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The Exchequer Costs of Nurse Training

by

KEITH HARTLEY AND LEIGH GOODWIN
- University of York

DISCUSSION PAPER 6

THE EXCHEQUER COSTS OF NURSE TRAINING

by

Keith Hartley
(Director, IRISS)

&

Leigh Goodwin
(Research Fellow, CHE)

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Abstract

- 1 The Exchequer costs of Registered General Nurse (RGN) and Enrolled Nurse (General) (EN(G)) training in England are divided into four components:
 - (a) English National Board expenditures;
 - (b) District Health Authority Costs - i.e. the costs of running and maintaining the 182 Schools of Nursing in England;
 - (c) 'On-the-Ward' Teaching Costs - i.e. the costs of teaching contribution of ward staff (in particular, the Ward Sister/Charge Nurse); and
 - (d) Net Salary Costs - i.e. the gross salary costs of trainees minus the costs of the replacement staff Health Authorities would have to employ in the absence of trainees. In other words, it is recognised that learners contribute to output during their training.
- 2 The key assumptions embodied within the 'central' estimates of this paper are:
 - (a) 100% of all Ward Sisters / Charge Nurses in hospital posts in England devoted 2% of their working time to teaching. The corresponding time for Staff Nurses was 6%.
 - (b) General Student Nurses (Gen Ss) and General Pupil Nurses (Gen Ps) are productive nurses for 2/3 and 0.8, respectively, of their training periods;
 - (c) the appropriate grades of replacement staff for 1st, 2nd, and 3rd Year trainees are: Nursing Auxiliary (NA), $0.5NA + 0.5EN(G)$, and EN(G), respectively.
 - (d) Replacement staff are at the mid-point on their salary scales;
 - (e) the wastage rate in 1982/83 was (equivalent to) 20% of Gen Ss and Gen Ps leaving at the midpoint of their courses;
 - (f) the rate of examination/assessment failure was 15% of entrants for RGN training and 5% of entrants for EN(G) training.
- 3 For 1982-83, the Exchequer costs of three years of training for an RGN was estimated at £9469, compared with £3904 for the two years of training for an EN(G). The estimates are particularly sensitive to the assumptions about the productive contribution of trainees.

- 4 The increases in the real costs of nurse training between 1963 and 1983 (271% for RGNs and 516% for EN(G)s) are largely the result of the significant rise in the salaries of trainees relative to NAs and qualified nurses.
- 5 For 1982-83, the Exchequer's annual aggregate gross expenditure on the training of general nurses was £330m. Allowing for the productive contribution of General Student and General Pupil Nurses resulted in an annual net expenditure by the state of some £126m on general nurse training in 1982-83.

I INTRODUCTION

This paper estimates the Exchequer costs of nurse training in England. Exchequer costs consist of expenditures by the state through the DHSS and the NHS. These outlays are estimated for the training of both:-

- i) Registered General Nurses (RGN) which requires 3 years training as a General Student Nurse (Gen S)
- ii) Enrolled Nurses (General) (EN[G]) which involves 2 years training as a General Pupil Nurse (Gen P).

Expenditure estimates are provided for 1982/83. In addition, comparisons with earlier years and with two previous studies provide insight into changes in the composition and magnitude of costs over time (Bendall, 1982; Bosanquet and Clifton, 1974).

Section II describes the aims of the research project and its methodology.

Section III presents estimates of the Exchequer costs of nurse training and their underlying assumptions. These costs are divided into four components:

- i) Expenditures by the English National Board.
- ii) The District Health Authority Costs
- iii) The on-the-ward teaching costs
- iv) The net salary costs - i.e. the gross salary costs of trainees net of the value of their productive contribution.

Section IV adjusts the aggregate cost components to allow for wastage and discount rates and presents central estimates for the Exchequer costs of RGN and EN(G) training. Sensitivity analysis is undertaken to show the responsiveness of the estimates to alternative assumptions.

Trends in the type and magnitude of the various components of Exchequer expenditure on nurse training, over the period 1963-83 are outlined in Section V. Finally, consideration is given to some of the policy implications of the estimates.

II The Research Design

This two year research project (1983-85) is funded by the Economic and Social Research Council. The research aims to estimate the costs and benefits involved in the training of general nurses in England i.e. Registered General Nurse (RGN) and Enrolled Nurse (General). The study aims to improve our understanding of the economics of the training process. We seek answers to the following questions:

- 1 What are the costs of nurse training - i.e. how much does it cost to train a nurse?
- 2 Who pays - how are training costs shared between nurses, the D.H.S.S. and the N.H.S.?
- 3 What are the benefits of training and how are the benefits shared between nurses and the health service?

We recognise that the study will be seeking answers to rather complex questions. In particular, major problems arise in the assessment and measurement of benefits - e.g. measurement and valuation of output; what happens to nurses after general training: do they require further qualifications or leave the N.H.S. (going where)? We shall seek to answer these questions through:

- 1 Analysis of the available statistical data - e.g. on earnings over a nurse's working life.
- 2 Interviews and discussions with staff in the health service. The interview part of the study will seek insights into the complex issue of benefits. Efforts will also be made to obtain data on the typical career patterns of nurses: where they were trained, where they first worked and their subsequent work experience in both the public and private sectors. Information on career patterns will be obtained through a questionnaire which we plan to distribute in May-June, 1985.

The study uses a human capital approach in which training is regarded as an investment in human beings (human investment). Like all investments, training involves present costs and the sacrifice of present consumption

in return for an expected higher income in the future (Becker 1964). Three sets of economic agents are involved in training, namely, individuals, firms or employees and the state: each will invest in training so long as it is expected to be worthwhile.

For individuals as trainees, learners or students, training costs take the form of expenditures incurred in skill acquisition (e.g. tuition fees, purchase of books and equipment) plus any foregone earnings - i.e. the difference between the trainee wage and earnings in the next-best alternative occupation. Individuals will expect to benefit from training through a higher monetary income or non-monetary gains (e.g. pleasant safe and agreeable job conditions) over their lifetime. The costs and benefits of nurse training for individuals are not reported in this paper and are the subject of a separate part of the research study.

