

Undergraduate Education About Cancer. A Survey of Clinical Oncologists and Clinicians Responsible for Cancer Teaching in Australian Medical Schools

Martin H.N. Tattersall, Alan O. Langlands, Wayne Smith and Les Irwig

Undergraduate cancer education in Australian medical schools is not integrated and there is little evidence of change in content or structure in recent years in spite of major changes in knowledge about cancer epidemiology and cancer biology, and in cancer management. A recent survey of graduating students/interns from all Australian medical schools revealed a disturbing variability in experience and lack of important knowledge. There was evidence of substantial differences in knowledge of, and rating of teaching between the different disciplines involved in cancer control and cancer management. To examine possible reasons for this, we surveyed cancer clinicians and teachers of oncology in the undergraduate curriculum at Australian medical schools. We asked them the same questions of knowledge as the students, and also to comment on the type and emphasis of teaching desirable in the medical students' cancer curriculum. The results indicate not only that the survey instrument was seen to be relevant, but also that some of the bias and misinformation detected in the student experiences may be attributed to attitude, knowledge and differences of opinion of the teachers. The results highlight the need for an integrated cancer curriculum to inform graduates about an illness which will be diagnosed in more than a quarter of the Australian population.

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INTRODUCTION

WE RECENTLY reported the results of a survey of an Australia-wide stratified random cluster sample of new Australian medical graduates [1]. The goals of this survey were to determine in new medical graduates their levels of knowledge about cancer, their level of exposure to clinical instruction and their rating of instruction in different aspects of cancer in order to assess a perceived need for curriculum changes. The survey instrument was developed from a previously reported questionnaire using Undergraduate Curriculum Guidelines [2, 3], designed by the Australian Cancer Society with input from cancer clinicians and others involved in undergraduate and family medical practice, education and training.

The results of this survey revealed disturbing variation in experience and a lack of important knowledge about cancer among graduating students. There were substantial differences in knowledge, experience in and rating of teaching between the medical, surgical, radiotherapeutic and palliative components of cancer care. More than twice as many graduates rated their instruction in the palliative management of cancer as poor or very poor compared with those rating their instruction as poor or very poor in cancer prevention or cancer treatment for cure. The respondents displayed a considerable lack of knowledge about radiotherapy treatment options. Knowledge of cancer prevention, and screening was variable and 40% and 34%, respectively, believed screening tests existed which had been demonstrated in valid studies to reduce mortality from cancer of

the colon or from melanoma. Knowledge of the goals of cancer treatment was disturbing in that more than a quarter would not treat metastatic testicular cancer patients with curative intent, but a sixth would treat patients with metastatic small cell lung cancer with the goal of cure. Knowledge of cancer epidemiology was patchy, and 30% of respondents thought a woman's greatest risk of developing breast cancer was in her 30s–40s. The reasons for these differences are undoubtedly complex but must include the teaching of students and the construction of the curriculum.

To examine this further we have surveyed Australian oncologists and 'teachers' in the undergraduate cancer curriculum at all Australian Medical Schools. We asked them the same questions of knowledge as the recent graduates, and also sought their views about the type and duration of teaching desirable in undergraduate cancer education of medical students.

MATERIALS AND METHODS

The survey instrument

The instrument used in this survey was identical in structure to that used to survey graduating medical students*. The questionnaire measured knowledge, perception of skills, exposure to teaching, and rating of instruction in oncology. The introduction to each segment differed from the original instrument [1], for example, the student-graduates were asked how competent they felt they were in various skills while the teachers were asked how important they thought it was that graduating students were competent in the same skills. Questions of knowledge were identical to those asked of the new graduates and investigated aspects of knowledge of cancer screening, cancer epidemiology, goals of cancer treatment and whether or not cancer treatment options existed in certain

Correspondence to M.H.N. Tattersall.

The authors are at the Department of Cancer Medicine, Blackburn Building, DO6, University of Sydney, NSW 2006, Australia.

*Available from the authors.

clinical instances. The last segment concerned the importance of various teaching components during undergraduate training.

