

# **Staying The Course: Reducing Attrition In Diagnostic And Therapeutic Radiography Degree Courses**



Photograph: Brighton and Sussex University Hospitals Bulletin.

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## EXECUTIVE SUMMARY

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This report is supported by the toolkit 'A Student Recruitment and Retention Guide for Diagnostic and Therapeutic Radiography'.

South West London Strategic Health Authority, on behalf of the NHS, commissioned this study into how best to reduce attrition rates in diagnostic and therapeutic degree courses in England. The main points were as follows:

### Findings

1. The demographic profile of diagnostic radiography students who started their course in 2000 was: 76 per cent female; 85 per cent white Europeans; 20 per cent aged 30 and over.
2. The demographic profile of therapeutic radiography students who started their course in 2000 was: 83 per cent female; 74 per cent white Europeans; 14 per cent Asian; 18 per cent aged 30 and over. Thus, therapeutic radiography students comprise a significantly higher percentage of females and Asians than diagnostic radiography.
3. Diagnostic radiography education attrition has increased significantly from 19 per cent and under between 1997 and 2000 to 30 per cent for 2003. This is double the 1999 rate and a source of considerable concern. The increase in attrition coincides with a considerable increase in commissions.
4. Therapeutic radiography education after a period of stability when a high attrition rate varied between 27 to 29 per cent between 1997 and 2001, attrition rose to 32 per cent in 2002 and then on to a worryingly high 38 per cent.
5. Therapeutic radiography attrition rate has been 6 to 8 percentage points higher than that of diagnostic radiography, between at least 1997 and 2003.
6. There is no one cause to attrition, which is why there are many initiatives that have targeted a large variety of problems.
7. Attrition rates within HEIs fluctuate from year to year, with no one continuously having a much worse problem than its counterparts.
8. Attrition was higher for males than females, in all age-bands in both branches of the profession.
9. Attrition increased with age, this was also the case for both diagnostic and therapeutic radiography. The only exception was for diagnostic radiography students in the 30 and older age group that had a slightly lower attrition rate than the 20 – 29 age group.
10. The proportion of students with a high attrition propensity, i.e. those over 21 and males, has increased.
11. Attrition in therapeutic radiography tends to be very much heavier during the first year, while in diagnostic radiography it was similar during the first two years and then falling during the third.
12. Students gave a high score to their career being consistent with their expectations, 5.8 for diagnostic radiography and 5.9 for therapeutic radiography (the maximum score was 7).

13. The lowest score was given to their tutor's support being consistent to their expectations, 5.1, by diagnostic radiography students. On the other hand, therapeutic radiography students gave their tutors a 5.5 rating.
14. Course satisfaction was rated higher by students in diagnostic radiography (5.5) than in therapeutic radiography (5.2).
15. Therapeutic radiography students were more likely to consider dropping out than those in diagnostic radiography (the respective rates were 43 and 30 per cent).
16. Diagnostic radiography students considered it was highly likely that they would work in the NHS; their score was significantly higher than those in therapeutic radiography (the respective scores being 6.6 and 5.8)
17. There was a mismatch between course content and job requirements, according to some respondents. Therapeutic radiography students were the more critical of the two disciplines.
18. Some students struggled with physics and did not expect it to be such an important part of the course.
19. A minority of students, including those who actually dropped out, complained about being bullied. This is also a wider problem within the NHS, with 10 per cent of staff stating that they had been bullied during the previous year.
20. Some students found it difficult to make the transition from formally taught classes to self-taught, problem based learning.

## **Recommendations**

1. In order to assess the value for money of educational investment, a longitudinal study should be carried out. This would follow cohorts of diagnostic and therapeutic radiography students from their first year at university until at least three years after they have graduated.
2. More support is required to ease the transition from a formally taught programme to self-taught, problem based learning for some students.
3. Given the likely relationship between increases in commissions and higher student attrition, commissioners need to decide what is their best trade off between intake and attrition levels
4. The role of the (newly qualified) radiotherapy radiographer should be clear to students prior to commencing training
5. Some universities need to identify students who are likely to struggle with physics at the very start of the course and to provide them with appropriate, intensive, remedial support.
6. A working group should look into the factors that underpin negative behaviour towards students such as bullying and recommend possible solutions.
7. An accreditation system should be developed that includes factors such as staff morale so that it favours departments that are good places to work

## 1 INTRODUCTION

- 1.1 South West London Strategic Health Authority, as the national lead Authority for radiography commissioned Conrane Consulting to report on attrition rates in diagnostic and therapeutic radiography degree courses in England.
- 1.2 The main objectives were to:
- Identify the reasons for high and low attrition rates in particularly common reasons for attrition ( 7.11 gives the answers)
  - Identify any consistently poorly performing universities
  - To establish if attrition rates were higher / lower than other courses- particularly health related
  - Engage key stakeholders in producing recommendations in how attrition rates could be reduced
  - To produce this report, based on:
    - Analysis of intakes and attrition rates by education provider
    - A literature research
    - Questionnaires completed by current students
    - Questionnaires completed by students who have dropped out
  - To produce *A Student Recruitment and Retention Guide for Diagnostic and Therapeutic Radiography*, based on interviews of staff in education commissioning, HE providers and trusts.
    - The draft *Guide* recommendations were presented to a national workshop,<sup>1</sup> and further recommendations were elicited. They were then prioritised by the delegates.
- 1.4 The next section of this report covers the methodology used to undertake the student survey. Then national data on intakes and attrition, by gender, age and education provider are reviewed separately for diagnostic and therapeutic radiography. This is followed by a section on survey results. Finally, a discussion is held on the key themes running through the report.

## 2 METHODOLOGY

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- 2.1 The universities that were invited to participate in the survey were selected to provide a balance between those located in major conurbations and those in smaller county towns. The authors would like to thank the following for their assistance, without which this study would not have been possible:
- Hertfordshire University
  - Kingston University
  - Liverpool University
  - St Martin's College, Lancaster
  - Sheffield Hallam University
  - University of Central England, Birmingham
- 2.2 Two separate questionnaires were used in order to establish why diagnostic and therapeutic radiography students dropped out. One was of ex-students who had actually dropped out and the other was of current students and enquired whether they had considered doing so. The questionnaires are to be found in Appendix 4.
- 2.3 HE providers sent questionnaires to the last known address of students who had dropped out. It was anticipated that the response rate would be too low to provide robust data. This proved to be the case, with an 11 per cent response rate, yielding 16 responses. The probable reasons for the poor response rate were that some questionnaires would not have reached ex-students, due to changes of address and those that did receive them, may not want to be reminded of what must have been a negative experience for them.
- 2.4 On the other hand, current students returned 234 questionnaires, with over a hundred from each discipline. This was sufficiently large to test a wide range of hypotheses.

### The Response Rate

**Table 1 – Returned questionnaires, by current and ex-students**

	<b>Current</b>	<b>Ex</b>
Diagnostic Rad.	124	6
Therapeutic Rad.	110	10
<b>Total</b>	<b>234</b>	<b>16</b>
Response rate	37%	11%

- 2.5 In order to encourage a good response rate, a £250 prize draw<sup>1</sup> was offered. There was a 37 per cent response rate for current students. However, this masked a large variation of responses from 7 to 100 per cent. The two universities with response rates of over 95 per cent distributed questionnaires during lectures. To ensure anonymity, students returned the completed

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<sup>1</sup> This was won by Becky Tarbuck, a diagnostic radiography student from Liverpool University.

questionnaires in sealed envelopes to their lecturer. The poor response rate was due in the main to sending questionnaires to students' homes during the summer holidays, which fell in the middle of the survey period.

### **The Sample**

2.6 In order to assess the representativeness of the sample to the total population of students, comparisons were made between the survey sample of university students in 2005 and the data for England of all students who started their degree in 2000. Slight differences between the two should be expected, as the sample is of a later intake.

**Table 2 – Gender of respondents**

	Diagnostic Rad.		Therapeutic Rad.	
	National	Survey	National	Survey
Female	76%	75%	83%	74%
Male	24%	25%	17%	26%

2.7 The gender of Diagnostic Radiography students in the survey and the national figures were virtually identical. On the other hand, there was a higher percentage of male therapeutic radiographers in the survey than in the national figures. However, the difference is not great.

**Table 3 – Age of respondents**

	Diagnostic Rad.		Therapeutic Rad.	
	National	Survey	National	Survey
Under 30	80%	72%	82%	71%
Over 30	20%	28%	18%	29%

2.8 The survey samples had a higher percentage of mature students, aged 30 or more in both disciplines.

**Table 4 – Ethnicity of respondents**

	Diagnostic Rad.		Therapeutic Rad.	
	Survey	National	National	Survey
White	91%	85%	74%	92%
Asia	6%	7%	14%	5%
Black	2%	4%	6%	1%
Other	2%	4%	6%	3%

2.9 The survey sample had a lower percentage of ethnic minorities than the national figures and this was more significant in the case of therapeutic radiography students.

2.10 In addition, HE provider, NHS trust and Strategic Health Authority staff were interviewed. While some of their contributions are reflected in this report, their detailed suggestions are to be found in A Student Recruitment and Retention Guide for Diagnostic and Therapeutic Radiography.

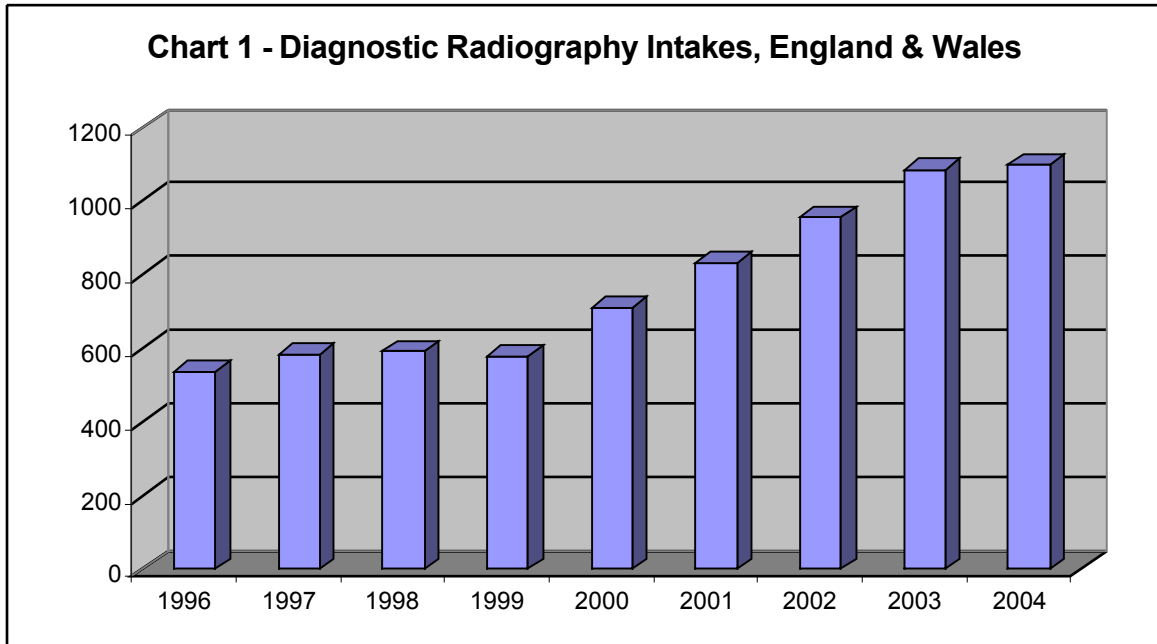
### **Representativeness of sample**

2.11 Taking the above comparisons into account, the survey sample is consistent with the national student population data.

### 3 DIAGNOSTIC RADIOGRAPHY– INTAKES AND ATTRITION

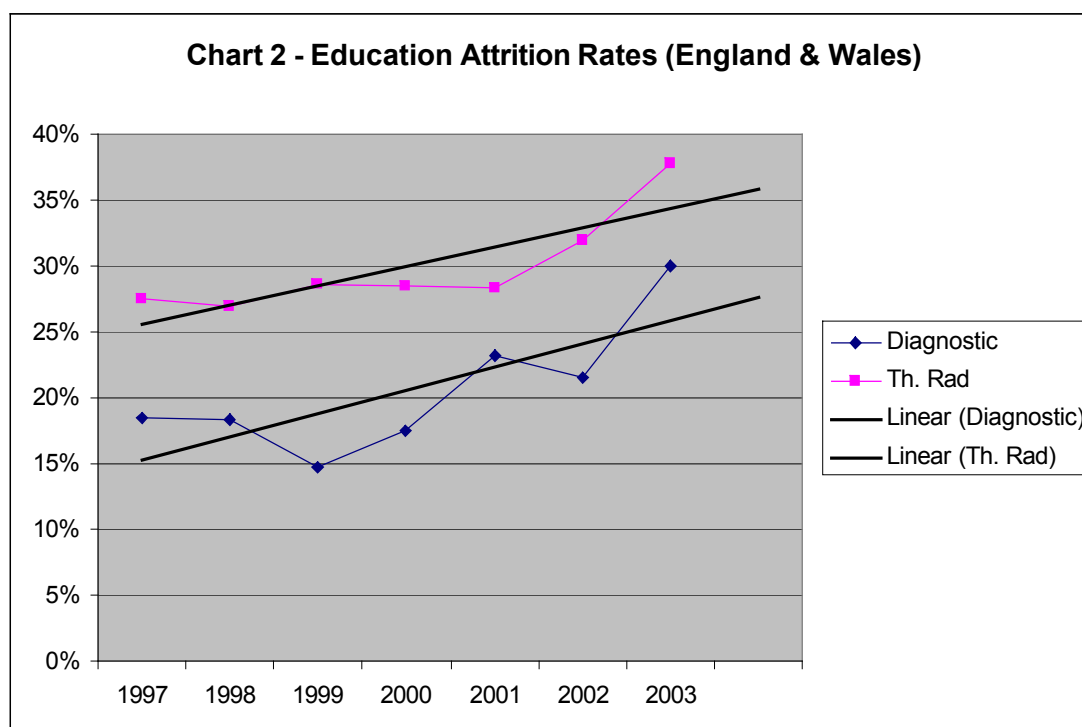
- 3.1 There were 12,147 Diagnostic Radiographers in 2004<sup>2</sup>, with a whole time equivalent of 10,015. The number of whole time equivalents has grown by 12 per cent between 1997 and 2004. Vacancies of over three month's duration had fallen from 4.8 per cent to 3.4 per cent between 2004 and 2005<sup>3</sup>.