Firms and employers rather than individuals might bear the costs of training. Such costs include the employment of training staff, buildings, equipment, any lost output due to training and the possibility that learners might receive a wage which exceeds their current productivity. The state might also bear some or all of the costs of training through the free or subsidized provision of education and training (e.g. universities, state skill-centres). Firms will expect to benefit from their training investments through greater profits and the community gains from any net social benefits such as greater output and "education for citizenship". Training costs borne by employers and the state in the form of the N.H.S and the D.H.S.S. are the focus of this Discussion Paper. For simplicity, the costs of nurse training borne by employers and the state are called Exchequer costs.

What is likely to determine the distribution of training costs between individuals, employers and the state? Here, the distinguishing feature of human capital is relevant. The human capital resulting from training remains with the individual regardless of the source of funding. In other words, the individual "owns" the training. This explains the distribution of training costs between individuals and firms. A distinction needs to be made between two limiting cases, namely, general and specific training.

General training provides transferable skills which have value to a large number of firms in the economy (e.g. verbal and written skills). In contrast, specific skills have value to only one firm, namely the initial training enterprise (e.g. astronauts, British Rail engine drivers, Concorde pilots). The costs of general training will usually be borne by workers (or the state). Consider a firm which pays for general training. If the training firm fails to pay the market wage, it will lose its newly-skilled labour to rivals (who have not borne any training costs); but if it pays the competitive wage it will not obtain a return on its training investments. Either way, the firm which pays for general training will suffer a loss. In contrast, the costs of specific training will be borne by the firm. Such training has no value to rivals, so that the firm can obtain a return on its training investments by paying a wage less than the productivity of the newly-skilled labour. For our purposes, questions arise as to whether nurse training resembles the specific skill model. In which case, if employers and the state bear training costs and seek to obtain a return on their human investments, they are likely to pay a wage which is below the productivity of a skilled nurse. Our first task is to determine whether employers and the state bear any of the costs of nurse training; and, if so, to estimate the magnitude of such costs. Questions also arise as to the Exchequer costs of a three year training course (RGN) compared with the two year training required for an EN(G); and the output implications of the different training periods. The benefits of nurse training will be investigated in the final stage of this research project.

At the outset, it is necessary to identify the "inputs" into nurse training:-

- i) Individual learner inputs.
- ii) Other manpower inputs - e.g. teachers in schools and on-the-job; administrative and secretarial support.
- iii) Capital in the form of buildings and equipment.
- iv) Technology - e.g. improvements in knowledge and learning techniques.

Directors of Schools of Nursing and other Directors (e.g. ENB) have the task of combining these "inputs" to produce a trained or skilled "output" as reflected in the successful completion of the course and the award of a certificate of qualification.

III Estimating the Components of the Exchequer Costs of Nurse Training

The four components of Exchequer expenditure on nurse training are:-

- i) The expenditures of the English National Board (ENB), as recorded in its Annual Report and accounts. These outlays, sometimes called formal costs, are financed by the D.H.S.S.
- ii) District Health Authority (DHA) costs comprising the running and maintenance costs of the 182 schools of Nursing in England.
- iii) On-the-ward teaching costs due to the loss of the productive time of ward staff involved in the teaching of trainees.
- iv) Net salary costs reflecting the value of the trainee's output whilst training.

Estimates of Exchequer training costs will clearly depend upon the assumptions made to calculate the various expenditure items. At each stage in the estimating process, the relevant assumptions are carefully specified. Some of these assumptions are likely to be modified following the results of further research work on this project.

1 English National Board Expenditures

The English National Board contributes towards expenditures on the training of all groups of nurses in England- i.e. general, mental, mental abnormality and sick children. The largest items in this category are the salaries of teaching, administrative, clerical and support staff, together with outlays on teaching equipment. Total expenditure by the ENB for the financial year 1982-83 was some £57.4m (GNC, 1982-83). Since the total number of nurse learners in England for 1982-83 was around 72,500 (excluding those taking degree courses at Universities and Polytechnics, whose direct teaching costs are not borne by the ENB), this represents about £800 per trainee per annum (1982-83 prices). However, the figure of £57.4m relates to the expenditures on all nurse learners of all years, grades and specialisms, and not just those undertaking general training. Also, it is likely that training costs per Gen S exceed those per Gen P due to the former spending a higher proportion of their course "in-class". In 1975-76, the General Nursing Council estimated that 75% of its total expenditure

was devoted to all student nurses with the remaining 25% for pupil nurses (GNC 1975-76). Applying these proportions of expenditure to the total number of nurse learners in each group showed that annual expenditures per student nurse exceeded the corresponding costs per pupil nurse by some 17%. Translating such figures into 1982-83 expenditure and numbers results in estimated ENB costs in the region of £826 per Gen S and £707 per Gen P (1982-83 prices). For simplicity, it is assumed that these expenditures are spread evenly between all years of trainees, and apply equally to different specialisms. These assumptions of an even distribution of costs and of no difference between specialisms are likely to create some bias in the estimates presented in this paper. Hopefully, as the research project proceeds and additional data are obtained, more accurate assumptions will be incorporated into the study.

2 District Health Authority Costs

These are basically the DHA contributions towards the heating, lighting, telephone, secretarial, clerical and other administrative expenses of the English Schools of Nursing. One survey of a small number of Schools estimated these costs to be some £200 per qualifier (Bendall, 1982). There were some 23,400 qualifiers of all grades and specialisms in 1982-83, giving a total outlay of £4.68m. Also, there are the administrative costs charged to the DHA's by the ENB for keeping trainee records (an index fee) and for running the final examinations, estimated at £21.50 per qualifier giving a total outlay of £503,100 in 1982-83 (Bendall 1982). On this basis DHA costs total £5,183,100 or an average of £72 per trainee in 1982-83. Assuming that these costs are distributed between student and pupil nurses in the same proportion as ENB expenditures, then DHA outlays are estimated at some £75 per Gen S and £64 per Gen P (1982-83 prices). As above, it is assumed that the expenditures are spread evenly between all years and specialisms. Moreover, this figure under-estimates the true DHA costs since no allowance is made for the opportunity costs incurred in the use of existing School of Nursing premises and capital. Buildings and capital could be put to alternative uses or rented out. Furthermore, there is no assessment of rent abatements received by trainees resident in NHS hospital accommodation.

3 On-the-ward Teaching Costs

Manpower costs are incurred due to the "loss" of the productive time of ward staff involved in the teaching of trainees in a working situation (on-the-job-training). These costs reflect the education, management and assessment functions undertaken by ward staff and which are associated with having learners on the ward. They include the loss of productive time due to the pure teaching and education contribution of ward staff as well as any extra time incurred during the normal course of ward nurses' duties. These are often regarded as indirect teaching costs since the ward staff involved are not paid directly for teaching and their contribution is not financed by the ENB. Nevertheless, these costs are real and they represent inputs into nurse training.