Those surveyed

A total of 179 medical, radiation, surgical and gynaecological oncologists selected from the membership of the Clinical Oncological Society of Australia were sent the survey instrument. This group included all radiation oncologist members and a random selection of 50 each of the other specialists. Seventy per cent responded, Table 1 lists the disciplines of the survey respondents, 86% of whom stated they were involved in undergraduate cancer teaching. The vast majority of respondents were clinicians and therefore there was very little input from basic scientists who may be involved in preclinical teaching.

Statistical analysis

The returned questionnaires were coded and entered into a dBase IV database with automatic range checks, cleaned and imported into the SAS statistical package for further cleaning and analysis. χ^2 tests were used to test the statistical significance of selected findings.

RESULTS

Skills

The majority of respondents felt that three of the four skills enquired about in the survey were very important (63–67%). These skills were competence in teaching women breast self examination, in doing a cervical smear and in recognising a malignant melanoma. Six respondents felt that it was not at all important that graduating students should be competent in teaching women breast self examination, and five felt the same way about competence in doing a Pap smear. The results were almost identical if only teachers of oncology were surveyed. The fourth skill namely the ability to discuss death with a dying patient was gauged as important by 48% of respondents.

Knowledge, epidemiology, prevention, screening and detection

Pap smears—cervical cancer. Sixty-six per cent of the total group of respondents and 43% of the teachers believed that the recommended frequency of Pap smear was annual. Twenty-eight per cent of both groups believed it was every 2 years. Half the respondents thought that Pap smear screening should never cease, but 30% felt it should cease between the ages of 65 and 70 years. A woman's age at greatest risk of developing cervical cancer was thought to be in her 40s by 44% of respondents. The respondents discipline influenced the answer to this question with a woman's greatest risk of developing cervical cancer being judged by teacher gynaecologists and surgeons to be in her 50s and 60s (31/44 = 70%), compared to radiotherapists and physicians (18/60 = 30%), more of whom favour the younger decades ($\chi^2_{(1)} = 11.1, P < .005$).

Table 1. Discipline of respondents to faculty survey

	No.	%
Surgery	26	21
Radiation oncology	33	26
Internal medicine/oncology	37	29
Gynaecology	25	20
Other	5	4
Total	126	

Breast cancer. A woman's greatest risk of developing breast cancer was thought to be in her 60s by 49% of teachers and 40% thought it was a woman in her 50s. Specialists varied somewhat in their views with 23 out of 31 (74%) physicians favouring the oldest age range option compared with 33 out of 84 (39%) surgeons, radiotherapists and gynaecologists ($\chi^2_{(1)} = 9.9, P < .002$).

Screening tests and epidemiology. A screening test which had been demonstrated in valid studies to reduce mortality was thought to exist for colon cancer and melanoma by 35% and 30%, respectively, of respondents (31% and 36% of teachers). Thirteen per cent of respondents thought no valid screening test existed which reduced mortality for breast cancer in valid studies. Seventy-nine per cent of respondents estimated within 10% the correct percentage of Australian deaths due to cancer. Only 62% understood the relationship between prevalence and incidence.

Cancer management and prognosis

Metastatic testis cancer and choriocarcinoma were judged treatable with curative intent by 90% and 95% of respondents, respectively. However, four of the 26 surgeons did not believe these metastatic tumours were treatable with curative intent. In the presence of blood borne metastases, 26% of the teachers would treat small cell lung cancer patients with curative intent (4/26 surgeons, 10/33 radiotherapists, 13/37 physicians and 9/25 gynaecologists). Forty-nine per cent of teachers would treat metastatic osteogenic sarcoma patients with curative intent, (11/26 surgeons, 16/33 radiotherapists, 21/37 physicians and 7/25 gynaecologists). Again 23% of teachers thought operable non-small cell lung cancer patients had a greater than 50% 5-year survival with appropriate treatment, and 48% thought osteogenic sarcoma patients had a greater than 50% 5-year survival (similar results for total respondents).