#### Student intakes



- 3.2 Intakes have increased very substantially by 105 per cent (563) to 1,099, between 1996 and 2004<sup>4</sup>. After a period of static commissions between 1996 and 1999, commissions grew sharply till 2003 when they levelled off. Increases of this scale must have created considerable pressure on NHS clinical placements. Intakes represent 11 per cent of staff-in-post and, assuming a 23 per cent attrition rate, graduates equate to 8 per cent of staff-in-post.
- 3.3 Data from the Society and College of Radiographers' professional register was analysed for students who began their courses at an English university in 2000 (paragraphs 3.3 to 3.7 refer).
- 3.4 There were a total of 612 students in the cohort, of whom 76 per cent were female and 24 per cent were male. The ethnic origins of 18 per cent were unknown and of the remainder, 83 per cent were white Europeans. There was no clear pattern regarding the non-Europeans, with the largest category being Asian at only 3.8 per cent of the total. One in five were aged 30 and over.

## Attrition

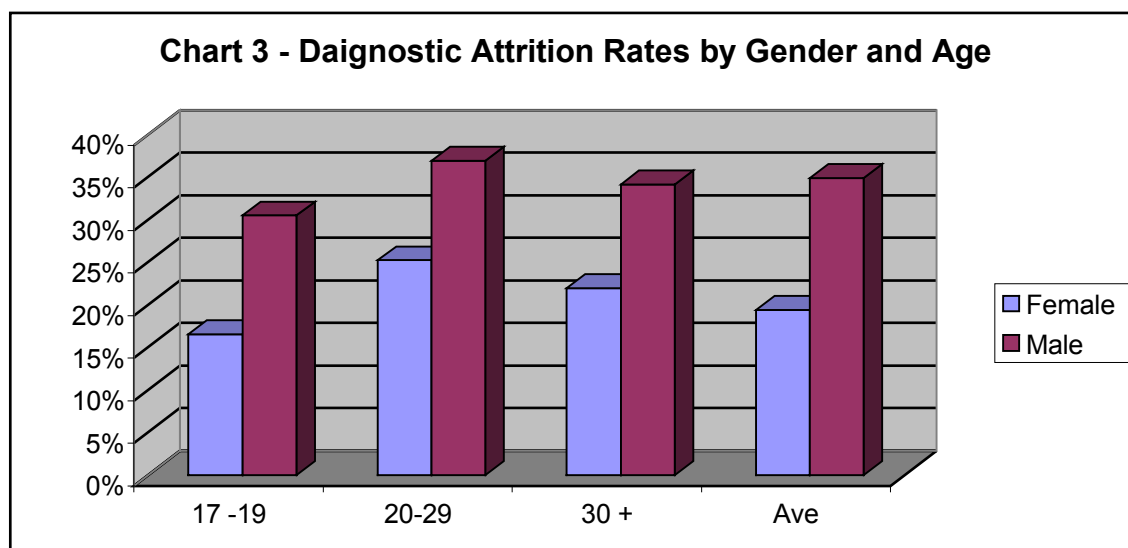


**Table 5 – Diagnostic Radiography Attrition (England and Wales)<sup>5</sup>**

Intake	Attrition
1997	19%
1998	18%
1999	15%
2000	18%
2001	23%
2002	22%
2003	30%
<b>Ave</b>	<b>21%</b>

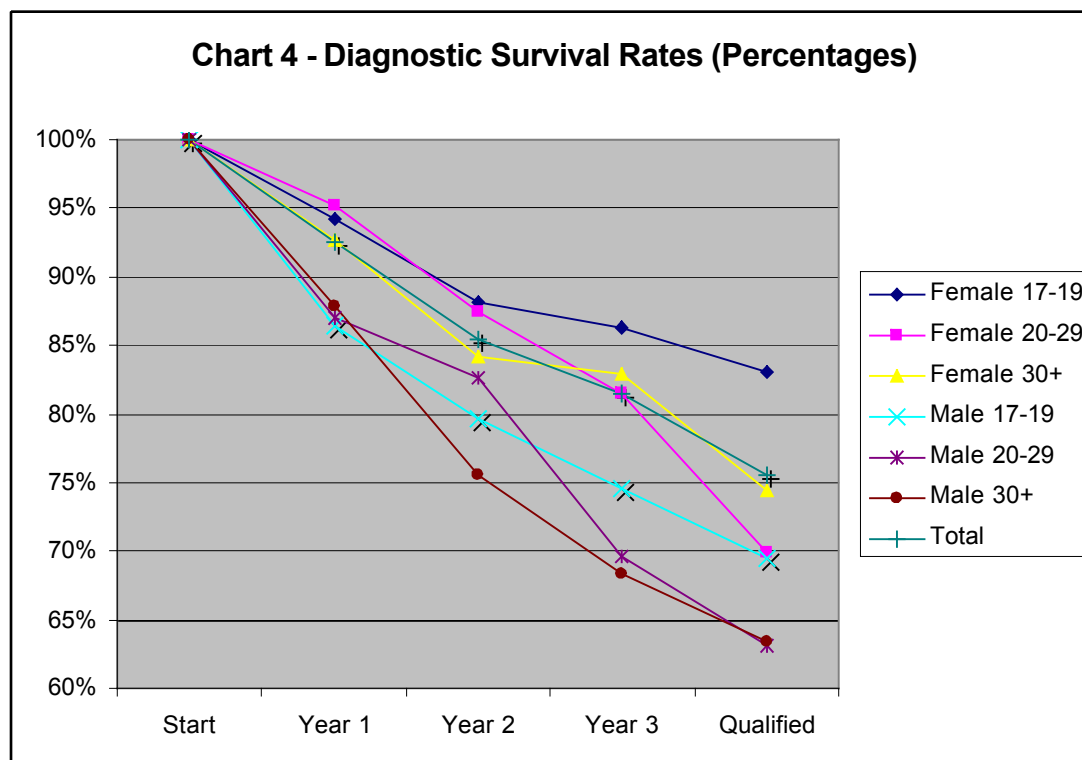
3.5 Attrition rates ranged between 15 and 19 per cent between 1997 and 2000. However, they climbed steeply to 30 per cent in 2003, which is double the lowest rate (15 per cent in 1999). This increase coincides quite closely with the increase in intakes. Indeed, the Joint Validation Report to Centres of Radiography Education commented,

“Centres will need to review their recruitment strategies especially and wonder whether their efforts are paying dividends where wastage is higher than the national average.”<sup>6</sup>



- 3.6 There was a student attrition rate of 23 per cent (141). Male attrition rates were significantly higher than female ones, being 35 and 19 per cent respectively. This pattern was reflected in all age-bands. The largest percentage of leavers during the student years were males aged 20 to 29 and the lowest was to be found amongst females aged 17 to 19. Given that a growing proportion of both students over 21 and males are recruited, this is likely to contribute to an increase in overall attrition rate, all other things being equal.
- 3.7 There is clearly an issue regarding males surviving their student years. However, another very important issue is the duration of careers in the NHS, or elsewhere in the profession, for each gender and age cohort. Unfortunately, this information is not collected and a crucial factor in calculating the value for money of educational investment is missing. It would be in the NHS' interest to accept a higher rate of attrition from certain groups, if they had sufficiently long NHS careers. This information could be obtained from a longitudinal study of students, which is the approach adopted for medical staff.

**Recommendation 1:** *In order to assess the value for money of educational investment, a longitudinal study should be carried out. This would follow cohorts of diagnostic and therapeutic radiography students from their first year at university, until at least three years after they have graduated.*

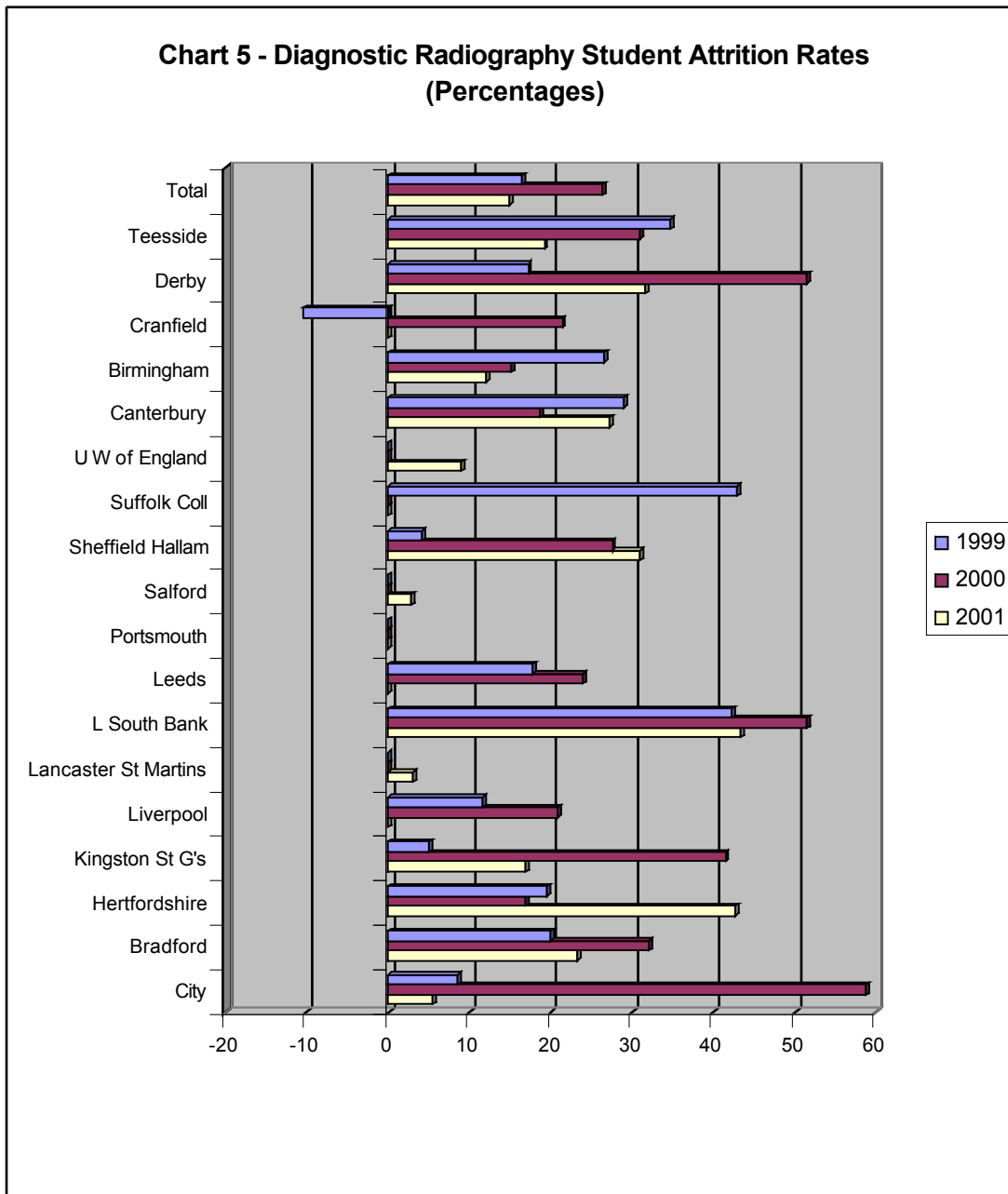


3.8 Diagnostic Survival Rates by year show that on average that wastage is almost equally heavy in years 1 and 2, while easing off during year 3.

#### Intakes and attrition by education provider

3.9 The following information on student intakes and attrition rates was provided by South West London Strategic Health Authority. This was due to data protection issues, which meant other sources e.g. JVC documentation could not be used. Institutes were asked by SWLHA in Oct – Dec 2004 to verify the data and to allow the data to be used in an attributable format.