In practice, the quantity and quality of teaching on wards may vary considerably with ward specialisms, staffing levels, occupancy rates and the previous experience, philosophy and motivation of senior staff on the ward. Another complication is that all grades of nurses on wards with learners probably make some teaching contribution, including third year trainees who typically assist first years (Reid 1983). Three uncertainties are involved:-

- i) The grades of skilled nurses involved in teaching.
- ii) The proportion of nurses in any grade who undertake teaching.
- iii) The average input or contribution of those who are involved in teaching.

Most studies concentrate on the teaching contribution of the ward sister or charge nurse (WS/CN) only. One justification for this might be that much of the WS/CN's total teaching contribution is likely to be outside the course of her 'normal' (non-teaching) duties - i.e. the time spent teaching would have been put to alternative uses in the absence of trainees. On the other hand, most of the teaching of Enrolled and Staff Nurses will probably take place during the course of duties which they would have undertaken irrespective of the presence of trainees. It has been suggested that it is reasonable to assume that two-thirds of WS/CN's spend, on average, 5% of their working day on education, teaching and related activities (Bosanquet and Clifton, 1974). These assumptions are

used to produce our 'low' estimate for on-the-ward teaching costs.

An alternative study found that both WS/CNs and Staff Nurses (SNs) were involved in teaching to the extent of 2% and 6% of their time, respectively (Reid, 1983a and 1983b). These results are used to generate our 'central' estimate for on-the-ward teaching costs. An 'upper' estimate is based on the view that some 90% of WS/CNs and SNs are involved in teaching, and that their average teaching contributions are 5% and 7.5% respectively, of their working time.

These assumptions need to be applied to estimates of the total gross salary bills of WS/CNs and SNs in England, including labour overheads (i.e. employers national insurance and superannuation contributions). Such figures are derived, in turn, from estimates of the average gross earnings of WS/CNs and SNs (plus 16% for labour overheads) multiplied by the number of such nurses in posts in English hospitals in 1982-83. The estimates exclude WS/CNs and SNs working outside hospitals - such as those in the community - since although many of these will have contact with trainees, it is unlikely that any of their teaching will occur outside the normal course of their duties. Trainees are regarded, in principle at least, as supernumerary whilst in non-hospital clinical areas.

Average gross earnings of WS/CNs and SNs, including 16% for overheads in 1982/83 were around £9,839 and £7,544, respectively (DHSS 1983). The numbers of WS/CNs and SNs (WTE) in posts in hospitals in England on 30th September 1982 were about 43,344 and 49,929, respectively. If non-hospital staff are included, these figures would be 57,021 and 81,277, respectively. Combining these data suggest that the gross salary bills of WS/CNs and SNs in hospital posts in England were of the order of £426.45m and £376.64m respectively in 1982-83. These assumptions and calculations of gross salary bills provide a central estimate of some £31m or about £430 per trainee for on-the-ward teaching costs in England during 1982-83. Table 1 shows the sensitivity of this estimate to alternative assumptions. The estimates range from under £200 to over £600 per trainee. It is assumed that informal costs are the same, on average, for student and pupil nurses.

Furthermore, the inclusion of non-hospital WS/CNs and SNs in post in September 1982 results in a central estimate of £48m or £662 per trainee, ranging from a low of £18.7m or £260 per trainee to a high of £63.63m or about £880 per trainee.

Table 1 Here

4 Net Salary Costs and the Value of a Trainee's Output

A distinction is made between gross and net salary costs. The former are defined as the gross salaries plus overheads of trainees which are borne by DHAs. The net figures consist of gross salary costs minus the manpower replacement costs which DHAs would have to meet in the absence of trainees. In other words, the replacement costs reflect the value of a trainee's contribution to output during the training process.

There is some debate as to whether gross salary outlays are 'true' costs. It has been argued that salaries represent maintenance allowances - i.e. they are 'transfer payments' in economists' jargon - and, ipso facto, do not represent true resource costs (Bosanquet & Clifton 1974). Such an interpretation, however, implies 'student status' for trainees, which they are clearly not ascribed in practice (not yet, at least). Trainees' salaries fall directly upon the budgets of DHAs alongside the salaries of the qualified nurses and Nursing Auxiliaries (NAs) in their employment. Furthermore, the productive contribution of trainees is taken into account when planning nursing establishments.

To estimate gross salary costs, the overall basic salaries of first, second and third year trainees for the year 1982/83 (i.e. £3531, £3680 and £3856 respectively)¹ were augmented by the 'average' London Weighting Allowance (LWA) received by Gen Ss and Gen Ps in England in 1982-83 (an estimated £194 per Gen S, and £122 per Gen P)² and by 16% for overheads. Gross salary costs thus calculated are: £4321, £4494 and £4698 for first, second and third year Gen Ss, respectively; and £4237 and £4410 for first and second year Gen Ps, respectively.

'Replacement' costs require an estimate of the value of the output or productive contribution of trainees. One solution is to assume that trainees are 'worth' exactly the salaries they receive - i.e. that salaries reflect the value of an individual's output (Bendell, 1982). An alternative and more satisfactory method of estimating trainees' productive contribution is to determine the gross salary costs of the qualified nurses and/or auxiliaries which nurse managers believe they would require to 'replace' trainees. In other words, in the absence of trainees how much would have to be spent on manpower to undertake the tasks currently performed by trainees as part of their apprenticeship?

Estimates of annual replacement costs require assumptions about the appropriate grades and points on the salary scales of replacement staff. These calculations then have to be adjusted for the estimated proportions of their training periods during which Gen Ss and Gen Ps are actually productive.

In calculating 'central' estimates for replacement costs, the following rules-of-thumb are used for replacement staff:-

$$\begin{aligned}1st \text{ Year Gen S and Gen P} &= NA \\2nd \text{ Year Gen S and Gen P} &= 0.5NA + 0.5EN(G) \\3rd \text{ Year Gen S} &= EN(G)\end{aligned}$$

Two sets of alternative schemes are used to assess the sensitivity of the central estimates to different assumptions about replacement:-

Years	Scheme I	Scheme II
First Year	NA	$0.5NA + 0.5EN(G)$
Second Year	$0.5NA + 0.5EN(G)$	$EN(G)$
Third Year	$0.5EN(G) + 0.5SN$	SN

Table 2 shows the overall bottom, mid and top points on the salary scales of replacement staff in 1982/83. These salaries are augmented by the 'average' LWA received by Gen Ss and Gen Ps in England in 1982/83, and for overheads.