Only five teachers (5%) thought that radiotherapy was a good alternative to surgery in the management of resectable melanoma but the majority thought that this was an option for anal cancer and cervical cancer (74% and 69%, respectively). The discipline of the respondents influenced the answer to this group of questions with surgeons in general believing radiotherapy was less commonly a viable treatment alternative compared to radiotherapists (Table 2). This Table shows a significant divergence between what the teachers felt was the case and what the students understood with regard to carcinomas of anus and cervix and to a lesser extent, carcinoma of the mouth.

Teaching. The great majority of teachers felt that graduates should have examined a patient with a cancer of the breast (99%), rectum (95%), lung (92%), melanoma (98%), lymphoma (94%) and oral cancer (86%). Similarly, the teachers agreed or strongly agreed that graduating medical students should be instructed in cancer prevention, curative treatment and palliative management of late stage disease (Table 3). Differences in relative importance of the three areas according to discipline are apparent (Table 4), with surgeons and gynaecologists being less strongly in favour of instruction in palliative treatments than physicians and radiotherapists ($\chi^2_{(1)} = 8, P < .005$). Interestingly, the trend is in the opposite direction in regard to instruction in cancer prevention ($\chi^2_{(1)} = 11.95, P < .0001$).

Clinic attendance. Over 97% of teachers considered that graduating medical students should have spent some time in

Table 2. Effect of discipline on perception of teachers of whether radiotherapy is an equally good alternative treatment to surgery in the management of cancers at a resectable stage

Teachers discipline	No	Primary cancer site (%)				
		Anus	Lung	Cervix	Melanoma	Mouth
Radiotherapy	29	90	35	86	3	86
Surgery	21	71	24	38	5	81
Medicine	31	77	29	65	0	71
Gynaecology	23	57	39	87	0	74
*Educators	104	74	32	69	2	78
Undergraduates		35.2	33.4	38.4	6.9	63.4
		$\chi^2_{(1)} = 51.9$ $P < .0001$	$\chi^2_{(1)} = .04$ NS $P = .84$	$\chi^2_{(1)} = 33.1$ $P < .0001$	$\chi^2_{(1)} = 3.98$ $P = .05$	$\chi^2_{(1)} = 3.75$ $P < .005$

* 20 respondents to the survey instrument stated they were not involved in medical undergraduate teaching. Two radiotherapy teachers did not respond to this question.

Table 3. Percentage of teachers who agree or strongly agree that cancer instruction is important

Area	Strongly agree	Agree	Total
Cancer prevention	68	30	98
Cancer treatment for cure	59	34	93
Cancer palliation	51	44	95

Table 4. Per cent of teachers who strongly agree that cancer instruction in defined cancer control area is important

Teachers discipline (no)	Attitudes		
	Cancer prevention	Curative treatment	Cancer palliation
Surgeons (21)	81	53	43
Radiotherapists (31)	55	61	58
Physicians (31)	48	52	61
Gynaecologists (23)	87	61	22

medical, surgical, radiotherapy and palliative care clinics for cancer patients. There was a trend for oncologists to favour students spending more time in surgical clinics than others. Table 5 shows that the time commitment to palliative care clinics was thought to be somewhat less important than other areas. When analysed by individual specialty, the majority of radiotherapists (18/30) favoured more than 20 h attendance at surgical and radiotherapy clinics, while most surgeons favoured less than 20 h at radiotherapy clinics but more than this at surgical clinics.

Curriculum balance. Respondents were asked to rank a list of six specified diseases according to the proportion of time in the undergraduate curriculum that should be devoted to them. Table 6 shows the results and indicates that overall, asthma was judged to justify the first rank with breast cancer and rheumatoid arthritis coming second and third. Leukaemia, AIDS and thyrotoxicosis were ranked lowest. Analysis of ranking according to specialty of teacher indicated that all disciplines ranked asthma

Table 5. Teachers (108) opinion about time commitments for visits/attachments to surgical, radiotherapeutic, medical or palliative care services for cancer patients

Time (h)	Teachers recommending time directed to specialty			
	Surgery	Radiotherapy	Medical	Palliative
0	3	2	2	3
1-4	5	16	13	19
5-20	51	60	66	66
> 21	43	26	23	19
Other	6	4	4	1
Total				

80% of educators favour more than 5 h spent visiting radiation oncology clinics, yet student experience was that 42% never attended radiation oncology. Similarly, 73% of educators favoured 5 or more hours spent in visits to palliative care clinics though 50% of students never actually made such a visit. In contrast most North American medical schools teach students about death and dying and some offer optional courses in terminal care [8].