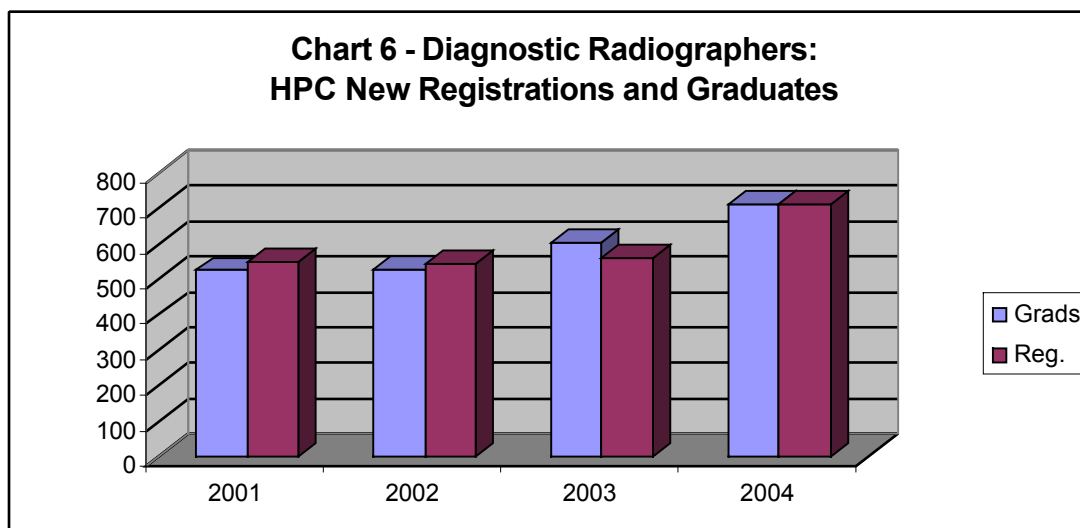
3.10 Student attrition rates fluctuated over the last three years for which data for complete intakes is available. It increased from 17 per cent to 36 per cent and then went back to 15 per cent.



3.11 The above data shows considerable fluctuations from year to year regarding attrition rates by educational provider. However, the data for some years has not been supplied, which shows up as the very unlikely attrition rate of zero.

### Graduates joining the professional register

3.12 In order to assess how many graduates go on to work in the profession, comparisons were made between the number of students graduating in a particular year and the number radiographers joining the professional register who were UK residents. However, strictly speaking this is outside the remit of this report on educational attrition.



**Table 6 – Diagnostic Radiographers: HPC New Registrants and Graduates**

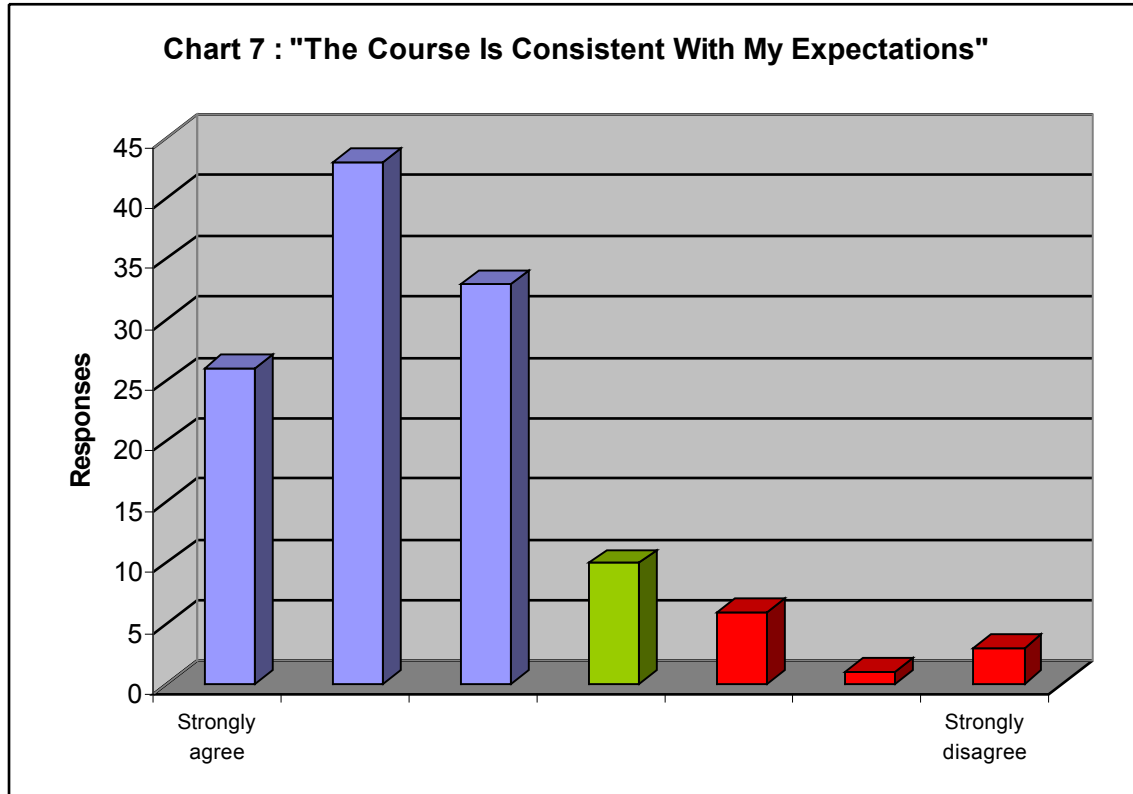
	<b>Reg.</b>	<b>Grads.</b>	<b>Per cent</b>
2001	550	525	105%
2002	544	529	103%
2003	560	604	93%
2004	712	711	100%
<b>Total</b>	<b>2366</b>	<b>2369</b>	<b>100%</b>

3.13 The above chart and table show that there is a very close relationship between UK registrations on the Health Professions Register and the number of radiographers graduating in a particular year. Taken over four years, the totals of graduates and registrations are virtually identical. This is very positive from an NHS viewpoint, as it suggests that almost all graduates join the professional register with an intention of working in the profession.

## 4 DIAGNOSTIC RADIOGRAPHY STUDENT SURVEY RESULTS

4.1 This section is based on the questionnaires completed by 124 current diagnostic radiography students.

### Attitudes to course



4.2 Most students had a favourable attitude to the course, with the second strongest endorsement being the most frequent response (35 per cent or 43 students) and a further 21 per cent who were strongly in favour. Only eight per cent of students held negative views. The average student score was 5.5 out of a maximum of 7. All respondents were invited to state which aspects of the course were not to their liking and 8 per cent of them found it to be difficult and 6 per cent too theoretical. Examples of negative statements include:

*"There was a lot more physics involved than I expected."*

*"I find the structure very messy and sometimes I find it difficult to see the relevance of some subjects/lectures."*

### Problems with learning styles

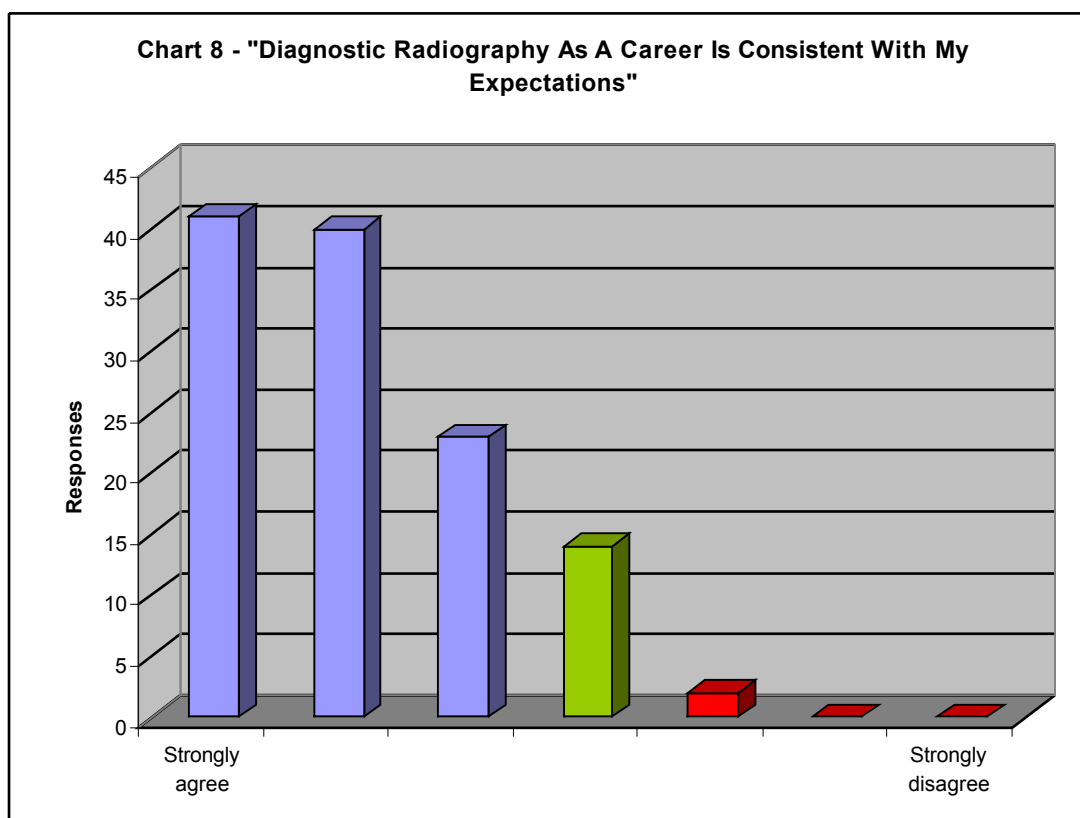
4.3 Some students expected more formal teaching and strongly disliked self-directed, problem based learning. The issue may be that some students need more preparation before they move from one type of learning style to another. The following comments were presented as criticisms:

*"I thought we would be taught more rather than teaching ourselves in Problem Based Learning."*

*"Because there are less lectures due to Problem Based Learning."*

**Recommendation 2:** *More support is required to ease the transition from a formally taught programme to self-taught, problem based learning.*

### Attitudes to career

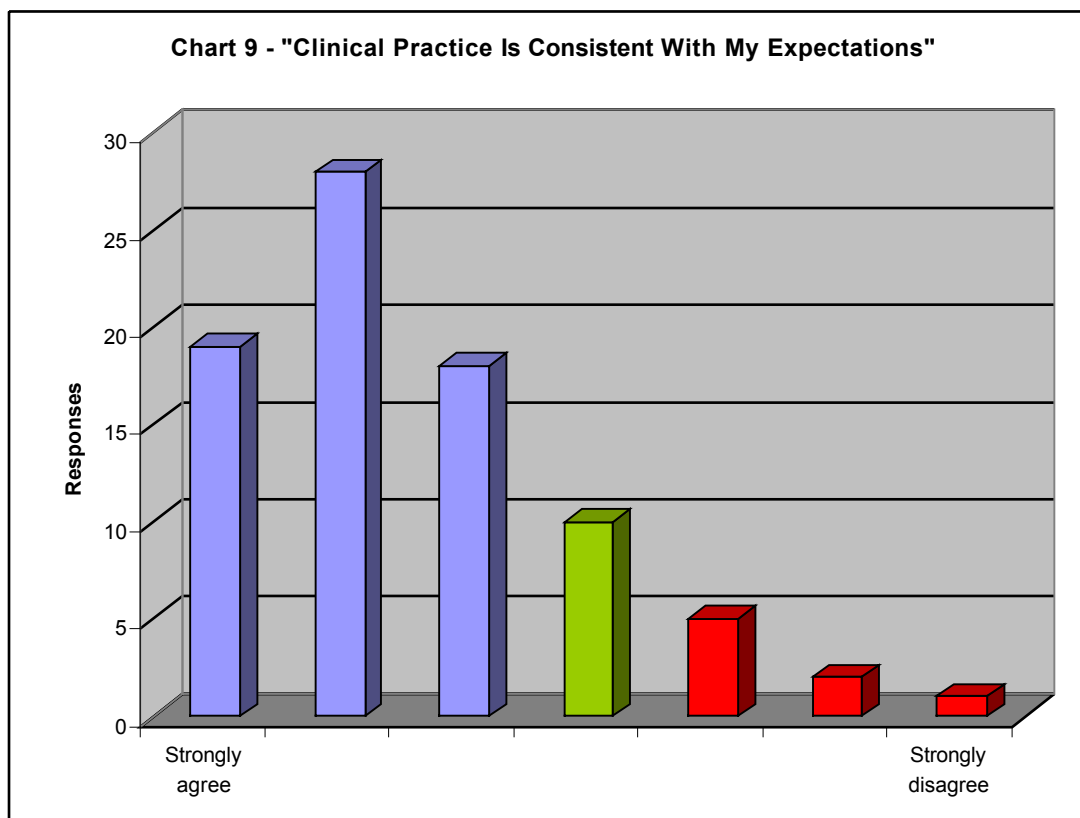


- 4.4 Students were very positive about Diagnostic Radiography as a career, with 34 per cent (41 students) being strongly in favour and 33 per cent (40 students) giving the next most favourable response. The average student score was 5.9 out of a maximum of 7. There were very few negative comments and three students mentioned that they felt it was difficult finding work. However, they were mature students who limited themselves to jobs in their local trust, as they were unable to apply for vacancies elsewhere, usually due to family commitments. There are still vacancies in different parts of the country (see section 3.1). Some of the verbatim comments were:

*"The money is better than I expected, it was more difficult to find a job than I expected."*

*"I thought there would be more authority and that it would be easier to progress and specialise, this is not always the case as people find it hard to progress in some hospitals."*

## Attitudes to Clinical Placements



- 4.5 The majority of students gave clinical practice a favourable rating, with the second highest category being chosen by 34 per cent of respondents and 23 per cent were strongly in favour. The average score was 5.4 out of 7. Negative responses were limited to 7 per cent of respondents and included:

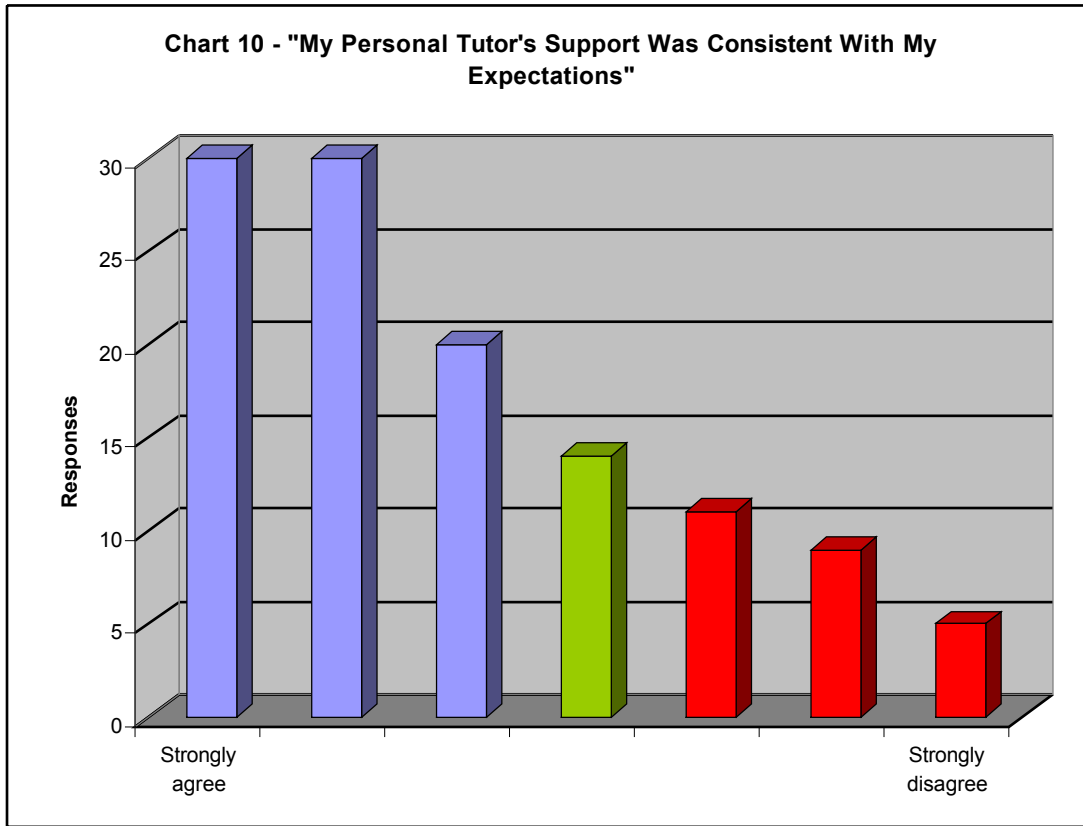
*"The hospital is crowded with students. I don't gel well with some of the first years in my group. I don't like the mentor system. "*

*"Expected more one to one mentoring. NHS is quite hierarchical."*

*"I was surprised by the attitude of some of the radiographers towards students. Although most were very helpful, I found others hostile."*

*"I thought it would be hard and it is. I feel like I have been thrown in at the deep end at times, though most of my mentors are excellent."*

## Attitudes to Tutor



- 4.6 Many students had a positive attitude towards their personal tutors, with 25 per cent being strongly in favour and a further 25 per cent of responses being in the next most favourable category. However, 21 per cent of students held negative views, which was the largest negative score in this series of charts. The average score was 5.1 out of 7, which compares unfavourably with that of therapeutic radiography students (5.5). Examples of some comments were:

*"I have never met my personal tutor."*

*"Expected person to discuss any problems with. Got lecture on missing one session as soon as I sat down in tutor's office. Aggressiveness was very off-putting and didn't feel this was somebody I could talk to."*

and more positively:

*"My clinical tutor has been much more supportive both in placement and at university than I hoped."*

## Intention of dropping out

- 4.7 Slightly more than a quarter of students (30 per cent) have thought of dropping out, which is slightly more than the percentage who actually did so (23 per cent).
- 4.8 Just under half of respondents who thought of dropping out did so during their first year. A minority 11 per cent (4 students) said that they wanted to drop out during clinical placement and two students sadly commented "all the time". Students with "A" level qualifications were less likely to drop out than those with other qualifications. The reasons given for dropping out varied, such as:

*Financial: "I was told I could claim back all expenses for hospital placement which was not true. At one point I was £1800+ out of pocket."*

*Clinical placement: "The staff there, save for a few wonderful people. I have [never] met such a bunch of dissatisfied, mean-hearted, miserable bullies in my whole life. As a student you are treated like dirt."*

*Time pressures: "Not enough time to study, no term breaks, was always a work placement, when at university had lectures most of the time."*

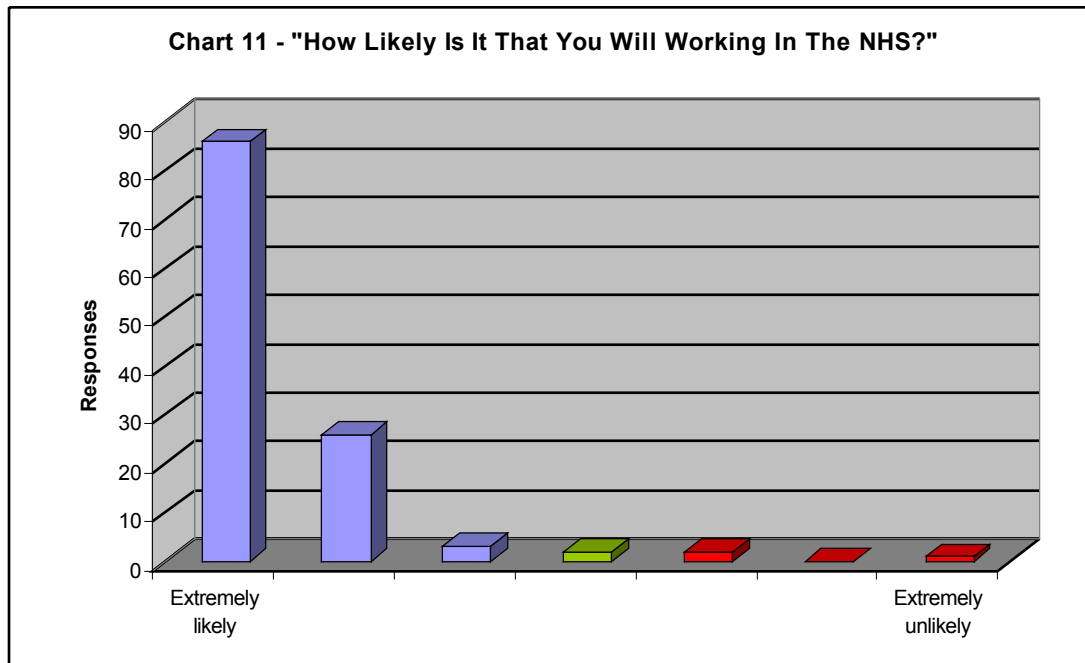
- 4.9 Students who thought of dropping out but who decided to stay fell into two main categories: the "soldiers" and the "professionals." The "soldiers" were those who just refused to give up and who wanted to avoid failure at all costs. The "professionals" were those for whom the attraction of working in the profession was sufficient of a motivation. For example:

*"Professional": "Because I love the job and it is what I have wanted to do for years."*

*"Soldier": "I don't like to give up on anything once I have started. Once I got so far through the course giving up seemed far worse than continuing."*

*"Out of spite. And why should I let some bullies bully me out of my chosen degree. Leaving would mean that they'd won. I know that others have left the course because of them and I am determined to show them that they can't intimidate me." (This respondent was referring to their clinical placement).*

### Likelihood of Joining NHS

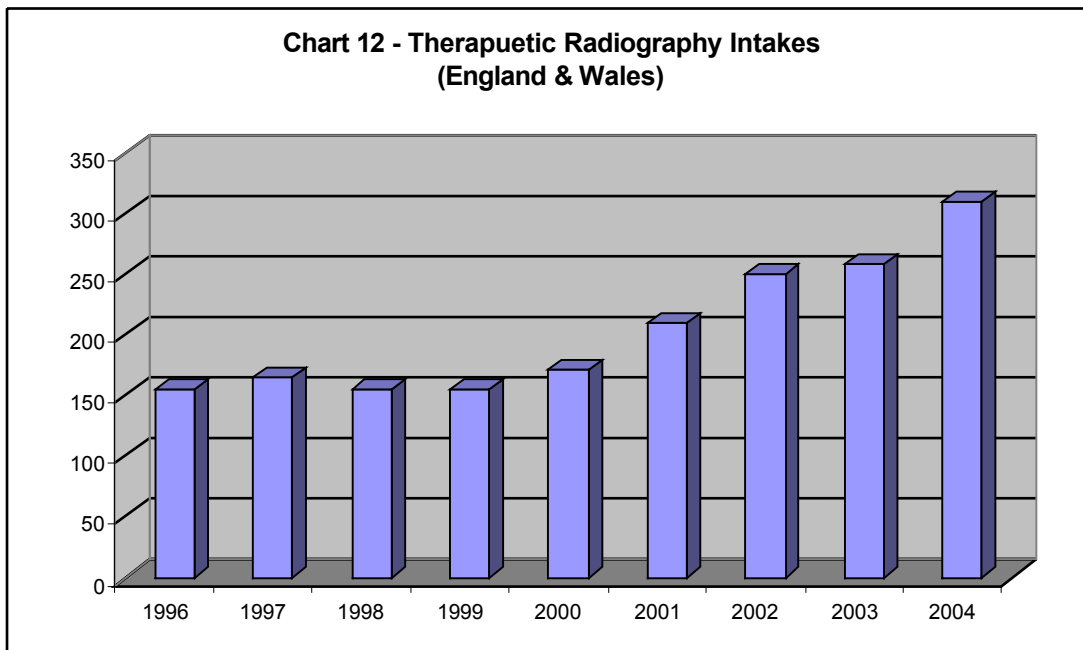


- 4.10 Students were positive about working in the NHS on qualification, with 72 per cent saying that this was extremely likely and a further 22 per cent being in the next most positive category. The average score was a very high 6.6 out of 7.

- 4.11 The few who were less positive were intending to travel and return (3 per cent or 4 students) and a further 3 per cent who said that they would work outside NHS radiography. This is consistent with the evidence from the Health Professions register, reviewed earlier.

## 5 THERAPEUTIC RADIOGRAPHERS

5.1 There were 1,753 Therapeutic Radiographers in 2004<sup>7</sup>, with a whole time equivalent of 1,545. The number of whole time equivalents has grown by 21 per cent between 1997 and 2004. Over recent years, some trusts have offered students £3,000, provided they stayed with them for at least 18 months to two years. However, this incentive is now used less widely. Vacancies of over three month's duration have fallen from 8.8 per cent in 2004 to 6 per cent in 2005<sup>8</sup>.



### Overview of intakes and attrition

5.2 The above chart shows that commissions have doubled (from 155 to 309, between 1999 and 2004). This based is on data for England and Wales provided by The Society and College of Radiographers. Increases of this scale must have created considerable pressure on NHS clinical placements. The largest increase percentage increase between two years was of 23 per cent (39 places) between 2000 and 2001 and the smallest, in recent years, was 3 per cent (8 places) between 2002 and 2003. The 2004 intake represents 19 per cent of staff-in-post (whole time equivalents) or 13 per cent, after applying a 33 per cent academic attrition rate.