To derive the annual replacement cost estimates shown in Table 3, the gross annual salary costs of replacement staff are multiplied by 'norms' representing the proportions of their two or three year training periods that Gen Ps and Gen Ss are productive members of nursing establishments. On the basis of data relating to training programmes at various Schools of Nursing in England, these 'norms' are reckoned to be 2/3 for Gen Ss and 0.8 for Gen Ps with the remaining 1/3 or 0.2, respectively, being spent either on study leave (in-school or off-the-job), or else (officially, at least) as supernumerary to the established nursing staff. Trainees are generally supernumerary whilst in theatres, in the community, on psychiatric wards, and on maternity wards. Now it may be argued that trainees are never 100% supernumerary in the sense of performing no duties (however trivial); but this is assumed to be counterbalanced by the fact that, whilst non-supernumerary, trainees are never 100% productive on wards since part of their working day is spent being taught. The sensitivity of the central estimates to increasing or reducing these 'norms' by \pm 5% of the training period is tested below (Section IV). For simplicity, it is assumed that these 'norms' apply to each year of training. Throughout these calculations annual leave and sick leave are excluded since replacement staff would also qualify for such entitlements.

Table 3 Here

The central point estimates for replacement costs use the 'rule-of-thumb' and 'norms' outlined above and take the mid-points on the salary scales of replacement staff. These are subtracted from the gross salary costs of trainees to generate central point estimates for net annual salary costs, as shown in Table 4. Predictably, as trainees become more experienced during their apprenticeship, net salary costs in total and as a percentage of gross salary decline substantially.

Table 4 Here

The norms used above need to be subjected to sensitivity analysis. They are simple approximations and do not show the effects on nurse training costs of possible variations in ENB policy towards the statutory levels of clinical experience required of learners. The effects of changing the productive norms by $\pm 5\%$ are shown in Table 3. For example, the Table shows the impact of raising or lowering the norm for Gen Ps from 80% to 85% or 75%. Comparison of the figures in Table 3 with the net salary cost estimates in Table 4 shows that a $\pm 5\%$ change in the norms affects the net salary costs of first, second and third year Gen S's by $\pm 19\%$, $\pm 25\%$, and $\pm 33\%$, respectively. The effects on the net salary costs of EN(G) training are even more dramatic: $\pm 40\%$ and $\pm 80\%$ for first and second year Gen Ps, respectively. In other words, an increase in productive time to 85% for Gen Ps will reduce second year net salary costs from £320 to £64 which is approaching a break-even position for the year. Alternatively, a reduction in productive time for the same group will increase net salary costs from £320 to £576 (1982-83 prices)!

There is a further view which has to be recognised. This suggests that the "two-thirds" norm for Gen Ss is accurate for the first and third years, but overstates the productive contribution of second year learners. Some experts regard a one-third norm as more appropriate for second year Gen Ss. On this basis, replacement costs for second year Gen Ss would be halved (to £1732) and their net salary costs would rise from £1030 to £2762. The implications of this alternative assumption for the final estimates of training costs are considered as part of the sensitivity exercise reported in Section IV.

IV Central Estimates of the Exchequer Costs of Nurse Training

The estimated annual costs per year and grade of trainee under the four cost headings can now be assimilated to produce overall annual costs for 1982-83. The results are shown in Table 5.

Table 5 Here

The total costs of nurse training cannot, however, be derived by simply aggregating the appropriate figures in Table 5. Three sets of adjustments are required:-

i) It is necessary to discount future costs to express them in terms of "present values". The figures in Table 5 for the costs of second and third year trainees are estimates of the costs actually incurred through the training of these learners in 1982/83; but we are interested in the costs of training 1982/83 entrants where some of the costs will fall in future years. The figures in Table 5 are used as estimates of the costs, which will be incurred during the second and third years of training (i.e. in 1983-84 and 1984-85). Table 6 shows the results of applying a 5% discount rate (this being the Treasury Discount Rate in 1982-83) to the central estimates of expenditures incurred in future years.

ii) Wastage has to be incorporated. Those individuals who enter nurse training but do not successfully complete their courses will have brought costs to bear upon the State up until the point that they leave, and these costs must be allocated to those learners who become qualified nurses. Ideally, data on wastage needs to be by cohorts of entrants broken down by grade, specialism, and year of study. Unfortunately, since 1980 ENB data merely show aggregate numbers entering and wasting in any particular year. However, taking total wastage between 1978 and 1983 as a percentage of total intake over these years produces 'crude' wastage rates of around 20% for both Gen Ss and Gen Ps. To incorporate wastage in a

satisfactory manner, further assumptions are required concerning the distribution of wastage throughout the training period. In the case of student nurses, recent cohort data indicated that of those who quit, about 25% left during their first year, 50% during their second year and 25% during their third year. Using this evidence, and in an attempt to incorporate wastage into the calculations in a simplified form, it was assumed that for a RGN, 20% of entrants leave mid-way through their course - i.e. mid-way through their second year. Similarly for pupil nurses, evidence suggests that wastage is also highest during their second year. In addition one study found that most first year leavers were concentrated into the initial six months (Lewis 1980). Therefore, it was assumed that 20% of entrants for ENG training leave mid-way through their course - i.e. at the end of the first year. For both students and pupils, alternative assumptions of 10% and 30% wastage were included in the sensitivity analysis.

iii) The cost estimates have to be adjusted for examination failures. In addition to training costs being raised by wastage, they are further increased because a significant proportion of Gen Ss and Gen Ps finish their courses but do not successfully pass the final examinations and assessments. Data on this issue are even less ideal than those relating to wastage, so again sensitivity analysis is important. It is generally thought that examination failure rates have declined in recent years in line with wastage rates; but that they are considerably higher for students than for pupil nurses. Using evidence cited by the Institute of Manpower Studies, the central estimates of training costs assume that 15% of entrants to RGN training and 5% of entrants to EN(G) training complete their course but fail the final examination/assessment (IMS 1984). Sensitivity analysis investigates the cost implications of varying these rates by $\pm 5\%$. It has to be noted that there is some ambiguity with the IMS evidence since it is not clear whether the rates refer to trainees' first attempts or allows for successful re-takes. Any omission of successful re-takes means that the central estimates probably over-estimate the true examination failure rate.

