Cancer knowledge and skills of interns in Australia and New Zealand in 2001: comparison with 1990, and between course types

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ABSTRACT

Objective: To compare the cancer knowledge and skills of interns in 2001 who graduated from graduate medical program (GMP) courses with those from non-GMP courses, and to compare the cancer knowledge and skills of interns in 2001 with those who completed a similar survey in 1990.

Design: Questionnaire survey of recently graduated interns in a random sample of Australian and New Zealand hospitals. The questionnaire was designed to allow direct comparison with the 1990 survey, and was guided by the Australian Cancer Society's Ideal Oncology Curriculum for Medical Schools.

Results: 443 interns completed the survey (response rate, 62%; 42 were excluded, leaving 401 surveys for analysis: 118 from GMP courses and 283 from non-GMP courses). Interns from GMP courses felt more competent than those from non-GMP courses at discussing death ($P = 0.02$), breaking bad news ($P = 0.04$) and advising on smoking cessation ($P = 0.02$), but less competent at preparing a patient for a hazardous procedure ($P = 0.02$). More GMP interns would refer a breast cancer patient to a multidisciplinary clinic (83% versus 70%; $P = 0.03$). Knowledge about cancer risks and prognosis was significantly less in GMP interns, but GMP interns rated their clinical skills, such as taking a Pap smear, higher than non-GMP interns. The GMP and non-GMP groups did not differ in their exposure to cancer patients, but compared with 1990 interns recent graduates had less exposure to patients with cancer.

Conclusions: GMP curricula appear to have successfully introduced new course material and new methods of teaching, but have not always succeeded in producing doctors with better knowledge about cancer. Recent graduates have less exposure to cancer patients than those who trained 10 years ago.

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OVER THE PAST DECADE, four Australian medical schools (Flinders University, the University of Queensland, the University of Sydney, and the University of Melbourne) have introduced four-year medical courses accessible only to graduates. Introducing these graduate medical programs (GMPs) required review and reform of the curricula. Five- or six-year undergraduate courses continue in other Australian and New Zealand medical schools, although there have been varying degrees of curriculum reform. Shorter courses may have less range and depth of content. Any such trend would run counter to efforts to increase teaching on cancer, which is a major and increasing health problem in both countries.[1] Past surveys of medical students' oncology knowledge and skills[2,3] have not indicated a high standard of training in this area.

We surveyed interns in early 2001 with a questionnaire based on one for an earlier study.[2] Our aims were:

- To compare the cancer knowledge and skills of interns in 2001 who graduated from GMP courses with those from non-GMP courses; and
- To compare the cancer knowledge and skills of interns in 2001 with those who completed the survey in 1990.

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METHODS

Subject population

The study population was recent medical graduates from all universities in Australia and New Zealand undergoing orientation as interns in teaching hospitals during the first two weeks of employment in January 2001. These doctors had just qualified but were not yet involved in hospital practice.

Sample size calculations and selection of hospitals were not straightforward because of likely cluster effects (the magnitude of which is difficult to estimate from published articles) and the lack of a comprehensive list of the numbers of interns accepted by each hospital from each medical school.

The earlier study obtained 389 responses.[2] Our study was designed to have an 80% chance of detecting and declaring statistically significant, using a two-sided $\alpha = 0.05$, absolute changes of about 10% in the proportions of interns reporting no exposure to palliative care (50% in 1990), to radiation oncology (42%) or medical oncology (18%), or "poor" instruction in palliative care

1: Proportion of respondents reporting levels of skills, by type of medical program

Skill	Perceived competence	GMP (*n*=118)	Non-GMP (*n*=283)	*P**
Advising to give up smoking	Very high	8%	3%	0.02
	High	33%	27%	
	Medium	54%	54%	
	Low	5%	16%	
	Nil	0	0	
Preparing a patient for a hazardous procedure	Very high	3%	2%	0.002
	High	15%	32%	
	Medium	44%	47%	
	Low	35%	18%	
	Nil	3%	1%	
Discussing death with a dying patient	Very high	4%	3%	0.02
	High	27%	10%	
	Medium	30%	40%	
	Low	36%	42%	
	Nil	3%	5%	
Breaking bad news	Very high	4%	2%	0.04
	High	29%	18%	
	Medium	42%	54%	
	Low	22%	26%	
	Nil	3%	0	
Recognising a melanoma	Very high	1%	1%	0.1
	High	15%	22%	
	Medium	48%	53%	
	Low	35%	24%	
	Nil	1%	0	
Performing a cervical smear	Very high	1%	1%	0.005
	High	17%	13%	
	Medium	62%	47%	
	Low	19%	38%	
	Nil	1%	1%	

P value by χ^2 test with four degrees of freedom.