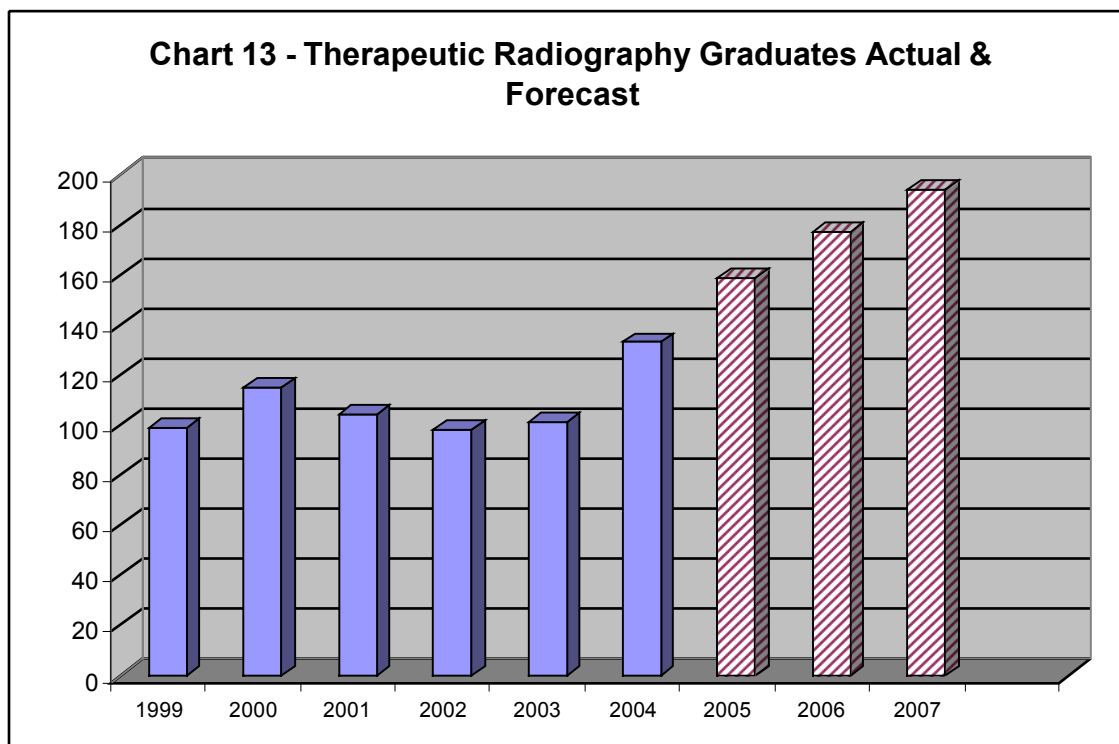
**Table 7 – Therapeutic Radiography Attrition, England and Wales (3 Year Programme)**

Intake	Attrition
1997	27%
1998	27%
1999	29%
2000	28%
2001	28%
2002	32%
2003	38%
<b>Ave</b>	<b>33%</b>

5.3 After five years when attrition rate plateaued at between 27 to 29 per cent, it rose to 32 per cent in 2002 and then on to a worryingly high 38 per cent. Chart 2 showed that therapeutic radiography attrition rate is always 6 to 8 percentage points higher than that of diagnostic radiography.

5.4 Data from the Society and College of Radiographers’ professional register was analysed for students who began their courses at an English university in 2000 (paragraphs 5.4 to 5.11 refer). There were 154 on the register, of whom: 83 per cent were female; 18 per cent were 30 and over; 74 per cent were white European; 16 per cent were Asian. This is a significantly higher percentage of Asian students than in diagnostic radiography.

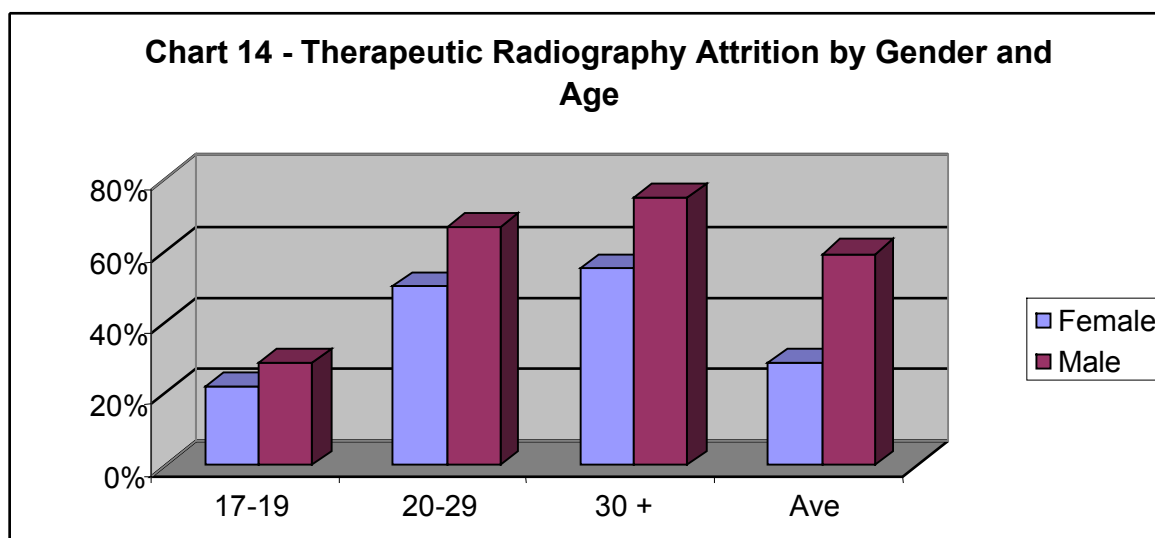
5.5 The NHS has improved its success rate in recruiting graduates from 89 per cent in 2000 to 98 per cent in 2003 and 2004 (see Appendix 2).



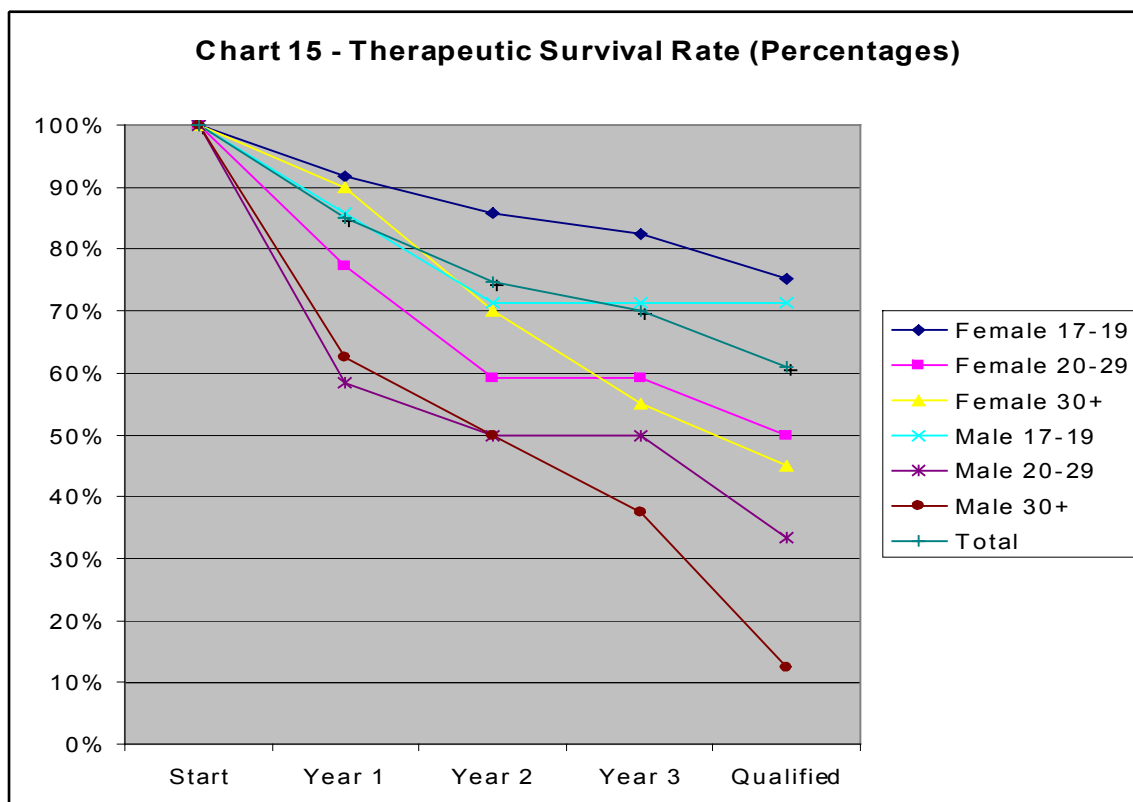
5.6 The data in the above chart shows actual number of graduates between 1999 and 2004 and from 2005 to 2007 are estimated using the average attrition rate of 33 per cent. On this basis, many of the current vacancies will be filled, and

whether all the graduates will find jobs in 2007, will depend on the rate of increase in funded establishment. (Workforce losses have not been taken into account)

### Attrition by age and gender



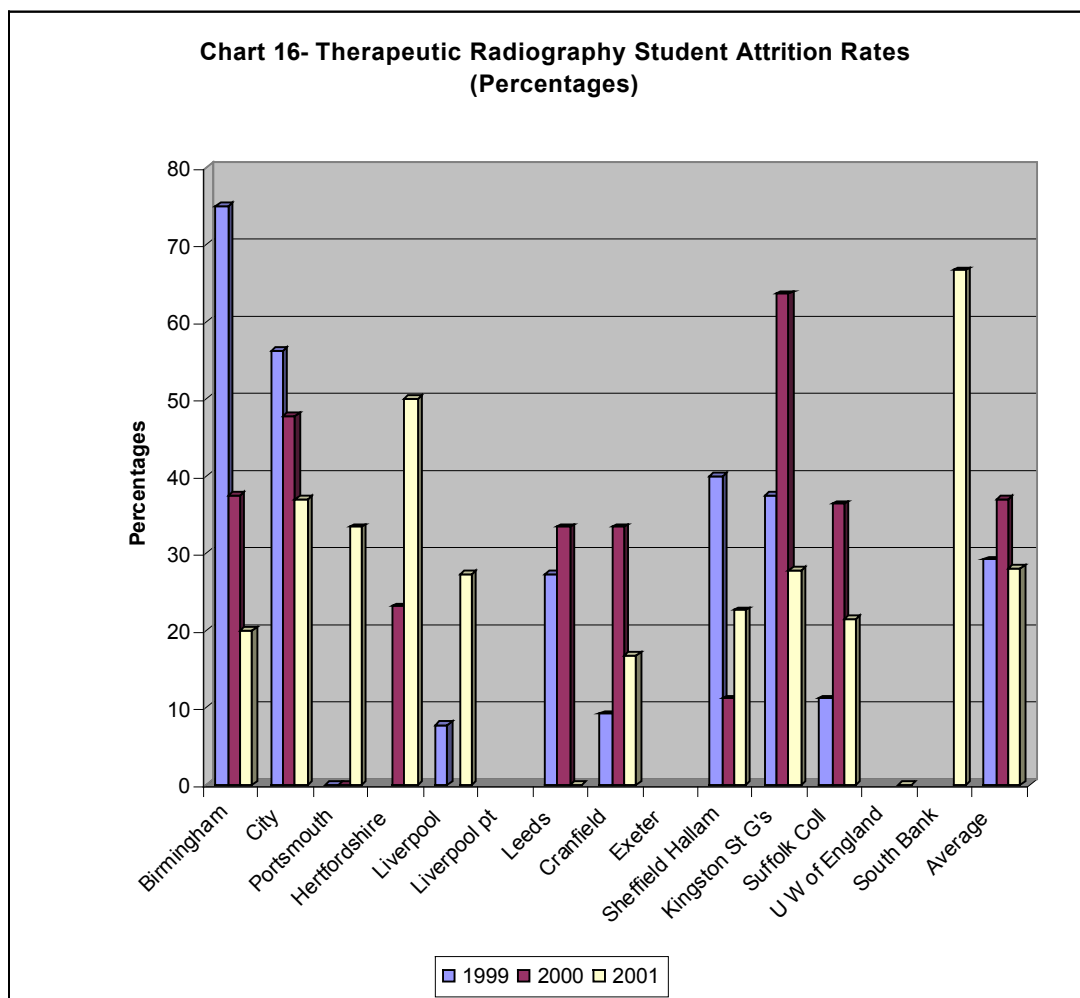
- 5.7 There was a total of 154 students who were first entered into the Society of Radiographers membership register in 2000, of whom 82 per cent were female and 18 per cent (27) were male. The ethnicity of 18 per cent of them was unknown, while 73 per cent of the students who stated their ethnicity were white Europeans.
- 5.8 Male attrition was almost double female attrition, being 59 and 32 per cent respectively. This pattern was repeated in all age-bands, however, it was more pronounced for the two older age-bands. Thus, the 17-19 age group had a significantly lower attrition rate. Given that a growing proportion of high attrition categories have been recruited, namely students over 21 and males, this is likely to have led to an increase in overall attrition rates, all other factors being equal.
- 5.9 A slightly higher percentage of white Europeans stayed in the profession than other ethnicities.



5.10 Attrition fell most heavily during the first Year (15 per cent), declining step-by-step in the following two years by 10 and 5 per cent, respectively. This heavy first year attrition contrasts with diagnostic radiography where the attrition over the first two years is very similar.

#### Intakes and attrition by education provider

5.11 The average attrition rate has fluctuated around 30 per cent, ranging from 30 per cent in 1999, increasing to 34 per cent and then declining to 29 per cent in 2001.