The introduction of a 5% discount rate, a 20% wastage rate and examination-assessment failure rates of 15% of entrants for Gen Ss and 5% for Gen Ps means that the figures in Table 5 can be used to deduce central estimates for the component parts and total Exchequer costs of nurse training in 1982-83. Table 6 presents the results. Two conclusions emerge. First that the costs of training a RGN (£9469) are almost 2.5 times the costs of training an EN(G) (£3904). Second, the most significant element of RGN training costs is the 'net' salary item, while for EN(G) training, ENB outlays are the largest component of total costs.

Table 6 Here

The results of the sensitivity analysis are summarised in Table 7. This table exhibits the absolute and percentage effects, ceteris paribus, upon the central cost estimates of varying specific assumptions. Clearly, central estimates for the costs of both RGN and EN(G) training are most sensitive to assumptions relating to the estimation of replacement costs. For instance, varying the proportions of their training periods which Gen Ss and Gen Ps are productive members of nursing establishments by $\pm 5\%$ alters the central cost estimates of RGN and EN(G) training (ceteris paribus) by $\pm 10.8\%$ and $\pm 14.5\%$ respectively. The choice of the most appropriate points on the salary scales of replacement staff is also significant and may vary the central cost estimates for RGN and EN(G) training by over 15% and 26%, respectively. Furthermore, the central estimates appear to be quite sensitive to changes in both wastage and examination/assessment failure rates. In the case of RGN training costs, for example, increasing the wastage rate by 10% would raise central estimates by 12.2% (£1152), while increasing the examination/assessment failure rate by 5% would raise central estimates by 8.3% (£789). Besides indicating useful areas for empirical research Table 7 also suggests that possible policy changes re 'student status' and the structure of nurse training programmes may have significant effects upon the costs of nurse training.

Table 7 Here

The figures shown in Tables 5 and 6 can provide an indication of the annual aggregate recurrent net costs of RGN and EN(G) training which will be incurred given any particular target number of newly-qualified RGNs and EN(G)s per annum. In 1982-83, it is estimated that there were some 40,700 Gen Ss and 16,500 Gen Ps in training in England. The figures shown in Tables 5 and 6 including assumptions about wastage, suggest that in 1982-83, the annual aggregate gross Exchequer costs of training for RGNs was £237m and EN(G)s was £93m: a total gross outlay by the state of £330m on general nurse training. Allowing for the productive contribution of learners, estimated at £140m for Gen Ss and £63.6m for Gen Ps results in annual aggregate net Exchequer training costs of some £97m for RGNs and £29.4m for EN(G)s in 1982-83.

V Exchequer Costs of Nurse Training over the Past 20 Years

The methodology described in sections III and IV was applied to data from 1975/76 and 1963/64 to glean some insight into the changing nature and magnitude of the Exchequer costs of nurse training over the past 20 years. The same assumptions used to generate central estimates for 1982/83 are employed again, excepting that the estimates for 1975/76 and 1963/64 assume a 25% wastage rate (as defined in the previous section) rather than 20%: the data suggests a declining wastage rate throughout the 1970s. ENB or formal costs were derived from GNC Annual Reports. DHA costs were assumed to have risen in proportion to formal costs between 1963/64, 1975/76 and 1982/83. On-the-ward teaching costs are estimated on the basis of data on the salary scales of WS/CNs and SNs and assuming the 'excess' of gross salary cost (including overheads) over basic salary was the same in 1963/64 and 1975/76 as in 1982/83. The same assumption is applied to the estimation of net salary costs for these years.

Table 8 summarizes the central estimates of the component costs, and total costs, of RGN and EN(G) training in 1975/76 (in 1975/76 prices). Comparison with Table 6 suggests that the distribution of total costs between components was similar in both years, the exceptions being the percentages of ENB and net salary costs for RGN's. Regarding totals, in nominal terms the costs of training a RGN and an EN(G) rose by 152% (from £3752 to £9469) and 187% (from £1361 to £3904), respectively. In real terms (inflating 1975/76 costs by the general retail price index for 1982, i.e. 237.7, with 1975 = 100), training costs increased by 6.2% and 20.7% respectively.³

Table 8 Here

Central estimates of the component costs, and total costs, of RGN and EN(G) training in 1963/64 are shown in Table 9. In 1963/64 prices, the costs of RGN and EN(G) training are £430 and £107, respectively, which (again, using the retail price index which was 40.1 for 1963: 1975 = 100), implies increases in real terms of 250% and 410%, respect-

ively, between 1963/64 and 1975/76; and of 271% and 516%, respectively between 1963/64 and 1982/83.

Table 9 Here

Table 10 illustrates the growth in the costs of nurse training over the past 20 years. The central estimates of this paper for RGN and EN(G) training costs in 1963/64, 1975/76 and 1982/83 are presented, along with the estimates of Bosanquet and Clifton for 1971/72, and of Bendall for 1982/83, in both current and constant 1982/83 prices.

Table 10 Here

The variations in the estimates shown in Table 10 reflect differences in assumptions. The study by Bosanquet and Clifton omitted net salary costs and assumed on-the-ward teaching costs at a level which was used to generate the low estimate of this study. On the other hand, the estimates of Bendall are below those generated here for RGN training and above ours for EN(G) training. This occurs despite the fact that Bendall's estimates of ENB costs (£2453 'per qualifier') and DHA costs (£221.5 'per qualifier') are similar to ours. However, she omits on-the-ward teaching costs and uses a different method of estimating what we refer to as 'replacement costs'. For simplification Bendall assumed the annual net salary cost of each year and grade of trainee to be one third of her estimate of the gross salary costs of a second year learner (estimated at £1552) implying net salary costs of £4656 and £3104 for RGN and EN(G) training, respectively. Our corresponding estimates are £4196 per RGN and £1088 per EN(G), the major differences arising with the latter group (see Table 6).

