centre	7	16	15	
Not applicable	74	53	60	
Consult in another Language other than English				
Yes	21	19	13	.224
No	79	81	87	
Roles[a]				
Clinician	95	99	98	.193
Academic teaching	41	61	83	<.001
Administrator	5	23	60	<.001
Researcher	51	71	82	<.001
Other	7	4	5	.732
Tumour Stream[b]				
Breast	58	57	51	.532
Lung	52	44	43	.402
Gastrointestinal	52	56	47	.364
Brain	23	29	16	.051
Head and neck	23	20	20	.784
Hepatobiliary	34	31	22	.072
Genitourinary	48	45	36	.115
Gynaecological	30	36	24	.104
Melanoma	30	31	27	.752
Sarcoma	16	8	12	.263
Generalist	45	43	20	<.001
Haematological	7	3	11	.054
Geriatric oncology	15	13	9	.255
Other	8	7	6	.854

[a] Oncologists can have multiple roles.

[b] Oncologists can treat/specialise in multiple tumour streams.

are based in capital cities. Among trainees, 21% reported consulting in a language other than English, indicating potential migratory change and cultural diversity in trainees and workforce trajectories.

Consultants and, to a lesser extent ECOs, are more likely to undertake research ($P < .001$) and administration ($P < .001$) compared to trainees, with 60% of consultants reporting they have a role in administration. For tumour stream subspecialisation and treatment only 20% of consultants were generalists compared to 43% ECOs, reflecting more subspecialty expertise differentiation over time, with the least common subspecialty reported for consultants being geriatric oncology.

The distribution of *work hours* and patients treated, by position, is presented in Table 3. Of note the Australian health care model is a two-tiered system of public and private cancer care options, on the background of a single payer universal health care system [15]. Depending on individual states and institutions, public outpatient clinics may be "private practice models" within a training hospital. Trainees spend significantly more hours per week on public clinic work ($P < .001$) and "other" work responsibilities ($P < .001$), compared to ECOs and consultants reflecting role differentiation across seniority and the shifting obligations across career stage. ECOs spend significantly more hours per week on research ($P < .001$) compared to consultants and trainees, reflecting early stage career and expertise development. Consultants spend significantly more hours per week on administration; consultants 7.5 hours, ECOs 5.8 hours, trainees 5.3 hours, ($P = .031$) and see a significantly greater number of total patients per week; consultants 49 patients, ECOs 34 patients, trainees 34 patients ($P < .001$). For the consultant cohort grouped as a whole, our survey results show a mean number of 4 *new* patients and 49 *total* patients seen per week. The maximum numbers of new patients seen per week were: trainees 25 patients, ECOs 20 patients, and consultants 12 patients.

There were 55 respondents conducting telehealth consultations, 43 attending rural outreach and 29 conducting satellite clinics. Their results are described as mean hours *per month* spent on these clinics.

Participants were asked to rate their satisfaction with the support provided by *colleagues* and their *workplace* as well as their satisfaction with *career development opportunities* and *work-life balance* (data not shown). The majority were satisfied with the support provided by colleagues, ECOs (78%) and consultants (77%) significantly more so than trainees (67%) ($P = .008$). Similarly, trainees were significantly less satisfied with their work-life balance (31%), compared to ECOs (53%) and consultants (51%) ($P = .001$) reflecting the career challenges and high demands faced by trainees during 3 years of intense training. There were no significant differences between the positions and support provided by their workplace (55% satisfied, on average) or career development opportunities (52% satisfied, on average).

Career prospects, preferences, and future plans

Table 4 shows the distribution of aspects related to career, by position. The majority of trainees (93%) were concerned about their career prospects. This level of concern reduced with a junior consultant role, yet 52% of ECOs were still concerned. Almost half (45%) of ECOs and consultants are undertaking a higher degree, signalling the future profile and career competitiveness in the field.

In terms of the tumour stream that participants envisage doing in the future, the top 3 preferences were the common cancers, namely breast, lung and gastrointestinal cancer. Among trainees 40% envisaged being a generalist and 22% practicing geriatric oncology. When the ECOs were also asked to rate their satisfaction with their current tumour stream(s), only 8% were dissatisfied, and

Table 3
The distribution of work hours and patients treated amongst the medical oncologist workforce survey sample, by position.