Table 6. Ranking by cancer teachers of the proportion of time during undergraduate training that should be devoted to specified diagnoses

1. Asthma
2. Breast cancer
3. Rheumatoid arthritis
4. AIDS
5. Leukaemia, thyrotoxicosis

as first, but surgeons and radiotherapists ranked breast cancer as second, while physicians and gynaecologists ranked rheumatoid arthritis second. Leukaemia and thyrotoxicosis were ranked fifth and sixth by all groups.

DISCUSSION

The results of this survey of clinical oncologists and clinicians involved in undergraduate cancer teaching should be viewed alongside the results of the interns-undergraduates survey [1]. Some of the responses from the latter group are at variance with what the teachers think, i.e. relative importance of palliation versus treatment for cure. However, while teachers clearly identify cancer screening and prevention as important in undergraduate training, some deficiencies in students knowledge in these areas may be due to differences of opinion about what is correct, i.e. age at greatest risk of cervical cancer, frequency of Pap smears, etc.

It seems that educators were not well informed about cancer epidemiology and had differing views about treatment goals and options. Beliefs about the age group at greatest risk of developing cervical cancer and breast cancer varied widely between specialists. An Australian woman's greatest risk of developing cervical cancer is in the oldest age range offered, and not in her 30s and 40s as was thought by 44% of respondents. It seems likely that preinvasive neoplasia was regarded as cancer by some of the teachers. The greatest risk of developing breast cancer is in the oldest age range, but again this was not thought to be the case by the majority of surgeons. These results indicate a lack of familiarity with epidemiological data even by specialists treating the actual disease on a regular basis. A similar conclusion can be drawn from the mistaken view expressed by 30–35% of teachers that screening tests exist which have been demonstrated in valid studies to reduce mortality from colon cancer or melanoma.

There was also evidence of differences in opinion about cancer management goals and treatment options. It is surprising that 25% of teachers would treat small cell lung cancer patients with 'curative intent—in the presence of blood-borne metastases'. Less than 10% of patients with localised disease survive 2 years from presentation even when treated with curative intent [5]. The proportion of long term survivors among osteogenic sarcoma patients with blood-borne metastases is about 10% [6], yet 46% of teachers would treat these patients with curative intent. These results highlight the need for teachers to agree on definitions of treatment goals, worthwhile outcomes, and the conceptions underlying treatment utility.

The divergence of opinion among teachers in regard to local treatment options in patients with cancers of different primary sites illustrates the difficulties of presenting unbiased views when teaching medical students, and makes a strong case for conjoint post-graduate education of oncologists whether they be drawn from the medical, surgical or radiotherapeutic streams. Similar problems have been encountered in Scandinavia [4], and elsewhere in Europe [7]. In a survey of 61 European universities,

95% favoured a common European curriculum in oncology [7]. Thus in Europe at least, there is evidence of a will to change the curriculum to take account of the impact of cancer in morbidity and mortality in the next decades.

It is perhaps surprising that the apparent variability in experience in the undergraduate curriculum as reflected in the intern responses is at variance with some of the views of those claiming involvement \pm responsibility for undergraduate cancer teaching. We feel that this observation is due to the curriculum in many Australian medical schools not reflecting the views of cancer teachers but more the entrenched attitudes of individual departments guarding their teaching time and turf. The opposition to oncology being taught by oncologists is a unique phenomenon in undergraduate education, with no parallel in any other specialty. It is difficult to conceive of a rationale for this opposition which reflects any credit on medical educators.

The teachers views about disease rankings in terms of curriculum time are surprisingly concordant across the disciplines, but it is our observation that the curriculum time rankings differ from those favoured by the cancer teachers.

The results of our survey of undergraduate education in Australian Medical Schools, and of the attitudes of teachers of oncology highlight the need for an integrated cancer curriculum. They also emphasise the advantages of identifying or developing an up to date reference source for undergraduate cancer teaching in Australian Medical Schools.

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