5.13 Care should be taken when reading the above chart, as HEIs with apparently no attrition most probably did not supply data for the years in question. City University showed an annual improvement. London, South Bank, had a 67 per cent attrition rate for the 2001 intake, however, this is a two year postgraduate course that attracts older students who typically have a higher attrition rate.

5.14 The University of Central England (Birmingham) has shown a remarkable improvement, starting with a 75 per cent attrition rate that declined stepwise to 43 and then to 24 per cent. Attrition has been improved by working more closely with trusts and by improved support to students on placement and by teaching study skills.

5.15 Before implementing Moodle, an open source virtual learning medium, examination results were satisfactory, while assignments were not. Students were insufficiently engaged in their learning and there was scope to improve critical evaluation of literature, to read more widely and to make better use of radiographic images.

5.16 Lectures, complete with talking heads and navigation aids, are put on CDs. Students can post questions about topics they did not understand on multimedia that are followed up later. The time released by not having formal lectures is used for problem based learning. This enables students to apply their knowledge through viewing a film to spot fractures or deciding whether the image needs retaking. Ten point questions are used to assess knowledge, one

of which will appear in the examination. Some students repeat the questions until they can give perfect answers. Students are given clinical scenarios and asked to make a diagnosis and plan and justify a diagnostic regime. Students are split into groups of three, one to answer a question, another to criticise the answer and a third to mediate the best perspective on the different points of view. This process verbalises thought and avoids the low engagement caused by the bystander effect.

### **Graduates joining the professional register**

5.17 In order to assess how many graduates go on to work in the profession, comparisons were made between number of students graduating in a particular year and the number therapeutic radiographers joining the professional register who were UK residents. However, strictly speaking this is outside the remit of this report on educational attrition.

**Table 8 – UK HPC Registrations as a percentage of graduates**

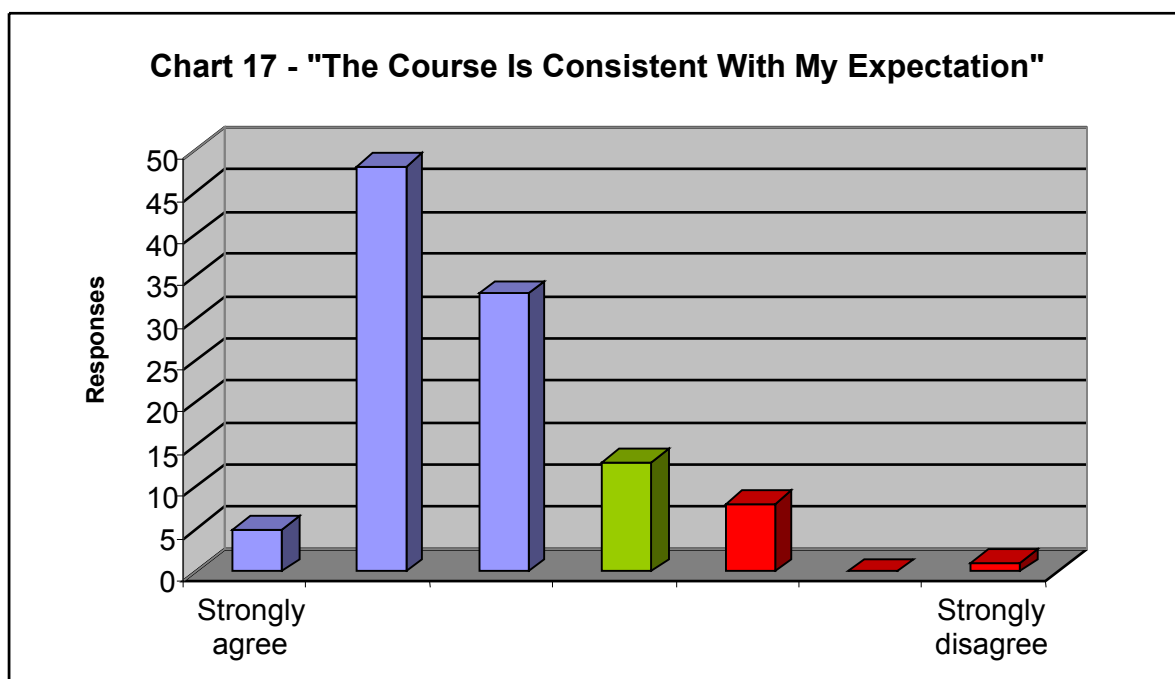
	<b>Reg.</b>	<b>Grads</b>	<b>Per cent</b>
2001	122	126	97%
2002	114	117	97%
2003	106	128	83%
2004	161	163	99%
<b>Total</b>	<b>503</b>	<b>534</b>	<b>94%</b>

5.18 Table 6 indicates that 6 per cent of graduates did not join the Health Professions Register between 2001 and 2004. This represents a loss of 31 therapeutic radiographers. This compares unfavourably with diagnostic radiography where there was virtually no difference between the two sets of figures. The problem appears to have been most marked in 2003 when the number of graduates exceeded the numbers registering by 21 per cent (22 therapeutic radiographers) although during this period one university alone had three Saudi students returning to Riyadh and two students going on to study medicine.

## 6 THERAPEUTIC RADIOGRAPHY STUDENT SURVEY RESULTS

6.1 This section is based on the questionnaires completed by 110 current therapeutic radiography students.

### Attitudes to course



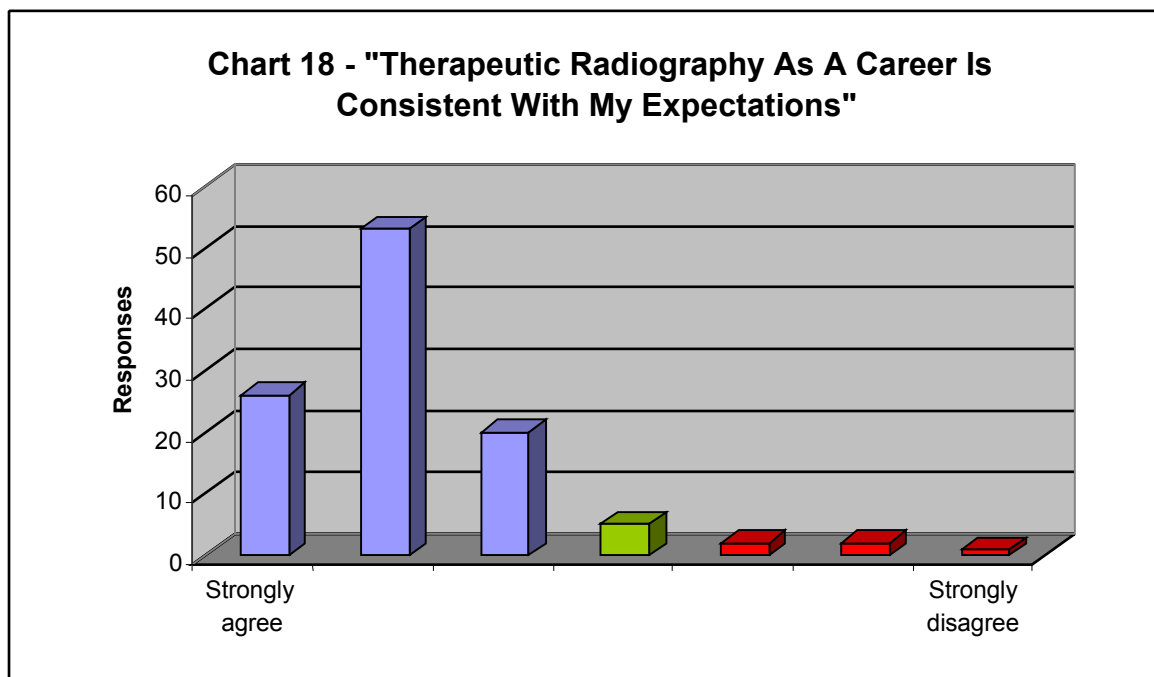
6.2 Students had a positive attitude towards the course with 44 per cent selecting the second most positive response. However, those who selected the most positive category were only 5 per cent (7 students) of the total, compared to 41 per cent in the case of diagnostic radiography. The average score was 5.2 out of a maximum of 7. The few negative comments included:

*"Rather irrelevant physics - some lectures and practicals." (2 other similar comments)*

*"Slightly disorganised. Lack of support from lecturers. Not enough taught sessions, too much independent study." (2 other similar comments)*

*"I expected the theory part of the course to be more directed in relation to our clinical practice, but instead it can feel separate and not interlinked or entirely useful"*

### Attitude to career

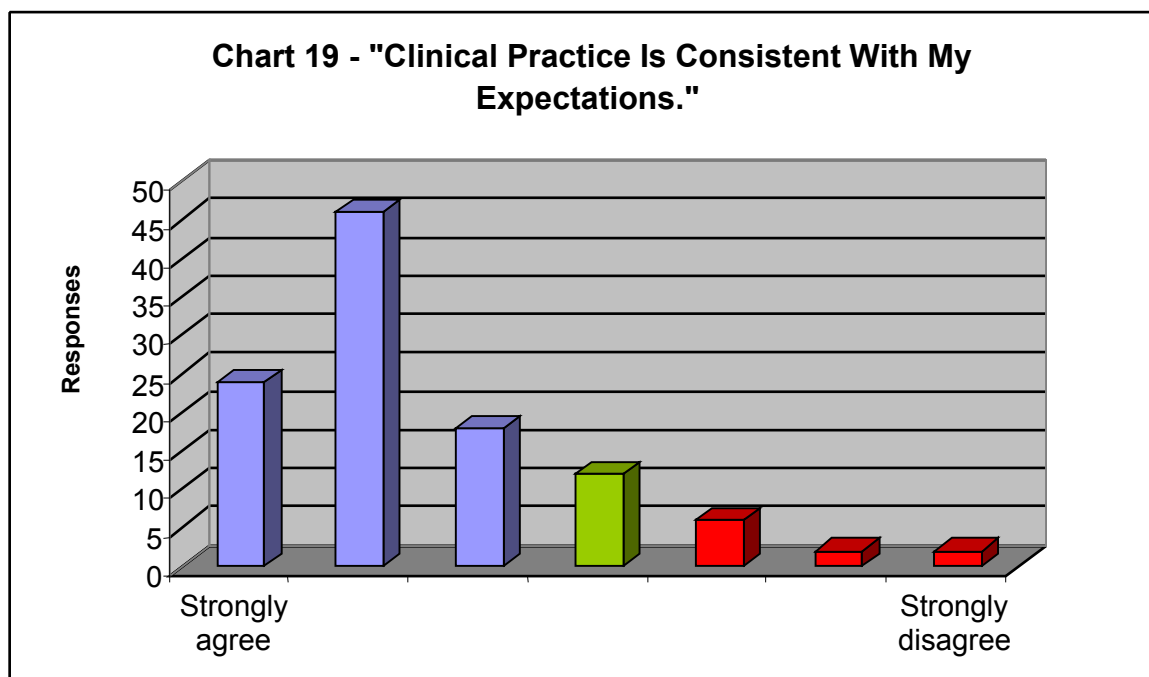


6.3 Students felt positively towards a career in therapeutic radiography, with 49 per cent selecting the second most favourable response and 24 per cent the most favourable one. The average score was 5.8 out of 7. When invited to comment, some negative observations were made, such as:

*"I expected radiographers to have more responsibility in deciding appropriate treatment for patients. Instead, on placement I saw the job was rather robotic and that most theory we learnt in university did not seem relevant."*

*"I feel as a career yes but due to general attitudes within departments on placement I feel a different centre once qualified will suit me also feel lack of patient contact is a let-down."*

## Attitude to Clinical Practice



- 6.4 Students had a favourable attitude to clinical practice, with 42 per cent selecting the second most favourable response and 22 per cent the most positive. A minority of 9 per cent had a negative attitude. The average score out of 7 was 5.5. Some comments included:

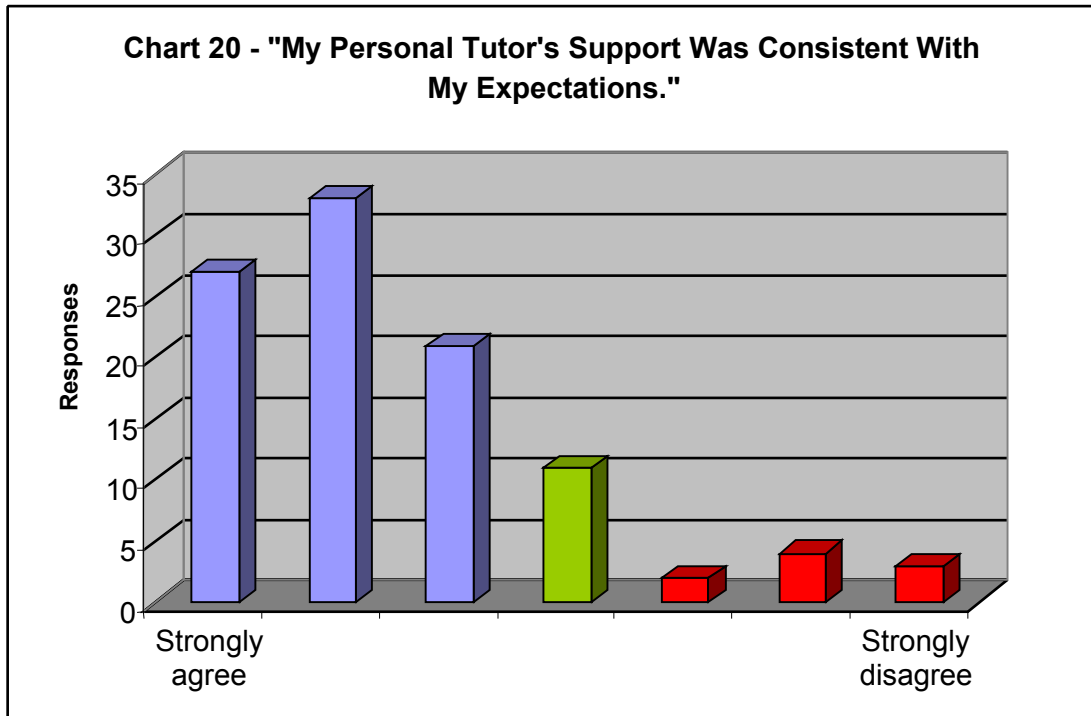
*"I thought that therapeutic [radiography] would involve a stronger clinical role, i.e. more examining patients, using more contrasts and injections etc and more using drugs. It is also more routine and slightly mundane than I thought it would be."*

*"Unhelpful attitude of many radiographers. Arrogance of supervisors. Bitchiness and bullying attitude towards students and fellow radiographers."*

*"Some staff treat you well, others like dirt. Some staff unwilling to sign off competencies for no good reason."*

*"I expected more time and more help from colleagues. Some radiographers are unhelpful and use students as skivvies."*

## Attitudes to Tutor



- 6.5 Students were favourably inclined towards their personal tutors, with 33 per cent selecting the second most positive classification and 27 per cent the most favourable. A minority of 9 per cent were dissatisfied. The average score was 5.5 out of 7. Comments included:

*"I haven't been allocated a personal tutor this year as yet."*

*"Personal tutor did not make time to see me and talk through problems. Clinical tutor was a great help at all times"*

*"I was very upset thinking I had failed my re-sit physics - tutor was not very supportive."*

## Intention of dropping out

- 6.6 The percentage of students who considered dropping out (43 per cent) was higher than the general attrition rate. Therapeutic radiography students were significantly more likely to consider dropping out than their diagnostic radiography counterparts. Age groups with a greater likelihood to think along those lines were 21-24 and 30-39. In accord with expectations, the majority (52 per cent) of students who considered doing so, initially felt like that during their first year. A minority (6 per cent) stated that they wanted to terminate their course during their clinical placements. The reasons given include:

*"Physics - I thought I wouldn't be able to learn it. Also, the workload!"*

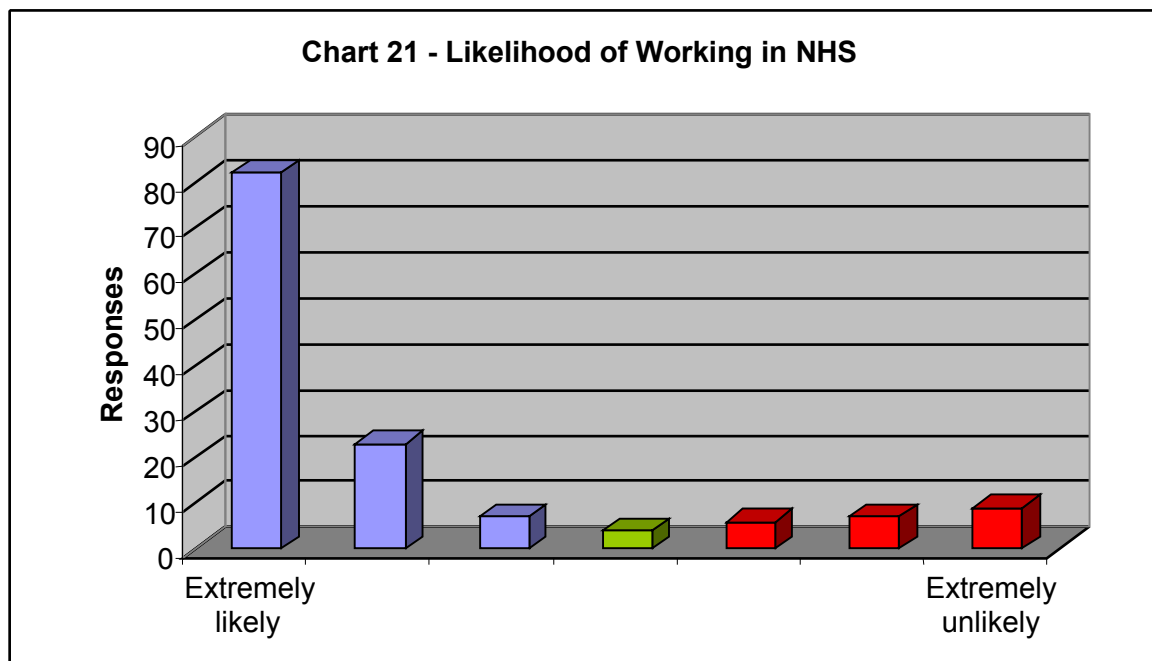
*"Too much work, poor communication between university and students, no time off, being treated like a 'dogs-body'."*

*"Query about the course content, too much Problem Based Learning, nervousness about the job."*

*"A string of bad preceptors and team staff made me feel like I was no good at the job and I lost confidence."*

6.7 As in the case of diagnostic radiography, the main reasons why students did not drop out after all was that they were “soldiers” (36 per cent), who just did not want to give up, and “professionals” (27 per cent), who were keen on a future in the profession. In addition, there was a smaller category of “graduates” (5 per cent), for whom hanging on to gain their degree was the most important consideration.

### Likelihood of Working in NHS



6.8 The greater majority of students (59 per cent) considered it highly likely that they would work in the NHS. This is less than in the case of diagnostic radiography (72 per cent). This is reflected in the lower average score of 5.8 compared to 6.6 for diagnostic radiography. The negative responses amounted to 16 per cent (diagnostic radiography: 2 per cent) and of this 7 percentage points related to the extremely unlikely category. Five respondents (4 per cent) gave “other” as what they will be doing on graduation and four (3 per cent) stated that they would “travel and see what happens”. These findings reflect past trends in registration levels with the Health Professions Council.

## 7 STUDENTS WHO HAVE DROPPED OUT

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- 7.1 Extreme care should be taken in generalising from the findings regarding the students who had dropped out, given the low response of 11 per cent and the very small sample size of 16 students (6 diagnostic radiography and 10 therapy radiography). However, it would be remiss to ignore this information entirely.

### Ex-student profile

- 7.2 The main difference between students who dropped out and current students is that the former were older, 31 per cent (5) being 40 or older, compared to 10 and 11 per cent for current students in the two disciplines. The higher rate of attrition for older students is consistent with the College of Radiography data for England.
- 7.3 The overall level of education of ex-students was not significantly different from current students, especially with regard to the percentage who applied to university from access courses. The smaller percentage of ex-students who had "A" levels was balanced by a higher percentage that had degrees. However, what is unknown is the relevance of their qualifications. For instance, it would be very interesting to be able to ascertain whether students with "A" level physics had lower attrition rates.

### Information about the course

- 7.4 Some ex-students researched their degree course carefully before applying and five had visited a department. They often combined a variety of sources of information to obtain a fuller picture. However, seven respondents did not answer this question, so their level of prior knowledge is unknown. Examples of comments of those who did respond include:

*"A detailed package on the course, university and the profession by the university. Plus an arranged visit to radiotherapy department prior to interview to view what is done and ask any questions."*

*"I had a thorough understanding of the content of the course but not the hours."*

### Attitude to the course

- 7.5 Half the ex-students selected the second most favourable category, very much in line with current therapeutic radiography students. Some of the comments included:

*"I felt there wasn't the support for mature students. Timetables didn't take into account for students travelling in."*

*"I feel that there wasn't enough emphasis on the amount of physics required for and during this course. In hindsight I felt I would have benefited from physics "A" Level."*

### Attitude to career

- 7.6 The largest number of responses were for the second most favourable category (39 per cent or 7) followed by the most favourable rating (22 per cent or 4). Comments included:

*“The profession did not seem to have the patient 'contact'/care that I was looking for as a career in the NHS. Also, I did not enjoy my placement in the general department of the hospital I worked in and this very much put me off wanting to graduate in the profession.” (Former diagnostic radiography student)*

*“I realised that the job was too practical for me - my short stature was a problem with the prospect of having to use a 'platform'. Also, the atmosphere was often not friendly, and the job would not have provided the intellectual challenge I sought.”*

### **Attitude to Clinical Practice**

7.7 The most favourable classification received the highest score (39 per cent or 6), followed by the next most favourable category (19 per cent or 3). Some of the comments included:

*“There was a lot more disagreement on clinical practice than I had expected and was not as stimulating I underrated the practical element.*

*“I was really disappointed by unfriendliness and lack of encouragement.”*

*“Mentors reluctant to help first years.”*

### **Attitudes to Tutor**

7.8 Ex-students gave favourable ratings to their tutors with scores of 43 per cent (6) and 29 per cent (4) for the two most favourable categories. The comments were mainly favourable with regard to them, although there were a couple of negative comments about placement staff. They include:

*“My Head of Department was amazing during this time. My parents also gave some support, however I still get the feeling that they are disappointed in me.”*

*“Good support from university - poor support from practitioners.”*

*“My personal tutor (clinical) was good, but I felt there were perhaps 'issues' between the hospital and university.”*

### **Why Students dropped out**

7.9 Ex-students often gave more than one answer, so it suggests that a decision to leave is likely to be based on an accumulation of negative experiences. A few left on health grounds and another mentioned bullying. Interestingly, one respondent mentions that they were influenced by others leaving, suggesting that a domino effect might operate. There were a couple of comments about not being sufficiently well informed regarding the content of the course, such as with regard to amount of physics in one case and the requirement to dissect bodies in another. Three students failed their course. Some of the comments include:

*“Cost of travelling in for a one hour lecture e.g. main reason was lack of support. If I didn't understand something, answer was 'get a book and read on it'. I am now at Salford on the same course and support in extra tuition for Maths, English is there, unlike university \*.”*

*“Finding it very difficult towards the end because of pressure and harassment from 2 particular clinical radiographers at the hospital. I must*

*also say that I was very ill and didn't know it, I ended up with cancer and gave up because of that."*

*"The course wasn't that well organised, but that wasn't to say the tutors were bad. There were a couple of very good tutors. Financially, the bursary was very low and travel was expensive. The distance to travel wasn't brilliant (2 hours. Others on the course were also feeling disheartened and starting to leave."*

7.10 Ex-students were asked what might have helped them to change their minds and stay on the course. Comments include:

*"If lectures were not given in huge theatres. This is intimidating. Who will say they 'don't understand' or 'can you clarify that' in front of 300 other students. (University X teaches radiographers together, in groups of 10 much more comfortable.)"*

*"I failed 2 exams, I was told by a long way and at the time thought it was impossible to redo them. After I got my results I found I missed them by 1%. The course tutor could have given me support but I got none. I got the only support from clinical tutor."*

7.11 Reasons for attrition fall into four main categories: personal; course related; placement related; professionally related. Some of the categories can be further subdivided and examples are provided of comments from respondents, such as:

**Personal**

- Illness and traumatic events
- Carer responsibility pressures
- Financial pressures

**Course related**

- Examination failure
- The course content, e.g. dissecting cadavers, underestimated the level of attainment required in physics
- Insufficient remedial support, e.g. physics
- Course workload felt to be excessive

**Placement related**

- Clinical placement experience, e.g. bullying

**Professionally and course related**

- Mismatch between expectations of job and reality, e.g. "sausage factory"

7.12 Personal factors such as illness, carer responsibilities and financial pressures are difficult to eliminate and at best, it would be a matter of supporting a student to mitigate the impact of these factors.

7.13 It is possible to influence some of the course related factors. First, the course that required dissecting cadavers should have made that clear, as it is not a common requirement for the profession. Second, students who find physics excessively difficult need to be identified at the beginning of their course and be given appropriate remedial support.

**Current activity**

7.14 Just over a quarter of students (5) were studying, two of whom are undertaking a diagnostic radiography degree at another university. Three were working in retail jobs, as an interim measure.

## 8. DISCUSSION

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8.1 This section reviews some of the important themes that re-merge in several sections of the report. While there were generally positive scores to most questions, when students were asked whether they had any criticisms, they articulated some serious ones. Although they represent the views of a minority, they are nevertheless important and include:

- The likely relationship between higher commissions and higher attrition rates
- the mismatch between course content and job requirements
- students who struggled with physics
- bullying
- personal tutors

### **The relationship between increases in commissions and attrition**

8.2 Given that attrition rates in both disciplines have increased markedly in recent years (diagnostic radiography: up from 22 per cent in 2002 to 30 per cent in 2003 and therapeutic radiography from 32 per cent to 38 per cent over the same period), it is important to identify the possible reasons. The most likely reason is the growth in commissions that could well have had adverse impacts on both the clinical placement and university experience. NHS staff would have had more students to supervise, meaning that they are likely to have less time for each individual student. Workload pressure would have also been increased by the need to meet demanding waiting time targets. Students would have received less personal attention in those HEIs where staff student ratios had deteriorated.