Work hours and patient load		Trainee	ECO	Consultant	*P* value
Work hours per week spent on:		**mean (SD)**	**mean (SD)**	**mean (SD)**	
Clinic (public)[a,b,c]	($n=301$)	24.4 (15.2)	19.3 (13.0)	15.5 (8.0)	<.001
Clinic (private)	($n=149$)	20.0 (10.6)	11.7 (11.1)	14.6 (11.1)	.273
Teaching / Training	($n=289$)	4.3 (6.2)	3.5 (3.0)	3.7 (2.5)	.417
Research[a,c]	($n=298$)	7.2 (8.4)	13.0 (14.0)	7.3 (7.9)	<.001
Administration[b]	($n=249$)	5.3 (3.6)	5.8 (4.3)	7.5 (6.6)	.031
Other work[b]	($n=112$)	15.0 (11.1)	10.2 (9.1)	7.5 (5.2)	<.001
Work hours per month spent on:		**mean (SD)**	**mean (SD)**	**mean (SD)**	
Telehealth	($n=55$)	2.8 (2.9)	6.2 (6.1)	3.1 (3.0)	.050
Outreach	($n=43$)	7.8 (5.1)	20.4 (25.6)	16.5 (17.1)	.477
Satellite Clinics	($n=29$)	11.5 (9.6)	20.7 (22.7)	10.2 (7.0)	.194
Patients seen:		**mean (SD)**	**mean (SD)**	**mean (SD)**	
Total patients / week[b,c]	($n=332$)	34.2 (14.5)	34.1 (19.9)	49.0 (25.5)	<.001
New patients / week	($n=316$)	5.1 (3.7)	4.4 (2.9)	4.3 (2.0)	.134
Patients starting new chemotherapy regime or targeted agents immunotherapy / week	($n=317$)	4.8 (2.9)	4.3 (3.5)	4.7 (3.2)	.554

[a] Statistically significant difference between trainee and ECOs groups.
[b] Statistically significant difference between trainee and consultant groups.
[c] Statistically significant difference between ECOs and consultant groups.

Table 4
The distribution of aspects related to career amongst the medical oncologist workforce survey sample, by position.

	Trainee ($n=73$) %	ECO ($n=97$) %	Consultant ($n=171$) %	*P* value
Concern about career prospects				
Concerned	93	52	–	<.001
Neutral	4	15	–	
Not concerned	3	33	–	
Undertaking or completed a higher degree				
Yes	29	45	45	.042
No	71	55	55	
Satisfaction with current tumour stream				
Dissatisfied	–	8	–	–
Neutral	–	16	–	
Satisfied	–	68	–	
Not applicable	–	7	–	
Tumour stream envisage doing/want to do in the future[a]				
Breast	47	43	–	.671
Lung	60	51	–	.206
Gastrointestinal	64	60	–	.542
Brain	10	18	–	.141
Head and neck	14	13	–	.955
Hepatobiliary	26	21	–	.406
Genitourinary	40	38	–	.834
Gynaecological	33	26	–	.311
Melanoma	41	30	–	.129
Sarcoma	4	4	–	.996
Generalist	40	22	–	.010
Haematological	3	1	–	.577
Geriatric oncology	22	7	–	.006
Other	0	3	–	.261
A major change in career in next 5 years[b]				
No change	–	38	61	<.001
Retirement	–	–	11	–
Major time out	–	7	9	.656
Move location	–	26	6	<.001
Change public/private/academic balance	–	45	20	<.001
Preferred primary work location in 3 years				
Capital city	49	48	–	.950
Major metropolitan area	41	41	–	
Regional / Remote centre	10	11	–	
	mean (SD)	**mean (SD)**	**mean (SD)**	
Preferred FTE fraction in 3 years[c]				
Public	0.42 (0.29)	0.47 (0.36)	–	.304
Private	0.27 (0.23)	0.18 (0.22)	–	.009

[a] Oncologists can treat/specialise in multiple tumour streams.
[b] Can indicate more than one major change.
[c] Total does not need to be 1.0 Full Time Equivalent (FTE).

Table 5
The distribution of supervision and mentoring ratings amongst the medical oncologist workforce survey sample, by position.

	Trainee ($n=73$) %	ECO ($n=97$) %	Consultant ($n=171$) %	*P* value
Satisfaction with supervision received				
Dissatisfied	11	6	–	.387
Neutral	29	25	–	
Satisfied	60	69	–	
Had any significant mentoring				
Yes	47	52	–	.521
No	53	48	–	
Importance in receiving mentoring				
Unimportant	15	7	–	.014
Neutral	1	11	–	
Important	84	82	–	
Your ability as a mentor				
Poor	–	4	2	<.001
Neutral	–	29	13	
Good	–	59	83	
Not applicable	–	8	2	
Your ability as a supervisor				
Poor	–	3	2	.209
Neutral	–	28	18	
Good	–	62	73	
Not applicable	–	7	7	
Completed RACP supervisor training				
Yes	–	33	76	<.001
No	–	67	24	

RACP = Royal Australasian College of Physicians.

they were spread across most tumour streams, with no obvious pattern.