Comparison of Tables 6, 8 and 9 suggests that the main reason for the massive inflation in the costs of nurse training (especially EN(G) training) over the past 20 years was the explosion of net salary costs, particularly between 1963/64 and 1975/76. Table 9 shows these to have been negative for EN(G) training in 1963/64. This increase in net salary

costs was the consequence of the narrowing of pay differentials between trainees and qualified nurses, and the reversal and subsequent widening of differentials between trainees and NAs during this period: learners now start on higher basic salaries than NAs. Using the terminology employed in this paper, gross salary costs have risen markedly in relation to replacement costs.

Three general remarks are in order. Firstly, the above discussion confirms the impressions furnished by Table 7, namely, that estimates of the costs of nurse training are particularly sensitive to assumptions about the productive contribution of trainees. Secondly, it would appear that nurse training in England has moved away from an 'apprenticeship' type of system under which trainees were comparatively underpaid and almost certainly bore a greater proportion of the total costs of nurse training (i.e. private and state costs).

Finally, the apparent rise in the real costs of nurse training over the past 20 years says nothing about changes in the quality of training, or of the 'standard' and productivity of newly-qualified nurses, over this period.

VI Some Policy Implications of the Results

Our central estimates of the costs are no more than tentative at this stage: they will be refined in the light of further evidence. Two main conclusions emerge. First, that RGNs cost approximately two and a half times as much to train as EN(G)s. Second, that the costs of both RGN and EN(G) training have risen dramatically in real terms over the past 20 years. These conclusions have relevance for at least two areas of policy debate.

i) The phasing out of EN(G)s

Both the RCN (1980) and the UKCC (1982) feel that the dual system of entry into nursing should be discontinued and replaced by a single system leading to one basic recognised statutory qualification, namely registration.

The manpower implications of such a proposal are significant. One study estimated that if EN(G) training were discontinued in 1984, then by 1996 the number of working EN(G)s would have declined by approximately 36% (a loss of over 13,250 in General Nursing alone: Bendall 1983). The cost implications of such a reduction in EN(G)s would obviously depend upon how DHAs would 'replace' EN(G)s on the ward. It will almost certainly be necessary to increase the number of RGNs being trained to compensate for this decline in EN(G) numbers. Concentrating purely upon the costs of nurse training (i.e. ignoring any increase or decrease in the salary costs of qualified and unqualified staff following the resultant change in staff mix), and leaving aside the possibility of a new type of nurse being introduced - falling somewhere between EN(G)s and NAs in terms of their level of training - such costs will rise significantly. This reflects the belief of nurse managers that well over half the work currently performed by EN(G)s would have to be carried out by a RGN or third year student nurse in the absence of EN(G)s. It should be remembered that RGNs cost over twice as much to train as EN(G)s, whilst NAs are capable of performing only a small proportion of the EN(G)s work. This assumes that DHAs would be able to replace EN(G)s with RGNs. They may be unable to do so for two reasons. Firstly, RGN (but not NA) salary

scales are significantly above those for EN(G)s and DHAs may (continue to) face tight budget limits. Secondly, there may be a shortage of adequately qualified entrants to RGN training - Bendall (1983) reckons that about 17% of the current intake of student nurses do not have 5 or more 'O' levels (the new minimum entry requirement to be introduced in 1985); while DES projections indicate a fall of about 23% in the number of school leavers in England with such qualifications over the next 10 years (1984-85 to 1994-95).

A recent study estimated that the costs of RGN training would rise by around 26% if the UK follows almost all other developed nations and transfers nurse training away from DHA Schools of Nursing and into the higher education sector, though there would almost certainly be a concomitant increase in the quality of nurse training and nursing care (Goodwin and Bosanquet, 1985). If more RGNs will have to be trained as a result of the discontinuation of EN(G) training, such a transition would suggest that the implications of phasing out EN(G)s for the Exchequer costs of nurse training would be increased further.

ii) Pay differentials between grades and the distribution of training costs

The rise in the Exchequer costs of nurse training over the past 20 years was largely due to the increase of trainee salaries relative to those of qualified and unqualified staff. Indeed, one estimate showed that over the 1963-81 period as a whole, while the real pay of qualified nurses (on average) rose by just 3%, and that of NAs by just under 22%, the real pay of trainees increased by over 57% (Gray and Smail 1982). In terms of relative pay, there has been a slight overall decline in the position of qualified nurses within the national pay structure while the position of trainees has improved. Such evidence seems to imply that the NHS has met an increasing proportion of the 'total' costs of nurse training. Human capital theory suggests that the more 'employer-specific' the skills involved, the greater the proportion

of the total training cost which will be borne by the employer. On completion of training the employer can pay a gross wage below the value of the worker's contribution to output: so receiving a return on the training investment reflecting the non-competitive (perhaps monopsonistic) nature of the labour market for nursing skills. It follows that the NHS policy on pay differentials between grades of nurses over the past 20 years assumed (and continues to assume) that skilled nursing services have become (and are) increasingly NHS specific (leaving aside equity considerations). However, what data are available on nurses working outside the NHS indicate - albeit tentatively, since there are 'push' as well as 'pull' factors involved (due to the growth in nurse unemployment) - the opposite. For example, the DHSS (1982) estimated that around 31,000 qualified nurses (mainly RGNs) were employed as nurses outside the NHS in England in 1980. Over two thirds of these were in independent hospitals, nursing homes and occupational health services (i.e. amounting to over 13% of all qualified nurses working in England in that year) and this total was increasing, particularly in the independent sector in London.

Data on nurse vacancies and registered unemployment suggests that the 1960s and early 1970s was a period of shortage in the market for skilled nursing services. Certainly, the rise in the real pay of trainees, along with a slowing down in the rate of increase of demand for skilled nurses, plus broader socio-economic factors such as higher female participation rates, female and male unemployment rates, and the average age of marriage, contributed to eliminating this shortage (Hoskins, 1982a).

In the present era of fixed budgets, however, it may be advisable for the NHS to reverse the trend in pay differentials between grades of nurse seen over the past 20 years - i.e. reduce the share of training costs met by the state by say, lowering trainees' salaries, or perhaps switching to a system of student 'grants' for trainees and increasing the salaries (and/or numbers) of qualified nurses. In 1981/82, trainees' salaries amounted to £365.1m - some 14.54% of the total nursing and midwifery salary bill of £2,510.9m. In terms of private rates of return to nurse training, the increase in private costs of training should be

compensated to a greater or lesser extent by the increase in annual net returns once qualified; so there should be little, or no, reduction in the supply of suitable entrants as a result of such a policy change. The advantage of this proposed policy would be higher 'survival rates' of qualified nurses (i.e. the wastage rate of qualified nurses should fall: Hoskins, 1982b), and an increase in the supply of qualified re-entrants (an increasingly important policy target given the forthcoming drop in the number of adequately qualified 18 year olds); together with increases in level of experience of ward staff, the stability of nursing establishments, and the rate of return to the state of nurse training.

