

The shortage of medical oncologists: the Australian Medical Oncologist Workforce Study

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Concerns are increasing in Australia and internationally that the supply of medical oncologists (MOs) is insufficient to meet the rising demand.^{1–5} The only study of the medical and haematological oncology workforce in Australia was published in 2001.⁶ This study found that there were 180 MOs in active practice in Australia (0.9 per 100 000 population), and an estimated shortfall of at least 40 medical and haematological oncologists.

The best estimate of the number of MOs in Australia in 2009 was 311, based on the membership of the Medical Oncology Group of Australia (MOGA), the peak representative body for MOs in Australia. This equates to 1.4 MOs per 100 000 population. Despite the increase since 2001, this figure is still well below comparable international figures, such as the 3.5 MOs per 100 000 population reported in the United States in 2005.⁷

In response to consumer concerns about the medical oncology workforce shortage, the Australian Medical Oncologist Workforce Study was initiated by MOGA in 2009. The purpose of this cross-sectional study was to evaluate the current and future capacity of the MO workforce by estimating the supply, demand and shortfall of MOs in Australia in 2009 and 2014.

Methods

Study population

Lead clinicians, directors, or solo practitioners ("lead clinicians") of all public and private adult medical oncology practices in Australia were invited to complete a self-administered survey. Lead clinicians could represent more than one practice. Practices and lead clinicians were identified using the MOGA membership database, consumer directories and databases of state and federal departments of health. Institutional human research ethics committee

Abstract

Objective: To determine current and projected supply, demand and shortfall of medical oncologists (MOs) and the Australian chemotherapy utilisation rate.

Design, setting and participants: A 2009 cross-sectional observational study of Australian adult medical oncology practice work patterns.

Instrument: Electronic or paper self-administered questionnaire.

Main outcome measures: The 2009 and projected (2014) supply, demand and shortfall of full-time equivalent (FTE) MOs, and the chemotherapy utilisation rate.

Results: 476 medical oncology positions comprising 234 FTE MOs were identified. Of the 150 medical oncology practices, 117 (78%) were in metropolitan locations and 33 (22%) were in rural locations. The average number of new patients seen per FTE MO was 270 patients (ranging by state from 191 to 343). The demand for FTE MOs was estimated at 326 to 391 in 2009 and 361 to 432 in 2014. The shortfall of FTE MOs was estimated at 92 to 157 in 2009 and 84 to 156 in 2014. The chemotherapy utilisation rate was 19%.

Conclusions: The current shortage of MOs is expected to persist in the future. National strategies are needed to increase the capacity of the medical oncology workforce and the chemotherapy utilisation rate.

approval of the study was obtained from the University of Wollongong.

The survey

A 23-item study-specific survey sought the following information from lead clinicians about their practice in 2008:

- nature of the practice (public, private or other; metropolitan or rural)
- current workforce (number and sex of MOs; full-time equivalent [FTE] MOs [filled and unfilled positions]; additional clinical appointments)
- workload (new patients; new patients who received chemotherapy; new chemotherapy courses)
- future supply of MOs (advanced training positions; overseas-trained physicians [OTPs]; MOs expected to retire between 2009 and 2014).

The number of FTE MOs describes the number of full-time equivalent staff members each working 40 hours per week. We distinguished chemotherapy agents from other anticancer agents according to the SEER*Rx Interactive Antineoplastic Drug Database.⁸ "Rural" included all non-metropolitan locations by the rural, remote and metropolitan areas classification.⁹

The survey was developed with the MOGA workforce study working

group, following a comprehensive literature review, and could be completed on paper or as an online questionnaire. The survey was administered in July and August 2009. Lead clinicians were initially sent a letter of invitation to participate by post and by email, a participant information sheet, the paper survey, a hyperlink to the online survey and one reminder by email. Non-responding lead clinicians were contacted by telephone and sent two reminders by email as required.