8.3 While it is crucial to increase education intakes when there are significant staff shortages, commissioners should take into account that attrition rates may increase as a result. On the one hand, low education attrition would mean smaller intakes. However, that would mean greater staff shortages, agency usage and patient waiting times. On the other hand, in the short term, commissioners may consider that it is better to reduce staff shortages, agency costs and waiting list, even at the price of higher education attrition

<p><b>Recommendation 3:</b> <i>Given the likely relationship between increases in commissions and higher student attrition, commissioners need to decide what is their best trade off between intake and attrition levels.</i></p>
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### **Increased recruitment from high attrition groups**

8.4 A further factor to take into account is that the increase in proportion of students who have been recruited from populations with a higher attrition rate, namely students over 21 and males. This is not to question the potential benefits of having a more diverse intake, however, there are negative consequences to education attrition. What needs to be established is the duration of NHS careers for these groups of staff, because if their careers are longer, the higher attrition rate may not be problematic.

## **Mismatch between course content and job requirements**

- 8.5 Some students questioned the relevance of some of the subjects taught for working in their discipline. Integrating theory with practice was also found to be an issue that universities needed to address in *Radiography Clinical Education and Training and Capacity and Quality* (2004)<sup>9</sup>. The following comment typified student responses:

*"I expected the theory part of the course to be more directed in relation to our clinical practice but instead it can feel separate and not interlinked or entirely useful."*

- 8.6 Another related theme was that some students found the job to be too mundane and did not permit as much patient contact as they would have liked. This was more the case in therapeutic rather than diagnostic radiography and was reflected in the following comments:

*"I thought that therapeutics would involve a stronger clinical role, i.e. more examining patients, using more contrasts and injections etc and more using drugs."*

*"In my current clinical placement I do not get to see everything and staff have little role in planning. "*

*"Very robotic, and all very much the same"*

- 8.7 A realistic appreciation of job requirements by students was held to be very important by Arnold, J et al (2003). This requires both the positive and negative aspects of working in the NHS to be presented to potential applicants, especially "there is not always as much time as one might like to help patients and establish relationships with them and colleagues."<sup>10</sup>
- 8.8 In any professional course there is a tension between how far the foundations in learning need to be laid for future practice and the extent that they should relate to the more mundane tasks required at the onset of a student's career. These tensions need to be periodically evaluated by HEIs and the NHS.
- 8.9 Given that therapeutic radiography has between a 6 to 8 percentage points higher attrition rate than diagnostic radiography, it would be useful to investigate this further.. In therapeutic radiography there has been a debate whether the profession should extend its boundaries to provide more holistic care in a wider range of settings. This builds on the approach set out in *Breaking the Mould*<sup>11</sup>. The counter view was in evidence when a few NHS staff told some therapeutic radiography students that psychology and sociology are not relevant to the needs of the job. This attitude was much less in evidence where NHS staff attached more importance to the results of patient experience surveys, according to academic respondents.
- 8.10 There is a further debate taking place regarding the skill mix and staffing levels in the profession. This debate should help influence the roles of the radiotherapy radiographer

<p><b>Recommendation 4:</b> <i>The skill mix of therapeutic radiography departments should be reviewed to ensure that they are clear to staff.</i></p>
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## **The struggle with physics**

8.11 Physics, without doubt, is the most problematic subject for students in this survey. Some underestimate the standard that they needed to attain in the subject and indeed, one student thought she ought to have really had a pass at "A" level in it. There was also a request for it being taught in small groups, with additional support being made available.

**Recommendation 5:** *some universities need to identify students who are likely to struggle with physics at the very start of the course and to provide them with appropriate, intensive, remedial support.*

## **Bullying**

8.12 While only a small minority of students were bullied on their clinical placements, this should not be left unchallenged. Similar behaviour was reported by Dennett (2002) in that "several students described situations where they had been reprimanded in front of other staff or patients."<sup>12</sup> One academic commented:

*"I am constantly surprised by students who complain about it [bullying] and in a few years later, when they have qualified, I get reports back from current students who complain that they are now giving students a hard time themselves!"*

8.13 Bullying is a widespread problem in the NHS and 10% of staff had been bullied and harassed by colleagues in the 12 months to March 2005, according to a survey of 217,000 NHS staff, by the Healthcare Commission<sup>13</sup>. Clearly, for bullying to continue on such a wide scale, it would be supported by cultural factors and a reluctance to challenge such behaviour effectively.

**Recommendation 6:** *a working group should look into the factors that underpin negative behaviour towards students and recommend possible solutions.*

8.14 Another approach to tackling bullying would be through accrediting departments. Departments that perform well, could use this to attract recruits. The assessment criteria could include: staff attitude survey results; staff wastage rates; sickness rates; opportunities for training; flexible working; having robust clinical governance structures in place, etc.

**Recommendation 7:** *an accreditation system should be developed that includes factors such as staff morale so that it favours departments that are good places to work. This would indirectly count against departments where bullying might be tolerated.*

## **Personal tutors**

8.15 Some personal tutors were very popular and were highly praised by name, even by students who had failed their courses. However, when students did not have ready access to a tutor, or when they experienced a negative response from them, this was problematic.

Appendix 1

**INTAKES AND ATTRITION RATES**

Therapeutic HEIs	1999						2000						2001			
	Intake	1	2	3	Loss	%	Intake	1	2	3	Loss	%	Intake	1	2	3
Birmingham	12	12	7	3	9	75	15	14	7	8	8	53	21	21	11	11
City	16	15	11	6	9	60	23	23		12	11	48	27	27	18	17
Portsmouth	7	7	7	7	0	0	6	6	6	6	0	0	9	9	6	6
Hertfordshire							13	13	12	10	3	23	12	12	8	6
Liverpool	26	26	25	24	2	8	25	25	25	21	4	16	33	31	22	22
Liverpool pt																
Leeds	11	10	8	7	3	30	9	8	7	5	3	38	4	4	4	4
Cranfield	11	11	10	10	1	9	9	9	7	6	3	33	6	6	6	5
Exeter																
Sheffield Hallam	10	10	7	6	4	40	18	14	12	12	2	14	31	31	24	24
Kingston St Georges	8	7	4	4	3	43	11	11	6	4	7	64	18	18	14	13
Suffolk Coll. - Ipswich	9	7	6	6	1	14	11	11	6	7	4	36	14	14	11	11
U West of England													17	15	15	15
South Bank													15	15	5	5
<b>Total</b>	<b>110</b>	<b>105</b>	<b>85</b>	<b>73</b>	<b>32</b>	<b>30</b>	<b>140</b>	<b>134</b>	<b>88</b>	<b>91</b>	<b>45</b>	<b>34</b>	<b>207</b>	<b>203</b>	<b>144</b>	<b>139</b>

Diagnostic HEIs	1999						2000						2001			
	Intake	1	2	3	Loss	%	Intake	1	2	3	Loss	%	Intake	1	2	3
City	43	35	33	32	3	9	51	51	39	21	30	59	47	36	34	34
Bradford	24	25	23	20	5	20	27	28	27	19	9	32	30	30	30	23
Hertfordshire	56	56	53	45	11	20	56	53	48	44	9	17	58	54	47	31
Kingston St Georges	23	20	21	19	1	5	42	41	31	24	17	41	50	53	45	44
Liverpool	26	26	25	23	3	12	25	24	18	19	5	21	31	26	26	26
Lancs. St Martins													41	33	32	32
L South Bank	27	26	27	15	11	42	36	33	16	16	17	52	37	30	22	17
Leeds	30	28	25	23	5	18	28	25	22	19	6	24	41	40	40	40
Portsmouth	34	34	34	34	0	0	20	20	20	20	0	0	51	51	51	51
Salford													41	36	35	35
Sheffield Hallam	24	24	21	23	1	4	29	29	20	21	8	28	31	29	21	20
Suffolk Coll. - Ipswich	27	21	14	12	9	43	32	23	23	23	0	0	42	41	41	41
U West of England	50	34		34	0	0	60	55		55		0	82	67	38	61
Canterbury	32	31	22	22	9	29	45	43	35	35	8	19	45	44	36	32
Birmingham	45	45	37	33	12	27	54	53	49	45	13	24	71	66	58	58
						-										
Cranfield	29	29	29	32	-3	10	28	28	23	22	6	21	20	19	20	19
Derby	29	29	18	24	5	17	35	35	27	17	18	51	37	38	31	26
Teesside	24	23	19	15	8	35	29	29	24	20	9	31	26	26	21	21
<b>Total</b>	<b>523</b>	<b>486</b>	<b>401</b>	<b>406</b>	<b>80</b>	<b>16</b>	<b>597</b>	<b>570</b>	<b>422</b>	<b>420</b>	<b>150</b>	<b>26</b>	<b>781</b>	<b>719</b>	<b>628</b>	<b>611</b>

Note:

- In some cases attrition is not absolute attrition, as some students have repeated years or taken a year's break in the case of pregnancy.
- Year 1 census point is November. Loss is calculated by subtracting year 3 from year 1. Attrition is calculated by taking year 3 as a percentage of year 1. The exception to this is UCE where the intake figures relate to the number of students who turned up on the first day and their wastage calculation has been based on that figure and not year 1. The latter in their case refers to the number of students at the end of the academic year and not at November.

***Staying The Course: Reducing Attrition In Diagnostic and Therapeutic Degree Courses***

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## RADIOTHERAPY RADIOGRAPHERS ANNUAL UNIVERSITY SURVEY

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Source: Jackson, Martine (2005) Christie Hospital

### Intakes

	1999	2000	2001	2002	2003	2004
Intakes	142	163	192	240	268	294
Increase		21	29	48	28	26
Percent		15%	18%	25%	12%	10%

### Graduates

	Actual						Forecast		
	1999	2000	2001	2002	2003	2004	2005	2006	2007
Graduates	99	115	104	98	101	133	142	158	173
Increase		16	-11	-6	3	32	9	17	15
Percent		16%	-10%	-6%	3%	32%	6%	12%	10%

### Attrition

Intake	1999	2000	2001	2002
Graduate	2001	2002	2003	2004
Students	38	65	91	107
Percent	27%	40%	47%	45%

### NHS success rate of graduate

	1999	2000	2001	2002	2003	2004
Graduate	99	115	104	98	101	133
Join NHS	96	102	96	92	99	130
Percent	97%	89%	92%	94%	98%	98%

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*Staying The Course: Reducing Attrition In Diagnostic and Therapeutic Degree Courses*

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## Appendix 4

### DIAGNOSTIC & THERAPEUTIC RADIOGRAPHY STUDENT QUESTIONNAIRE

*This project is funded by the NHS and seeks your views on being a Diagnostic or Therapeutic Radiography student, so that we can increase the number of students who qualify and want to follow NHS careers. Your confidentiality will be maintained at all times as we will not analyse or report on information on an individual basis.*

*There is a £250 prize draw, for those who choose to enter! Please complete the separate form.*

1. What were your expectations of your diagnostic or therapeutic radiography university course before starting? (e.g. personal, academic, professional, etc.)

2. The course is consistent with my expectations.

😊      1      2      3      4      5      6      7      ☹️  
Strongly agree                                    Strongly disagree

3. If your course is not consistent with your expectations, why not?

4. Diagnostic or Therapeutic Radiography as a career is consistent with my expectations

😊      1      2      3      4      5      6      7      ☹️  
Strongly agree                                    Strongly disagree

5. If the career is not consistent with your expectations, why not?

6. Clinical practice is consistent with my expectations. Not applicable – have not done any

😊      1      2      3      4      5      6      7      ☹️  
Strongly agree                                    Strongly disagree

7. If clinical practice is not consistent with your expectations, why not?

8. Do you have a personal tutor? Yes  No

## DIAGNOSTIC & THERAPEUTIC RADIOGRAPHY EX-STUDENT QUESTIONNAIRE

This project is funded by the NHS and seeks your views on having been a Diagnostic & Therapeutic Radiography student, so that we can increase the number of students who qualify and want to follow NHS careers. Your confidentiality will be maintained at all times as we will not analyse or report on information on an individual basis.

*There is a £250 prize draw, for those who choose to enter! Please complete the separate form.*

1. Why did you choose to undertake a Diagnostic or Therapeutic Radiography course? (e.g. personal, academic, professional, etc.)

2. What were your expectations of your Diagnostic or Therapeutic Radiography university course before starting?

3. The course was consistent with my expectations.

☺      1      2      3      4      5      6      7      ☹  
Strongly agree                           Strongly disagree

4. If your course was not consistent with your expectations, why not?

5. Diagnostic or Therapeutic Radiography as a career was consistent with my expectations

☺      1      2      3      4      5      6      7      ☹  
Strongly agree                           Strongly disagree

6. If the career was not consistent with your expectations, why not?

## REFERENCES

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### Document background

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