VII Conclusion: The Need for Further Research

This Paper has estimated the Exchequer costs of two and three year nurse training programmes.⁴ The magnitude of the sums involved and the additional costs of three year training raise questions about whether the various training programmes represent a worthwhile investment for the state. The next stage in the research project will address the complex issue of the benefits to the state as a result of investing in nurse training. Four related methods will be used to obtain insights into the possible magnitude of benefits:-

- i) Consideration of gross and net pay.
- ii) An examination of pay and conditions of nurses outside the NHS. For example, private hospitals which have not borne any training costs are more likely to pay a wage which reflects the full productivity of the skilled nurse (ceteris paribus).
- iii) An analysis of wastage rates following qualification - e.g. do RGNs stay in the NHS much longer than EN(G)s; how much longer and what are the implications for total NHS training costs over a given period?
- iv) An assessment of the cost on output implications of using different mixes of RGNs and EN(G)s on the wards of NHS hospitals. Consider two wards with identical or similar case mixes, etc, but with slightly different proportions of RGNs and EN(G)s. We need to ask ward sisters to assess the "output" implications of these different nursing inputs.

We fully recognise that the assessment of benefits is complex and that in the available time the most we can accomplish is to identify some major policy questions and explore alternative methods of measuring the benefits of nurse training. This will be the focus of the next stage of the research project.

Footnotes

- 1 The salary scales of all grades of nurses, including trainees, were amended some 21 weeks into the 1982/83 hospital year - 'new' scales becoming effective from 23rd August, 1982. Figures shown in the text are calculated on the basis of 'old' scales being effective for 21 weeks of the year, and 'new' scales for 31 weeks.
- 2 'New' LWAs come into effect on 1st July, 1982, some 3 months into the 1982/83 hospital year. 'Old' and 'new' LWAs are combined with recent data showing that around 26.7% of all Gen Ss, and 16.4% of all Gen Ps, training in England are eligible for the LWA to produce figures for the estimated total payment of LWA to Gen Ss and Gen Ps in England in 1982/83. Although 'resident' trainees in the London area are in receipt of a reduced LWA, we assume that they effectively receive the full LWA, the difference being a measure of the (extra) rent abatements they receive - rental values being greater in London, yet all resident nurses in England being subject to a national rental scale.
- 3 The difference between the rates of inflation of RGN and EN(G) training costs is due to the more rapid growth of the net salary costs of 3rd year trainees relative to 1st and 2nd years, resulting from a narrowing (in real terms) of differentials between the salaries of 1st, 2nd and 3rd year trainees, and the widening differential (in real terms) between the salaries of EN(G)s and NAs.
- 4 In comparison, basic flying training for an RAF pilot costs £78,000; cost per successful fast jet pilot up to the end of advanced flying training is £530,000; and costs per pilot up to the standard required for joining an operational squadron is some £1.7m (1980 prices: HCDC 1981).

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Table 1

On-the-ward Teaching Costs
(£p.a, 1982-83)

Costs	Low Estimate	Central Estimate	High Estimate
Total Costs	14,215,000	31,127,400	44,613,450
Costs per Trainee	196	429	615

Notes

- i) The low estimate assumes that two-thirds of WS/CNs are involved in teaching and devote 5% of their working time to teaching.
- ii) The central estimate assumes that the average teaching contributions of all WS/CNs and SNs are 2% and 6%, respectively, of their working time.
- iii) The high estimate assumes that 90% of WS/CNs and SNs are involved in teaching, and devote 5% and 7.5%, respectively, of their working time to teaching.

Table 2

Incremental Points on Salary Scales of Replacement Nurses

(£p.a., 1982-83)

Grade	Bottom	Mid	Top
Nursing Auxiliary (NA)	3374	3826	4312
Enrolled Nurse (EN)	4302	4745	5190
Staff Nurse (SN)	4777	5300	5824

Note

Assuming 'old' salary scales were applicable for the first 21 weeks of 1982/83 hospital year.

Table 3

Replacement Costs,* 1982/83 (£p.a.)

Percentage of training period Gen Ss and Gen Ps spend as productive members of a nursing establishment, and point on salary scale of replacement staff						
Year and Grade	Productive Contribution: Two-Thirds			<u>±5%</u>		
	Bottom	Mid	Top	Bottom	Mid	Top
<u>General S</u>						
1st Year	2759	3109	3485	207	233	261
2nd Year	3118	3464	3824	234	260	287
3rd Year	3477	3819	4163	261	286	312
<u>General P</u>						
Year and Grade	Productive Contribution: 80%			<u>±5%</u>		
	Bottom	Mid	Top	Bottom	Mid	Top
1st Year	3244	3664	4114	203	229	257
2nd Year	3675	4090	4522	230	256	283

* Based upon a replacement staff scheme of: NA, $0.5NA + 0.5EN(G)$ and $EN(G)$ for 1st, 2nd and 3rd Year trainees, respectively.

Table 4

Central Estimates of Gross Salary Costs,
Replacement Costs and Net Salary Costs

Year & Grade	Costs £p.a., 1982-83		
	Gross Salary Costs (a)	Replacement Costs (b)	Net Salary Costs (a) - (b)
<u>General S</u>			
1st Year	4321	3109	1212
2nd Year	4494	3464	1030
3rd Year	4698	3819	879
<u>General P</u>			
1st Year	4237	3664	573
2nd Year	4410	4090	320

Table 5

Central Estimates Of Component And Overall Costs For Each Year Of Training, 1982-83

Year and Grade	(a) ENB Costs Per Trainee £s	(b) DHA Costs Per Trainee £s	(c) On-the-ward Costs Per Trainee £s	(d) Net Salary Costs Per Trainee £s	(a)+(b)+(c)+(d) Overall Costs Per Trainee £s
1st Year Gen S	826	75	429	1212	2542
2nd Year Gen S	826	75	429	1030	2360
3rd Year Gen S	826	75	429	879	2209
1st Year Gen P	707	64	429	573	1773
2nd Year Gen P	707	64	429	320	1520

Table 6

Central Estimates Of The Component And Total Costs Of Training, 1982-83

Components of total costs	Cost Per RGN £	% Of Total %	Cost Per EN(G) £	% Of Total %
ENB Costs	3275	34.6	1659	42.5
DHA Costs	297	3.1	150	3.8
On-the-ward Teaching Costs	1701	18.0	1007	25.8
Net Salary Costs	4196	44.3	1088	27.9
Total	9469	100.0	3904	100.0

Note

Estimates shown assume a discount rate of 5%, a wastage rate equivalent to 20% of Gen S and Gen P entrants leaving midway through their courses, and examination/assessment failure rates of 15% and 5% of entrants for Gen Ss and Gen Ps respectively.