Additional sources of data

Data were obtained from the Royal Australasian College of Physicians (RACP) about the numbers of medical oncology advanced trainees registered with the RACP and trainees awarded fellowship between 2005 and 2009. The number of new cases of cancer reported in Australia in 2008 was obtained from state and territory cancer registries.¹⁰ The projected number of new cases of cancer in Australia during 2014 assumed a growth of 2% per year.¹⁰ The populations of each state and territory in June 2009 were obtained from the Australian Bureau of Statistics.¹¹ An optimal chemotherapy utilisation rate of 51% was based

1 Medical oncology practices in Australia in 2008

	NSW	VIC	QLD	WA	SA	TAS	ACT	NT	National
Practices (% of national)	42 (28%)	56 (37%)	25 (17%)	11 (7%)	5 (3%)	5 (3%)	5 (3%)	1 (1%)	150
Type of practice (% of practices)									
Public	25 (60%)	22 (39%)	10 (40%)	8 (73%)	2 (40%)	3 (60%)	2 (40%)	1 (100%)	73 (49%)
Private	12 (29%)	27 (48%)	14 (56%)	3 (27%)	3 (60%)	1 (20%)	3 (60%)	0	63 (42%)
Other	5 (12%)	7 (17%)	1 (4%)	0	0	1 (20%)	0	0	14 (10%)
Place of practice (% of practices)									
Metropolitan	28 (67%)	48 (86%)	21 (84%)	6 (55%)	5 (100%)	3 (60%)	5 (100%)	1 (100%)	117 (78%)
Rural	14 (33%)	8 (14%)	4 (16%)	5 (46%)	0	2 (40%)	0	0	33 (22%)
Solo practitioners (% of practices)	6 (12%)	5 (9%)	4 (16%)	1 (9%)	1 (20%)	3 (60%)	0	1 (100%)	21 (14%)
MOs (% of national)	138 (29%)	176 (37%)	63 (13%)	41 (9%)	28 (6%)	11 (2%)	18 (4%)	1 (0.2%)	476
MOs attending rural clinics (% of MOs)	23 (17%)	13 (7%)	10 (16%)	7 (17%)	2 (7%)	2 (18%)	8 (44%)	0	65 (14%)

NSW = New South Wales. VIC = Victoria. QLD = Queensland. WA = Western Australia. SA = South Australia. TAS = Tasmania. ACT = Australian Capital Territory. NT = Northern Territory. MO = medical oncologist.

on previous modelling.¹² Optimal workloads of 150 and 180 new patients seen per FTE MO per year were based on Canadian and Australian benchmarks.^{1,13}

Statistical analysis

Descriptive statistics were used to summarise the responses to the survey at state, territory and national levels. Calculations excluded practices that reported missing data for the relevant item. The chemotherapy utilisation rate was calculated as the ratio of the number of new patients reported in the survey to be receiving chemotherapy, and the new cases of cancer reported to state and territory cancer registries.

The current MO supply was calculated as total FTE MOs for 2009. The projected supply was calculated as current supply + (average number

registered advanced trainees/year [an anticipated FTE/qualified specialist of 0.5] × 5 years) – (FTE number expected to retire in the next 5 years).

The demand for FTE MOs was calculated as new cases of cancer reported to cancer registries × optimal chemotherapy utilisation rate ÷ benchmarks of 150 and 180 new patients seen/FTE MO/year. The shortfall was calculated as supply – demand.

Statistical analysis was performed using Microsoft Office Excel 97–2003 (Microsoft, Redmond, Wash, USA).

Results

Response rate

We identified 116 eligible lead clinicians in 150 Australian adult medical oncology practices. Ninety-four clinicians completed the survey, eight

declined to participate and 14 did not respond (response rate, 81%). Data were provided about the number of medical oncology positions in 102 of 150 centres (68%), and the number of FTE MOs in 77 of 150 centres (51%).

We estimated that missing data represented no more than 20 (<10%) unreported FTE MOs because missing data predominantly related to small rural and/or private practices without a dedicated oncologist, three medium metropolitan practices and one regional practice. Data were provided about the number of new patients with cancer seen in 63/150 centres (42%) (representing 181/234 [77%] reported FTE MOs), and about the number of new patients who received at least one course of chemotherapy seen in 50/150 (33%) centres (representing 137/234 [59%] reported FTE MOs). From these data, we estimated