(29%). This required at least 400 responses in 2001. We considered that, if the response of 84% obtained in 1990 could be duplicated, we would have to distribute about 500 questionnaires. There are about 1200 interns each year in Australia and New Zealand, so the simplest design involved a one-in-two sample. We stratified hospitals by State or country, ranked them by numbers of interns, divided the list into consecutive pairs, and then selected at random one member of each pair of hospitals.

Questionnaire

Our questionnaire covered areas of knowledge and attitudes identified in the Australian Cancer Society (ACS) Ideal Oncology Curriculum as essential for graduating medical students.[4] There were 90 questions divided into 34 topics. These included knowledge of prevention, screening and early detection of cancer, as well as the care and outcome of patients with cancer. We also asked about the interns' perceptions of their abilities to perform important tasks in clinical practice, such as preparing a patient for a hazardous procedure and discussing death with a dying patient. Interns rated the quality of their teaching about cancer, and reported the time in their medical courses that they thought was devoted to areas of clinical management, such as palliative care and radiotherapy.

We also asked interns about their career aspirations, whether they had a previous degree, and to identify the university where they studied medicine.

A copy of the questionnaire is available from the corresponding author.

Administration of the survey

All interns at each selected institution were asked to complete the survey. A representative of the ACS Oncology Education Committee contacted the intern orientation supervisors to arrange the time and venue for administration of the survey.

Analysis

Relationships between variables were examined via contingency tables and χ^2 tests. Contingency tables (for all response categories) were used to calculate χ^2 values and the appropriate *P* values for all analyses involving categorical variables. We adjusted for the clustering effect of the sampling method using Stata.[5] As confidence intervals are not presented for all relevant point estimates in the earlier report,[2] we were not able to compare our results directly with those from the previous study, which were adjusted for sampling design. We relied on unadjusted comparisons of the differences in proportions, although these might lead to Type 1 errors (ie, detecting significant differences where none exist). Therefore, differences in proportions between the two studies that are only marginally significant should be interpreted with some caution.

Ethics

Instructions on the questionnaire, which was anonymous, indicated its completion was voluntary. The Research Ethics Committee of the South West Sydney Area Health Service approved the protocol for the study.

Consumer perspective

The chair of the Breast Cancer Action Group NSW (S C) was invited to collaborate with the researchers so that the content of the survey and the discussion of the results could be informed from a consumer advocate's perspective.

2: Exposure to cancer patients with specific tumours

Tumour site	"Never examined patient" 1990 (*n*=389)	GMP (*n*=118)	Non-GMP (*n*=283)	*P**
Breast	na	8%	6%	
Lung	na	2%	5%	
Lymphoma	na	21%	20%	
Melanoma	14%	20%	19%	0.03
Mouth	20%	56%	53%	<0.0001
Rectum	17%	31%	32%	<0.0001

na = not asked in 1990. * Comparison of all 2001 interns ($n = 401$) with 1990 interns ($n = 389$), χ^2 with 1 degree of freedom.

3: Attendance at oncology clinics

Clinic	"Never attended" 1990 (*n*=389)	2001 (*n*=401)	*P*
Medical oncology	18%	20%	0.71
Palliative care	50%	18%	< 0.001
Radiation oncology	42%	22%	< 0.001
Surgical oncology	11%	3%	< 0.001

RESULTS

Response

Twenty-nine hospitals were sampled in Australia and New Zealand. There were 443 (62%) responses from the 719 interns who were surveyed. Questionnaires were completed and returned by 17% to 100% of interns at the selected hospitals. Response rate was low in Victoria because of lack of cooperation in administering the survey at some hospitals rather than the respondents' choice not to reply. Fifteen doctors were not trained in Australia or New Zealand and 27 did not nominate their training university; these respondents were excluded, leaving 401 surveys for analysis.