Table 7

Sensitivity Analysis

Alternative Assumptions		Effects On Central Estimates (ceteris paribus)			
		Cost per RN	Cost per EN(G)	£	% of Total
Teaching contribution of ward staff (a)	i) Assume 2/3 of WS/CNs devote 5% of their time to teaching & SNs make no teaching contribution ii) Assume 90% of WS/CNs devote 5% of their time to teaching and 90% of SNs devote 7.5% of their time to teaching	-924 +737	-9.8 +7.8	-547 +438	-14.0 +11.2
% of training period trainees are productive nurses (b)	i) Assume 'norms' for each year and grade are changed by +5% ii) Assume 'norm' for 2nd year Gen S is reduced to 1/3	+1018 +2278	+10.8 +24.1	+565 -	+14.5 -
Grades of replacement staff (c)	i) Assume $\frac{1}{2}EN(G)$, $EN(G)$ and SN for 1st, 2nd and 3rd year trainees respectively ii) Assume NA, $\frac{1}{2}NA+\frac{1}{2}EN(G)$, and $\frac{1}{2}EN(G)+\frac{1}{2}SN$ for 1st, 2nd & 3rd Yr Gen Ss, respectively	-956 -239	-10.1 -2.5	-770 -	-19.7 -
Points on salary scales of replacement staff (d)	i) Assume bottom points ii) Assume top points	+1373 -1434	+14.5 -15.1	+981 -1038	+25.1 -26.6
Wastage (e)	i) Assume (equivalent to) 30% of Gen Ss and Gen Ps leaving (on average) midway through their training period ii) Assume (equivalent to) 10% of Gen Ss and Gen Ps leaving (on average) midway through their training period	+1152 -847	+12.2 -8.9	+379 -289	+9.7 -7.4

Table 7 (continued)

Sensitivity Analysis

		Effects On Central Estimates (<i>ceteris paribus</i>)			
Alternative Assumptions		Cost per RGN		Cost per EN(G)	
		£	% of Total	£	% of Total
Annual rate of discount (f)	1) Assume 0% ii) Assume 10%	+428	+4.5	+81	+2.1
		-415	-4.4	-81	-2.1
% of entrants who fail final examination/assessment (g)	i) Assume 20% of Gen Ss and 10% Of Gen Ps ii) Assume 10% of Gen Ss and 0% of Gen Ps	+789	+8.3	+279	+7.1
		-676	-7.1	-244	-6.25

Notes

- (a) Central estimates assume 100% of WS/CNs devote 2% of their time to teaching and 100% of SNS devote 6% of their time to teaching.
- (b) Central estimates assume 2/3 for each year of Gen S Training and 0.8 for each year of Gen P training.
- (c) Central estimates assume grades of Replacement Staff are: NA, INA +EN(G), and EN(G) for 1st, 2nd and 3rd year trainees, respectively.
- (d) Central estimates assume mid-points of salary scales of Replacement Staff.
- (e) Central estimates assume wastage rates equivalent to 20% of Gen Ss and Gen Ps leaving midway through their training periods.
- (f) Central estimates assume an annual discount rate of 5%.
- (g) Central estimates assume 15% of entrants to Gen S training and 5% of entrants to Gen P training fail the final examination/assessment.

Table 8

Central Estimates Of The Component And Total Costs Of Training, 1975-76

Components of Total Costs	Cost Per RGN £	% Of Total %	Cost Per EN(G) £	% Of Total %
ENB Costs	1104	29.4	553	40.6
DHA Costs	100	2.7	49	3.6
On-the-ward Teaching Costs	669	17.8	391	28.7
Net Salary Costs	1880	50.1	368	27.0
Total	3752	100.0	1361	100.0

Note

Costs in 1975-76 prices

Table 9

Central Estimates Of The Component And Total Costs Of Training, 1963-64

Components Of Total Costs	Cost Per RGN £	% Of Total %	Cost Per EN(G) £
ENB Costs	196	45.6	98
DHA Costs	17	4.0	10
On-the-ward Teaching costs	188	43.7	110
Net Salary Costs	29	6.7	-111
Total	430	100.0	107

Note

Costs in 1963-64 prices

Table 10

The Growth Of The Exchequer Costs of Nurse Training 1963-83

Year	Cost Per RGN		Cost Per EN(G)
	Nominal (Current Prices)	Real (Constant 1982-83 Prices)	
1982/83 (a)	9469	9469	3904
1982/83 (b)	7330.5	7330.5	5778.5
1975/76 (a)	3752	8919	1361
1971/72 (c)	360	1440	256
1963/64 (a)	430	2549	107

- (a) Central estimates of this paper
- (b) Estimates of Bendall (1983)
- (c) Estimates of Bosanquet and Clifton (1974)

Appendix I

Nurses Whitley Council Pay Scales

(effective from 23 August 1982)

(in £s)

Pay Grade Title	Incremental Points						
	Min	1	2	3	4	5	6
Nursing Sister II	6321	6616	6914	7211	7509	7805	8103
Staff Nurse SRN	4998	5217	5436	5656	5875	6094	
Enrolled Nurses	4501	4656	4810	4965	5120	5275	5430
Nursing Auxiliary	3530	3687	3846	4003	4160	4317	4512
Student/Pupil	1st Yr	2nd Yr	3rd Yr				
Student Nurse	3695	3850	4035				
Pupil Nurse	3695	3850					

Appendix II Organisations Approached

The project has been discussed with representatives from the following:

Association of Nurse Administrators, London

DHSS, London

English National Board, London

Manpower Services Commission

Royal College of Nursing, London

Schools of Nursing in Leeds, Northallerton and Wakefield

United Kingdom Central Council, London

Yorkshire RHA, Harrogate

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