2 Medical oncology positions in Australia in 2008

	NSW	VIC	QLD	WA	SA	TAS	ACT	NT	National
Population*	7 099 700	5 427 800	4 406 800	2 236 900	1 622 700	502 600	351 200	224 800	21 874 900
MOs (% of national)	138 (29%)	176 (37%)	63 (13%)	41 (9%)	28 (6%)	11 (2%)	18 (4%)	1 (0.2%)	476 (100%)
FTE MOs									
FTE MOs filled (% of national)	88 (35%)	68 (29%)	29 (12%)	22 (9%)	20 (9%)	6 (3%)	7 (3%)	1 (0.4%)	234 (100%)
FTE MOs unfilled (% of national)	7.5 (26%)	8.0 (28%)	6.3 (22%)	0	3.6 (13%)	2.0 (7%)	1.1 (4%)	0	29 (100%)
Total FTE MOs (% of national)	89 (34%)	76 (29%)	35 (14%)	22 (8%)	24 (9%)	8 (3%)	8 (3%)	1 (0.4%)	263 (100%)
Average FTE per MO	0.6	0.4	0.5	0.5	0.7	0.5	0.4	1	0.5
FTE MOs per 100 000 population	1.2	1.3	0.8	1.0	1.5	1.2	1.9	0.4	1.1
Female MOs (% of MO)	46 (33%)	49 (28%)	20 (32%)	9 (22%)	9 (32%)	3 (27%)	4 (22%)	0	140 (29%)
MOs by practice type (% of MOs)									
Public	73 (53%)	90 (51%)	38 (60%)	21 (51%)	13 (46%)	9 (82%)	10 (56%)	1 (100%)	255 (54%)
Private	50 (36%)	85 (49%)	24 (38%)	20 (49%)	15 (53%)	2 (18%)	8 (44%)	0	204 (43%)
Other	15 (11%)	1 (0.6%)	1 (2%)	0	0	0	0	0	17 (4%)
MOs by practice place (% of MOs)									
Metropolitan	131 (95%)	172 (98%)	58 (92%)	30 (73%)	28 (100%)	11 (100%)	18 (100%)	1 (100%)	449 (94%)
Rural	7 (5%)	4 (2%)	5 (8%)	11 (27%)	0	0	0	0	27 (6%)

NSW = New South Wales. VIC = Victoria. QLD = Queensland. WA = Western Australia. SA = South Australia. TAS = Tasmania. ACT = Australian Capital Territory. NT = Northern Territory. MO = medical oncologist. FTE = full-time equivalent. * At 30 June 2009.

that an additional 25% of new patients with cancer were seen and an additional 40% of unreported new patients received at least one course of chemotherapy.

Nature of the practices

Most practices surveyed were in metropolitan areas, a minority were private practices and there were few solo practitioners. Sixty-five MOs (14%) attended rural outreach clinics (Box 1).

Current supply

Of 476 medical oncology positions, 49% comprised FTE MOs (Box 2). Three-quarters of the FTE MOs were found in the three most populous states or territories (New South Wales, Victoria and Queensland). The national average FTE per medi-

cal oncology position was 0.5, and almost one-third of the medical oncology positions (29%) were filled by women. There were more medical oncology positions in public than private practices. Few medical oncology positions were located in rural centres.

Workload

49 073 new patients with cancer were reported to have been seen in 2008, 43% of the 115 126 estimated new cases of cancer.¹⁰ An average of 270 new patients were reported to have been seen per FTE MO. 21 954 new patients seen in 2008 (45%) received at least one course of chemotherapy, with an average of 160 (ranging from 94 in South Australia to 198 in NSW) new patients receiving chemotherapy per FTE MO. The national chemotherapy utilisation rate was 19%.

Future supply

There were 85 medical oncology advanced training positions identified, of which 74 (87%) were filled. There were 91 medical oncology advanced trainees registered with the RACP in 2009. The number of first-year trainees increased from 11 to 39 between 2005 and 2009. Numbers of registered trainees exceed training positions identified because some trainees work in positions outside medical oncology (eg, palliative care). There were 32 OTPs nationally, with the highest number in Queensland. Thirty-two FTE MOs (14%) were expected to retire between 2009 and 2014 (about six FTE MOs per year).

Current and projected demand

For an optimal workload of 150 new patients/FTE MO/year, the demand for FTE MOs was 391 in 2009 and 432 in 2014 (Box 3). For an optimal workload of 180 new patients, the demand was 326 in 2009 and 361 in 2014. The highest demand (over optimal workload) for FTE MOs was in NSW.

Current and projected shortfall of medical oncologists

For the current supply of 234 FTE MOs, the shortfall of FTE MOs (over optimal workload) was 92 to 157 in 2009, and 84 to 156 in 2014 (Box 3). The highest absolute shortfalls were in NSW and Queensland (Box 4).

Discussion

We identified a current shortage of MOs in Australia, expected to persist in the future. A conservative estimate of the current supply, demand and shortfall of MOs was 234, 326 and 92 FTE respectively (at a workload of 150 new patients/FTE MO/year). Shortfalls of MOs were found in all states and territories and in metropolitan and rural centres.