There were 118 respondents from interns trained in GMP courses and 283 from non-graduate intake courses. Interns trained in GMP courses were over-represented relative to the proportion of people graduating from such programs (33% of interns from GMP courses responded, compared with 22% of interns from non-GMP courses; $P = 0.001$).

"New" subjects

Certain subjects have become more prominent in the past decade. These "new" subjects include communication skills, critical appraisal, and multidisciplinary care. Relative to interns from non-GMP courses, GMP interns perceived themselves as having significantly better communications skills, such as competence in advising patients to give up smoking, being able to break bad news, and to discuss death with a dying patient. However, they reported lower competence at preparing patients for hazardous procedures (Box 1).

More GMP than non-GMP interns would refer a patient with breast cancer to a multidisciplinary clinic for management (83% versus 70%; $P = 0.03$). There was no difference between interns in their knowledge of support

4: Knowledge of the age at which a patient is at greatest risk of developing specific cancers

Specific cancer	Age at greatest risk of developing cancer	Proportion of responses GMP (*n*=118)	Non-GMP (*n*=283)	*P*
Breast	30s	3%	1%	0.5
	40s	11%	12%	
	50s	46%	49%	
	60s	40%	37%	
Cervix	30s	30%	16%	0.02
	40s	38%	41%	
	50s	21%	29%	
	60s	11%	14%	
Colorectal	30s	0	0	0.04
	40s	7%	2%	
	50s	33%	32%	
	60s	60%	66%	

P value from χ^2 test with three degrees of freedom. In each case the highest age group is the correct answer.

5: Proportion of respondents who gave the correct answer when asked which of the following cancers had a five-year survival of greater than 50% with appropriate treatment

Specific cancer (correct answer)	Proportion giving the correct answer GMP (*n*=118)	Non-GMP (*n*=283)	*P*
Duke's C carcinoma of the colon (No)	81%	80%	0.7
Operable non-small-cell carcinoma of the lung (No)	44%	61%	0.002
A 2-cm node-negative breast cancer (Yes)	89%	96%	0.01
Hodgkin's disease above and below the diaphragm (Yes)	26%	32%	0.2
Stage I cancer of the prostate (Yes)	98%	98%	0.7
Cancer of the ovary with peritoneal metastases (No)	96%	97%	0.6
Cancer of the testis with pulmonary metastases (Yes)	26%	37%	0.04

P value from χ^2 test with three degrees of freedom. In each case the highest age group is the correct answer.

services such as domiciliary palliative care or consumer groups.

All GMP interns had received training in critical appraisal, as opposed to 80% of non-GMP interns ($P = 0.02$). There was no difference, however, in their knowledge of the existence of evidence-based guidelines or their knowledge about the evidence on screening for cancer.

Clinical skills

GMP interns reported a higher perception of their ability to perform a cervical smear compared with interns from non-GMP courses ($P = 0.005$). There was no difference in their perceptions of their ability to recognise a melanoma (Box 1).

Exposure to cancer patients and primary tumours

There were no significant differences between the GMP and non-GMP intern groups in their reports of exposure to patients with lung, lymphoma, breast, oral, prostate or rectal cancer (Box 2). However, for both groups, exposure to patients with specific cancers had declined when compared with 1990 interns (Box 2).

There were no differences between the GMP and non-GMP groups in the proportion who had never examined a primary tumour in breast (GMP, 18%; non-GMP, 13%), mouth (GMP, 65%; non-GMP, 63%), prostate (GMP, 56%; non-GMP, 60%) or rectal cancer (GMP, 52%; non-GMP 51%) or melanoma (GMP, 28%; non-GMP, 25%).

The time spent in clinical attachments in medical oncology, palliative care, radiation oncology or surgery did not differ in the interns in 2001 between the two types of medical course. Attendance at clinics in palliative care, radiation oncology and surgical oncology was greater in 2001 than in 1990 (Box 3).

Cancer knowledge

Significantly more GMP interns stated (incorrectly) that the age at which a woman was at greatest risk of cervical cancer was in her 30s, and significantly fewer GMP interns stated correctly that the age at which a person was at greatest risk of colorectal cancer was in the 60s (Box 4). There was no significant difference in estimating the age at greatest risk for breast cancer.