Most consultants (61%) indicated no intended major career change in the next 5 years, which was significantly higher than ECOs (38%) ($P < .001$). Related to this is the significantly higher percentage of ECOs who intend to move location (26%) and/or change their public/private/academic balance (45%) in keeping with early stage career trajectory—compared to consultants (6% and 20% respectively) (both $P < .001$). For the trainees and ECOs mean values of preferred *public* FTE fraction in 3 years of 0.42 and 0.47 suggest part-time public hospital employment arrangements, with preferred *private* FTE fraction in 3 years being 0.27 and 0.18 respectively. There were 10% of trainees and 11% of ECOs who stated regional and/or remote centres as their preferred primary work location in 3 years. Some of the participants ($n=44$, 25.9%) also held the position of Director of an oncology Department. On average, these departments employed 6.6 FTE oncologists. The Directors reported that it took approximately 3.7 months to recruit their last permanent FTE oncologist and 50% of the Directors indicated that they could confidently predict an increase in FTEs in the next 3 years; an increase of 1.4 FTEs on average (data not shown).

Most consultants (87.7%) were satisfied with their overall clinical work—specifically including private clinic work satisfaction (55.6%) and public clinic work (60.5%). Satisfaction with their overall academic work was also high (57.2%), but was much lower for administration and/or organization executive work (34.9%) (data not shown).

Supervision and mentoring

The distribution of supervision and mentoring ratings amongst the participants, by position, are shown in Table 5. The majority of trainees (60%) and ECOs (69%) were satisfied with the supervision they received. This correlates well with the ECOs and consultants considering themselves as being good supervisors (65% and 73% respectively). In our cohort, 33% of ECOs *v* 76% of consultants reported having completed supervisor training workshops with the Royal Australasian College of Physicians (RACP) ($P < .001$).

Although (84%) of trainees and (82%) of ECOs considered mentoring to be important, and (83%) of consultants considered themselves as good mentors, only half of the trainees (47%) and ECOs (52%) reported receiving significant mentoring—highlighting a potential gap in succession planning.

Subspecialisation

Table 6 shows the distribution of tumour stream subspecialisation across state and area, for the participants. A significantly higher percentage of oncologists in Queensland work in the generalist stream, compared to other states ($P=.022$).

Discussion

This study has expanded on issues explored in the previous two Australian Medical Oncology workforce studies. Unique to this study is the inclusion of trainees and the focus specifically on workforce issues from the perspective of different career stages in medical oncology, rather than researching the workforce as a unitary group. We have also examined workload intensity through hours spent on diverse roles and responsibilities as an oncologist

Table 6
The distribution of tumour stream across state and area, for the Medical Oncologist Workforce Survey sample.

Work situation	NSW/ACT ($n=101$) %	VIC/TAS ($n=137$) %	QLD ($n=77$) %	WA ($n=14$) %	SA/NT ($n=25$) %	*P* value	Capital city ($n=237$) %	Major metro. area ($n=69$) %	Regional/Remote centre ($n=48$) %	*P* value
Tumour stream*										
Breast	54	52	60	29	64	0.204	51	59	65	.132
Lung	38	50	40	57	64	0.064	43	48	54	.370
Gastrointestinal	54	45	56	14	68	0.008	48	57	54	.367
Brain	24	18	29	21	12	0.316	14	30	46	<.001
Head and neck	28	15	26	14	16	0.089	17	28	29	.058
Hepatobiliary	29	21	38	7	24	0.041	20	39	42	<.001
Genitourinary	50	37	45	14	28	0.030	33	59	50	<.001
Gynaecological	34	25	34	7	32	0.170	20	39	58	<.001
Melanoma	28	23	42	29	40	0.055	26	32	48	<.001
Sarcoma	15	7	14	14	20	0.157	11	12	19	.276
Generalist	25	34	45	21	20	0.022	22	39	77	<.001
Haematological	2	17	1	7	8	<0.001	6	4	25	<.001
Geriatric oncology	10	9	13	0	28	0.048	8	14	25	.002
Other	3	9	5	29	4	0.006	10	1	2	.022

* Oncologists can treat/specialise in multiple tumour streams. ACT = Australian Capital Territory; NSW = New South Wales; NT = Northern Territory; QLD = Queensland; SA = South Australia; VIC = Victoria; WA = Western Australia.

such as administrator roles, in addition to absolute patient numbers seen per week. Furthermore, we present data on preferred future work contexts in 3 years' time, together with preferred tumour streams, to help map potential gaps in workforce planning. Our findings related to supervision and mentoring may also help provide insights into unique workforce needs.