MOs in Australia in 2008 had a high clinical workload compared with international benchmarks. The average number of new patients per FTE MO of 270 is well above Canadian recommendations of 160 to 175¹ and the suggested Australian benchmark of 150 new patients per year.¹³ Reduction of this clinical workload requires training more than double the estimated shortage of FTE MOs, given that the average FTE per MO was 0.5 (Box 2). The increasing diversification of MOs into non-clinical roles will only increase the demand on clinical responsibilities should the shortage not be addressed.

The national chemotherapy utilisation rate was surprisingly low, and well below the evidence-based Australian standard of 51%.¹² This is of concern because it implies that some patients who may benefit from chemotherapy are not receiving it. Possible explanations for a low chemotherapy utilisation rate include suboptimal referral rates of patients with cancer, patients referred with advanced rather than early stage cancer, and low prescribing rates of chemotherapy to new patients with cancer. We suspect that we have underestimated the chemotherapy utilisation rate, because only one-third of centres (representing about 60% of the total national MO workload) reported the number of new patients who received chemotherapy. However, even correcting for the underestimate, it is unlikely that chemotherapy utilisation in Australia approximates expected standards.

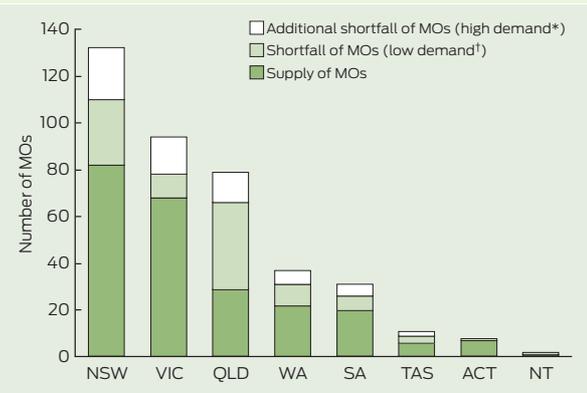
The number of trainees was greater than the number MOs expected to retire. This suggests that the supply of MOs should be able to meet the increased demand over the next 5 years, assuming full integration of the trainees into the medical oncology workforce. However, allowing for part-time work practices, overseas

3 Current (2009) and projected future demand, supply and shortfall of MOs



MO=medical oncologist. *Workload benchmark 150 new patients/MO/year. † Workload benchmark 180 new patients/MO/year.

4 Current (2009) supply and shortfall of MOs, by state and territory



*150 new patients/MO/year. †180 new patients/MO/year. MO=medical oncologist. NSW=New South Wales. VIC=Victoria. QLD=Queensland. WA=Western Australia. SA=South Australia. TAS=Tasmania. ACT=Australian Capital Territory. NT=Northern Territory.

placements and maternity and other leave, the increasing supply of trainees does not allow for a substantial increase in the capacity of the medical oncology workforce to address the current shortage. Supplementation of the workforce by OTPs is welcome, but is limited by their uncertain supply.

Although not directly comparable, our findings are similar to the results of the most recent study of the oncology workforce in the US,⁷ and studies of the medical workforce in other oncology specialties such as radiation oncology¹⁴ and palliative care.¹⁵ The US study found that demand for MOs is expected to rise by 48% between 2005 and 2020, but supply will only rise 14%, translating into a shortfall of 2550 to 4080 oncologists (about one-quarter to one-third of the 2005 supply).

Our study has several limitations. The response rate of 81% was acceptable, but may not have been high enough to generalise the results to all MOs and practices in Australia. Lead clinicians, rather than individual MOs, were surveyed to maximise the response rate, but this was at the cost of detailed knowledge about workplace patterns of individual MOs. Only the clinical workload of MOs relating to chemotherapy was included, so the results may have underestimated the true workload of MOs in Australia, which also includes other systemic therapies such as hormonal therapy. Our study highlighted the lack of basic data collection at some oncology practices. Some responses were estimated rather than counted, and many centres were un-

able to provide any data about workload. This reduced the accuracy of the results and is likely to have underestimated the workload relating to new patients.

Despite these limitations, we provide a snapshot of the current medical oncology workforce in Australia, and an estimate of the current and future workforce shortages. Addressing the shortage needs a multilevel approach aimed at increasing the supply of MOs by increasing recruitment, training and participation rates, improving clinical practice efficiency, and the introduction of innovative methods of service delivery through involvement of other health professionals and use of models of shared care.

Tailored national strategies will be necessary to ensure an adequate medical oncology workforce in the future, and ongoing monitoring will be needed to guide and promote the strategies.

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