When asked which cancers had a five-year survival of more than 50%, fewer GMP students gave the correct answer for breast, lung and testis (Box 5). There was no difference for Hodgkin's disease, ovary, prostate or rectal cancer.

Teaching methods

GMP interns reported more contact with patients in their first year (97% versus 28%; $P < 0.001$), role play (98% versus 74%; $P < 0.001$), clinical skills laboratories (97% versus 73%, $P < 0.001$), problem-based learning (100% versus 79%; $P < 0.005$) and formative assessment (100% versus 89%; $P = 0.01$).

Perceptions of the quality of teaching

GMP students rated their teaching more highly than interns from non-GMP courses for smoking cessation ("good" or "very good", 45% versus 29%; $P = 0.04$), the management of incurable cancer ("good" or "very good", 24% versus

6: Respondents' perceptions of the quality of training in specific subjects

Specific topic	Rating of quality of training	Proportion of responses		*P*
		GMP (*n*=118)	Non-GMP (*n*=283)	
Cancer primary prevention	Very good	4%	4%	0.9
	Good	33%	30%	
	Reasonable	55%	56%	
	Poor	7%	9%	
	Very poor	1%	1%	
Cancer screening	Very good	2%	5%	0.07
	Good	46%	34%	
	Reasonable	44%	53%	
	Poor	8%	8%	
	Very poor	0	0	
Assisting patients to stop smoking	Very good	9%	6%	0.04
	Good	36%	23%	
	Reasonable	41%	46%	
	Poor	14%	24%	
	Very poor	0	1%	
Management of potentially curable cancer	Very good	1%	4%	0.3
	Good	28%	25%	
	Reasonable	47%	54%	
	Poor	23%	17%	
	Very poor	1%	0	
Management of incurable cancer	Very good	0	2%	0.15
	Good	24%	15%	
	Reasonable	46%	45%	
	Poor	29%	34%	
	Very poor	1%	4%	
Management of symptoms in patients who are dying of cancer	Very good	1%	3%	0.07
	Good	25%	16%	
	Reasonable	43%	38%	
	Poor	28%	38%	
	Very poor	3%	5%	

P value from χ^2 test with four degrees of freedom.

17%; $P = 0.15$) and dying patients ("good" or "very good", 26% versus 19%; $P = 0.07$). There were no significant differences in the interns' rating of their teaching about the primary prevention of cancer, screening for cancer or the management of curable cancer according to the course intake requirements (Box 6).

DISCUSSION

Although there may be biases with the self-reporting of perceptions of competence and knowledge, systematic differences between GMP and non-GMP interns, or with the interns of 1990, are unlikely. It is therefore reasonable to make comparisons between the groups.

As expected, interns from GMP courses reported better communication skills, and greater awareness of multidisciplinary cancer management and critical appraisal than their counterparts from non-GMP courses. All are areas of new content that were not universally implemented in our previous survey of curricula.[6]

GMP interns did not report lower competence in clinical skills, but did exhibit less knowledge of areas such as the age of greatest risk of developing cancer and the outcomes of treatment.

Clinical exposure in terms of cancer patients seen and time spent in cancer-related clinical attachments were similar between the interns of 2001, but experience was less than ideal — fewer than half the interns surveyed had ever examined a patient with rectal or prostate cancer. Although the proportion that had attended oncology clinics was greater in 2001 than in 1990, more respondents in 2001 had never examined a patient with melanoma, mouth cancer or rectal cancer.

Others have reviewed the relationship between GMP and traditional teaching and students' knowledge and skills and reported equivalent outcomes.[7-9] Where differences have been reported, they have been attributed to different course content or student selection.[7] Student satisfaction may be higher in GMP courses.[10] In Australia, it appears that GMP curricula have successfully introduced new course material and new methods of teaching, but have not always succeeded in producing doctors with better knowledge about cancer. The interns' perceptions of their skills in performing common clinical tasks have improved, but their exposure to patients with common cancer types remains poor.

From the public's perspective, two disturbing results are the ratings given to quality of instruction, and how little exposure interns in 2001 had had to patients with cancer compared with their colleagues 10 years previously. Consumers, who pay for the training of doctors as well as being obliged to use their services, will hope that these findings prompt more thorough teaching of oncology, such as that outlined in the ACS Ideal Oncology Curriculum.[4]

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COMPETING INTERESTS

None identified.

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