Fourty-eight percent of our participants were female. With current AHPRA data indicating 44% of oncologists being female, and 2009 oncology workforce data demonstrating females comprised 29% of the total FTE positions, there may be an increasing trend of the number of women entering the profession. This data is in keeping with Australian national medical workforce data overall showing an increase in the number of women training as specialists [16]. The 2009 survey documented a supply of 234 FTE consultants with an average number of 270 new patients per FTE per year. In our study, the median number of new patients seen per week per consultant was 4. The number of new patients seen per FTE per annum was beyond the scope of this paper.

Employment opportunities for newly qualified oncologists have changed. In 2009 there were 29 unfilled FTEs. Our data documented 93% of trainees and 52% of ECOs were concerned about future career prospects. Higher degrees were being pursued or completed in almost one-third of trainees and almost half of ECOs. Attaining higher qualifications and skills has become a competitive factor in a restricted job market placing more pressure on all oncologists, including those who might not consider these endeavours to align with their personal and professional goals.

Another issue emergent from this study was the low regional workforce preference in trainees (10%) and in ECOs (11%) which will be a challenge for regional staffing and especially long-term retention. This is a critical issue, as approximately one-third of people living with cancer in Australia reside in regional and rural areas [17]. Despite employing different approaches to overcome the distance barrier in meeting patient needs (eg, Telehealth, Regional Cancer Centres) [18,19], survival outcomes are poorer in these areas when compared with cities [20,21]. It is not only the oncologist but also the support staff, and hospital IT support such as electronic medical records and electronic chemotherapy prescribing, that is essential to create incentives for rural jobs [22]. Innovations such as the North Queensland teleoncology model [23], expansion in cancer research in rural, and regional Australia with more effective cancer networks and iterative new models of care may also be future incentives for rural oncology [19]. Other emergent data were the trainees' and ECOs' mean values of preferred public FTE fraction in 3 years of 0.42 and 0.47 which may reflect pursuit of other career opportunities outside of a public hospital or future work-life balance priorities for junior faculty. To this end, the optimal fractional FTE arrangement which provides both employer and employee workplace efficiency and satisfaction in public oncology institutions should be explored for future planning.

A unique aspect of our survey was a focus on the effectiveness of supervision and mentoring, for advanced trainees and ECOs. Although the majority of trainees and ECOs considered mentoring to be important, the level and form of mentoring received was inconsistent between individuals. While supervision is important, effective mentoring can potentially offer a less experienced professional a perspective into the profession that is different to formal supervision [24]. Mentoring can benefit not only individual career development but also the growth of the profession. Additionally, future efforts should focus on encouraging participation in a RACP supervisor workshop, once qualified as a consultant.

The patterns of tumour stream subspecialisation are also important data emerging from our study. Oncologists practising in regional and remote areas were more likely to assume a generalist role than their colleagues working in major cities or metropolitan areas - likely due to practice demands. Thus, it could be interpreted that the opportunity to practice in specific tumour streams, were influenced by geographic locations. Furthermore, while the medical oncology workforce is responsive to cancer demands, ongoing attention is perhaps needed to ensure that there are appropriate numbers of oncologists in each tumour stream to meet current and projected needs. For example, as Australia's population ages, geriatric oncology is an important emerging subspecialty to be fostered [19].

Finally, workforce diversity in oncology matters, not only in Australia but in all multicultural societies especially as the population of high-risk racial and ethnic groups increases [25,26]. Understanding the different values, health beliefs and perspectives of emerging communities is imperative not only for the delivery of optimal cancer care but also to promote health disparity research. More research on cultural and linguistic diversity of the workforce, and the geographic distribution (eg whether concentrated in certain states or urban regions) would be beneficial.

There were some limitations to our study. Although the response rate is exceptionally good, compared to similar studies [27], data were obtained via self-report, so it is possible that that some results may have been affected by recall bias. We did not collect Medicare (publicly funded universal health care in Australia) data on service utilisation. We did not collect FTE positions nationally or waiting times for new patients.

Despite these limitations, information from our study can provide all stakeholders a useful framework for scenario modelling and discussion, to aid workforce planning endeavours and initiatives. Addressing the concerns and meeting the aspirations of medical oncologists will help keep the workforce and health system enriched and versatile, to deal with the challenges of delivering quality cancer care to the Australian population.

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Declaration of interest

None.

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